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## Business Information Systems Unit 3 Business Management for Computer Science Students

Prof. Dr. Martin Hepp

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## Logistics



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- **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



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### 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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3

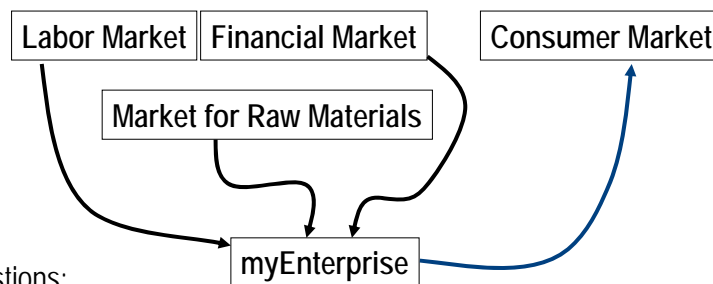


## A Very Much Simplified Model of An Enterprise



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### 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



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- *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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5



## Topics and Sub-Disciplines



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




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6




# Accounting




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- 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



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

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Accounting: Profit and Loss Account	
<b>Expenses</b>	<b>Revenues</b>
Goods Purchase, Freights,... Wages Interest paid Depreciation <b>Net Income / Loss</b>	Sales Other income
<b>Total Expenses</b>	<b>Total Revenues</b>

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## Accounting: Depreciation



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- 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



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- Linear
  - Depreciation per year:  $(\text{purchasing price} - \text{remaining value at end of usage}) / \text{duration of usage}$
- 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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12



## Decision Making: Certainty vs. Uncertainty



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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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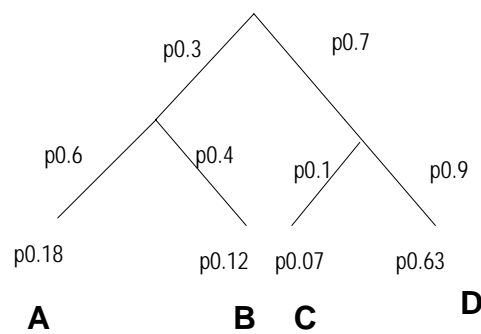


## Decision Tree



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**Decision Tree: Comparison of 2 Options**

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**Option 1**

**Option 2**

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**Finance**

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- 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



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- 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



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- 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



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- 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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24




## Example

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




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## Human Resources

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- 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



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# Marketing



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- 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

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# Operations Management



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



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## Coordination of Economic Activity



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



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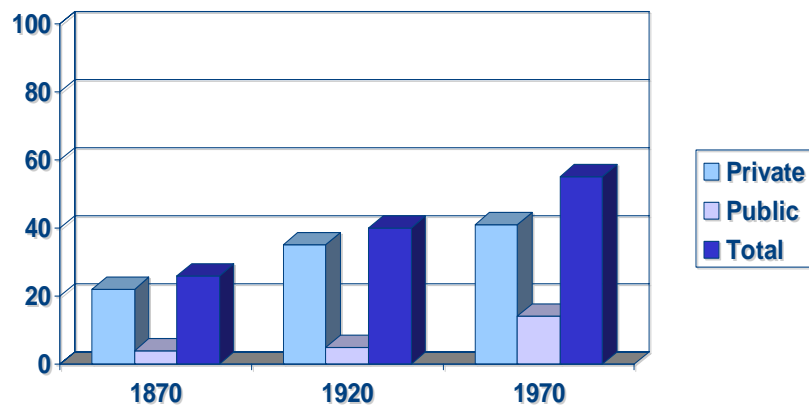
## Wallis/North: Empirical Findings



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### Percentage of Transaction Costs on GNP



simplified from Wallis/North (1986)



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## Trade-off: Specialization Gains vs. Cost of Coordination



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- 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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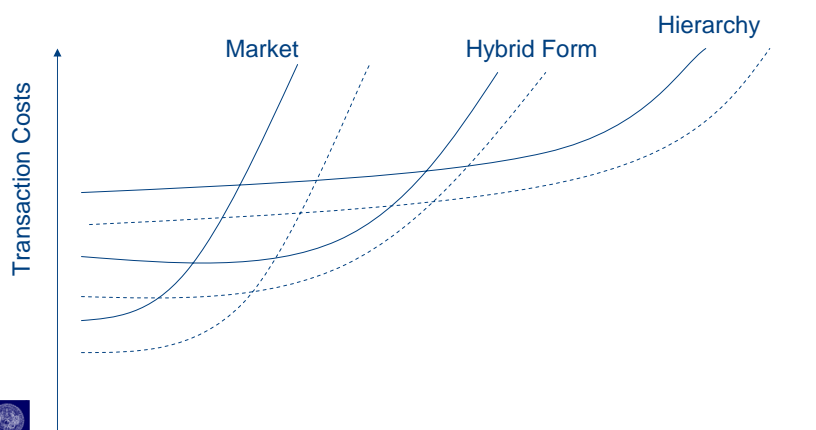


## Impact of ICT on Market Structures and Organizations



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## Project Management



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




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## Use of Project Management Tools



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Project Planning Documentation												Page			
System Warehouse Inventory System (Modification)											1 of 1				
Date 12/10											Signature				
System	Analyst														
Completed activity	Cecil Truman														
Activity*	Individual assigned	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Week															
R-Requirements definition															
R.1 Form project team	Vp, Cecil, Bev														
R.2 Define obj. and constraints	Cecil														
R.3 Interview warehouse staff															
for requirements report	Bev														
R.4 Organize requirements	Team														
R.5 VP review	VP, Team														
D- Design															
D.1 Revise program specs.	Bev														
D.2.1 Specify screens	Bev														
D.2.2 Specify reports	Bev														
D.2.3 Specify doc. changes	Cecil														
D.4 Management review	Team														
I- Implementation															
I.1 Code program changes	Bev														
I.2.1 Build test file	Team														
I.2.2 Build production file	Bev														
I.3 Revise production file	Cecil														
I.4.1 Test short file	Bev														
I.4.2 Test production file	Cecil														
I.5 Management review	Team														
I.6 Install warehouse**															
I.6.1 Train new procedures	Bev														
I.6.2 Install	Bev														
I.6.3 Management review	Team														

\*Weekly team reviews not shown here  
\*\*Report for warehouse 2 through 5.



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**FIGURE 12.11**

**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; StartDishwasher[Start Dishwasher] --> DishwasherRuns[Dishwasher runs]; StartDishwasher --> HaveShower[Have Shower]; DishwasherRuns --> DriveToWork[Drive to Work]; HaveShower --> MakeCoffee[Make Coffee]; MakeCoffee --> DriveToWork;
```

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**Thank you!**

The slides will be available on the internet at  
<http://www.heppnetz.de/teaching/bis/>

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