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Business Information Systems Unit 3 Business Management for Computer Science Students

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Logistics

- **Lecture**
 - Wednesdays, 10:15-12:00, HS 11
- **Exam**
 - **Jan 30, 10:00 - 12:00 (120 minutes)**
 - **Classroom: HS 11**
 - **Registration Deadline: Jan 7, 2008**
- **No classes on Nov 21 and December 5!** Instead, all future lectures will be 15 minutes longer, i.e. from 10:15 - 12:00.

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Focus of Business Management

General Focus:

- How to manage an enterprise based on rational decisions?

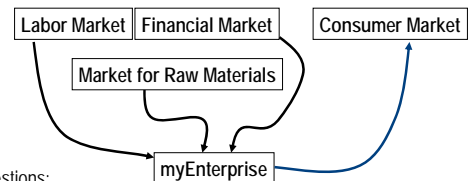
Core Problems:

- Sourcing and Use of Scarce Resources
- Efficient Production
- Market Development and Diffusion
- Investment and Financing Decisions
- Planning, Decision Making, and Controlling
- Use and Development of Human Resources

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A Very Much Simplified Model of An Enterprise



Core Questions:

Which products should be produced in which quantities?
(radios or toasters, corn flakes or bread?)


Which resources should be used in which ratios?

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Division of Labor and Productivity

• *The greatest improvement in the productive powers of labor ... seem to have been the effects of the division of labor. To take an example, therefore, the trade of the pin-maker: a workman not educated to this business, nor acquainted with the use of the machinery employed in it, could scarce, perhaps, with his utmost industry, make one pin in a day, and certainly could not make twenty. But in the way in which this business is now carried on, not only the whole work is a peculiar trade, but it is divided into a number of branches, of which the greater part are likewise peculiar trades. One man draws out the wire, another straightens it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head; to make the head requires two or three distinct operations: to put it on is a peculiar business, to whiten the pins is another: it is even a trade by itself to put them into the paper; and the important business of making a pin is, in this manner, divided into about eighteen distinct operations, which, in some factories, are all performed by distinct hands, though in others the same man will sometimes perform two or three of them.*



Adam Smith:
The Wealth of Nations, 1776

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Topics and Sub-Disciplines

- Accounting
- Decision Science
- Operations Management
- Finance
- Human Resources
- Marketing

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Accounting

- Financial Accounting
 - Target Audience: Investors, State (Taxation),...
 - Purpose: Determine and monitor financial success of the enterprise
- Cost Accounting
 - Target Audience: Decision-makers inside the enterprise
 - Purpose: Determine and monitor efficient use of resources (e.g. labor costs for a project vs. earnings from this project)

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Accounting: Balance Sheet

- Purpose: Snapshot of the financial state of an enterprise
- Compares all assets vs. all liabilities
- Allows to quickly grasp the „health“ of an enterprise in financial terms
- Assets and liabilities are divided into short- and long-term obligations (checking, money market, ...)

Assets	Liabilities
(All Assets)	(All Liabilities)

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Accounting: Balance Sheet

Assets	Liabilities
Current assets <ul style="list-style-type: none"> • Cash • Accounts receivables Fixed assets <ul style="list-style-type: none"> • Land • Buildings • Office equipment • Machinery • Vehicles 	Accounts payable Accrued payroll and withholding Long-term liabilities Owners equity
Total Assets	Total Liabilities

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Accounting: Profit and Loss Account

Expenses	Revenues
Goods Purchase, Freights,... Wages Interest paid Depreciation Net Income / Loss	Sales Other income
Total Expenses	Total Revenues

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Accounting: Depreciation

- Lasting assets lose value over time.
- This must be properly reflected in accounting.
- Example: Purchase of a machine in 2007 – the money is spent, but the machine exists as a substitute asset.
- Goal: Estimate the loss of value over the lifespan of a lasting asset.

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Accounting: Depreciation: Standard Methods

- Linear
 - Depreciation per year: (purchasing price – remaining value at end of usage) / duration of usage
- By output / usage
 - e.g. per kilometer driven, tons anodized,...
- By a fixed percentage of the remaining value
 - e.g. 30 % of the purchasing price for the first year, 30 % of (purchasing price – 30 %) for the second year, ...

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Decision Making: Certainty vs. Uncertainty

Decision Making under certainty is simple, because we can compute the financial result in advance:

Example:

- Option 1: We produce 10 units of Corn Flakes, which causes costs of 1 EUR per unit, and will sell all of them or 3 EUR per package
- Option 2: We produce 20 units of Corn Flakes, which reduces the costs to 0,5 EUR per unit and will be able to sell 18 of them at 2 EUR per package

However, in most cases we do not know the actual outcome.
Standard technique: Working with estimated probabilities

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Decision Tree

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Decision Tree: Comparison of 2 Options

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Finance

- Investment Decisions
- Comparing alternative ways of raising capital (e.g. a loan from a bank vs. issuing stocks)
- Take into account that financial resources cost/earn interest.

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Finance: Standard Methods

- Net Present Value

$$NPV = \sum_{t=1}^T \frac{C_t}{(1+r)^t} - C_0$$

- C(0) – Cash flow at the beginning, C(t) Cash flow at the end of period t, r = Interest rate
- [Example](#)

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Total Cost of Ownership (TCO)

Purchase Price
+ Installation, Training
+ Supplies
+ Maintenance
TCO

determined by the chosen brand
determined by usage and brand

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TCO: Cost of Supplies and Maintenance

- In order to determine the cost of all supplies and maintenance, one must make assumptions about the product usage, e.g.
 - how many pages will be printed per week
 - how many hours will the machine run per day (-> power consumption)

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TCO: Examples of Printer Supplies

Paper: 10 \$ per 500 sheets
 Toner: 50 \$ for a unit that will last for 2,000 pages
 Drum unit: 200 \$, needs to be replaced after 10,000 pages

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Approach 1: Divide Price for Each Part by Amount of Pages

Paper: 10 \$/500 sheets → \$ 0.02/page
 Toner: 50 \$/2,000 pages → \$ 0.025/page
 Drum unit: 200 \$/10,000 → \$ 0.02/page

\$ 0.065/page

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Problem:

Paper: 10 \$/500 sheets → \$ 0.02/page
 Toner: 50 \$/2,000 pages → \$ 0.025/page
 Drum unit: 200 \$/10,000 → \$ 0.02/page

When one prints 12,000 pages over the whole life span of the printer, you have to pay for **2** drum units, **not 1.2!**

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Approach 2

- To solve this problem, you can determine the actual number of supply units needed to print the total number of pages.
- Example for 12,000 pages:
 - 24 boxes of paper, 6 toner kits, 2 drum kits

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Example

- Assumptions:
 - Printer costs \$ 300 including installation, but without first drum kit and toner
 - Costs of supplies as on the previous slides
 - Printer will be used for 3 years
- Usage:
 - 20 pages per day → 100 pages per week (Mo – Fr) → 5,000 per year (50 weeks) → 15,000 within 3 years

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Example

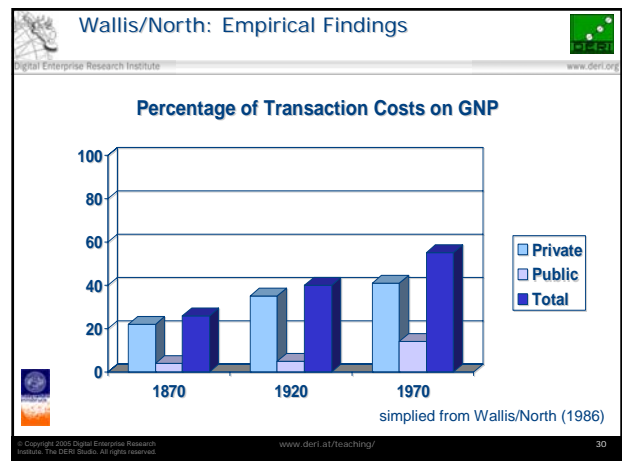
Approach 1		Approach 2	
Purchase Price	\$ 300	Purchase Price	\$ 300
Supplies $15,000 * 0.065$	\$ 975	30 Boxes of Paper $30 * \$ 10$	\$ 300
TCO	\$ 1275	8 Toner Kits $8 * \$ 50$	\$ 400
		2 Drum Kits	\$ 400
		TCO	\$ 1400

- ### Human Resources
- Core topics:
 - Managing Human Resources
 - Recruiting
 - Career Management
 - Contracts, Salaries, Monitoring
 - Legal constraints of human labor as a factor of production
 - Incentives and Agency Conflicts
 - Only part of an agent's behavior is observable
 - Agents are assumed to be guided by own interests
 - Example: Fix salary vs. commissions
 - Efficient contracts make sure that the incentives of employer and employee match

- ### Marketing
- In the early industrial age, enterprises produced what they could technically produce.
 - Marketing was a revolutionary approach of putting market demand and preference structures in the center of interest.
 - *"Marketing is the process of planning and executing the pricing, promotion, and distribution of goods, ideas, and services to create exchanges that satisfy individual and organizational goals."* American Marketing Association.
- Core Topics:
- Product Design based on consumer preferences
 - Pricing (price elasticity)
 - Market Segmentation (e.g. professional vs. consumer products)
 - Promotion / Advertisement

- ### Operations Management
- Inventory Level, Procurement
 - Replenishment (e.g. KANBAN)
 - Production planning (sequence, scheduling,...)
 - Quality control

- ### Coordination of Economic Activity
- Coase (1937), Williamson (1975), Picot (1982)
 - Transaction costs: „production costs of coordination“
 - using the market
 - internal
 - Resources spent on
 - initiation
 - negotiation
 - completion
 - control
 - supervision



Trade-off: Specialization Gains vs. Cost of Coordination

- Further increase in specialization is limited by level of transaction costs (cost of coordination)
- Thus, technology and methodologies for reducing transaction costs are of utmost importance for future economic development.

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Impact of ICT on Market Structures and Organizations

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Project Management

- Project schedule
- Project milestone
- Project deadline
- Critical path

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Use of Project Management Tools

Project Planning Documentation

System	Identification	Priority	Start	End	Phase	Owner
1. System Analysis	1.1. Requirements Gathering	High	10/01/05	10/15/05	Analysis	J. Doe
1. System Analysis	1.2. System Design	Medium	10/15/05	10/30/05	Design	J. Doe
2. System Development	2.1. Coding	High	10/30/05	11/15/05	Development	A. Smith
2. System Development	2.2. Testing	Medium	11/15/05	11/30/05	Testing	A. Smith
3. System Deployment	3.1. Deployment	High	11/30/05	12/15/05	Deployment	M. Brown
3. System Deployment	3.2. Support	Low	12/15/05	01/15/06	Support	M. Brown

FIGURE 19-11
Sample Gantt Chart
A Gantt chart shows progress through systems development activities by putting a bar through appropriate cells.

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Critical Path Method (CPM)

```

graph LR
    Start([Start Dishwasher]) --> Dishwasher[Dishwasher runs]
    Start --> Shower[Have Shower]
    Dishwasher --> Drive[Drive to Work]
    Shower --> Coffee[Make Coffee]
    Drive --> End(( ))
    Coffee --> End
  
```

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Thank you!

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