

SOFTWARE ON PURPOSE

- Software development estimated Money in US is more than
 - \$275 billion annually
- Canceled project
 - \$63 billion
- The money wasted annually + not showing any return is about
 - \$149 billion
- Be aware that this cost data is for the United States only



WHY THIS



REASONS OF SOFTWARE PROJECT FAILURE

- The customer's requirements and specifications were
 - incomplete, vague, or ambiguous.
- Those requirements kept changing
 - throughout the project.
- Bad design decisions were made.
- The staff didn't have enough expertise in
 - new technologies used on the project.



REASONS OF SOFTWARE PROJECT FAILURE

- The projects weren't given
 - enough resources to be successful.
- The projects weren't sufficiently
 - planned and managed.
- The project's externally imposed
 - deadlines were unrealistic to begin with



FEW BAD BUSINESS DECISION



BAD BUSINESS DECISIONS BEING MADE BY

- consciously or unconsciously someone decided to
 - Not provide complete, precise requirements
 - Allow the requirements to change throughout the project.
 - Use an inappropriate design.
 - Not properly address—or even consider—the risks and uncertainties of new technologies impose on software projects



BAD BUSINESS DECISIONS BEING MADE BY

- Not provide enough resources for the project to be successful
- Not sufficiently plan or manage the project
- Impose unrealistic deadlines on the project



WHY BUSINESS



WHY ARE COMPANIES IN BUSINESS/

- Let's start by asking from our self what might be the single, most fundamental question to a business????
- Why are we in business in the first place???
- it's fun??
- it's educational.?
- or because it's a way to have a positive impact on society??
- .



WHERE DOES THE MONEY COME FROM?

For-profit companies bring in money by

- selling products
- services,
- by making investments in other companies
 - computer hardware manufacturer brings in money by selling and leasing its products as well as by offering repair services and service contracts.
 - software company sells a computer-aided design (CAD) package brings in money or may bring in money by performing custom modifications

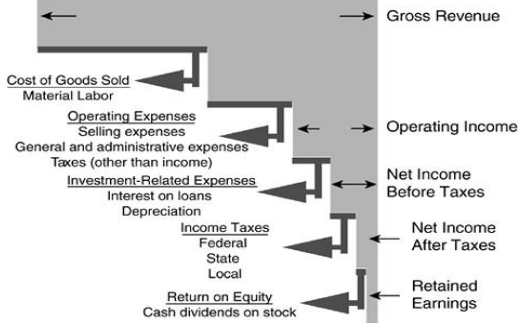


WHERE DOES THE MONEY GO?

1. Cost of Goods Sold
2. Operating Expenses
3. Investment-Related Expenses
4. RETURN ON EQUITY



WHERE DOES THE MONEY GO?



COST OF GOODS SOLD

- The first, and usually the largest, drain on gross revenue is the cost of **producing the goods and services that were sold**.
 - In an automobile manufacturing company, this would be all of the expenses required to make cars.
 - In a software company, this would be all of the expenses to package, deliver, and support the software products and services.

COST OF GOODS SOLD

- The components of the cost of goods sold are as follows:
 - **Materials**—The cost of the raw material.
 - In a pure software company, the material costs will probably be a very small percentage of the overall expenses but will still probably not be zero. Costs to buy the distribution media (blank disks, blank CDs), print the manuals, etc. would all be considered material costs. Even a software company that distributes software products over the Internet (Web) pays to connect to the Internet.
 - **Labor**:The money that pays the salaries and wages of the people who create and deliver the products and services.
 - Typically this also includes benefits such as vacation, insurance, retirement, and company-sponsored continuing education together with incentives such as employee profit sharing, bonuses, and stock options.
- The cost of goods sold is described in much more detail in [Chapter 15](#).

OPERATING EXPENSES

- Operating expenses are all **the additional costs necessary to run the company beyond just producing the products and services**.
 - **Selling expenses**:All of the expenses related to selling the products and services.
 - These include salaries and wages of the sales and marketing staff, advertising costs, free samples, showrooms, and so on.
 - **General and administrative expenses**:
 - Expenses such as equipment rental and lease, facilities rent and lease, maintenance costs, insurance, salaries and wages of administrative and management staff.

OPERATING EXPENSES

- **Research and development expenses**— Expenses related to creating new products and services or finding more efficient ways of producing existing products and services.
 - Software development and maintenance costs in a typical for-profit organization are classified either as research and development or general and administrative expenses.
- **Taxes (other than income)**— This is all of the taxes that the corporation pays, except income taxes (which are addressed later).
 - Examples are property taxes on real estate the corporation owns, business and occupation taxes, excise taxes, etc.

INVESTMENT-RELATED EXPENSES

- This includes interest and depreciation:
 - **Interest**—The typical corporation is at least partially financed through borrowed money (loans).
 - Example: Loans, loan payments, interest, and separating interest from loan payments.
 - **Depreciation**— Conceptually, depreciation is a way to spread the purchase price of a long-lived capital asset (a building, some expensive piece of equipment, etc.)
 - **Income Taxes**— Federal, state, and local income taxes can add up to take more than 50% of the net income before taxes

RETURN ON EQUITY

- Assuming there is any money left, this is the real profit of the corporation. One of the first uses of net income after taxes is to pay cash dividends to the stockholders (the owners of the company).
- These dividends are one way that stockholders earn money from their investment in the company. (An increase in the stock price is the other.)
- What's left after all of the above has been taken out is called retained earnings. This is, along with new loans and equity capital (issuing more stock), the money that the corporation has available to invest in future growth and expansion (i.e., beyond just continuing as is).

WHY ARE INCOME AND EXPENSES IMPORTANT?

- One measure of a company's financial health is its profit margin.
- The profit margin is the percentage of gross revenue that ends up as profit.

$$\text{Profit Margin} = \frac{\text{Net Income After Taxes}}{\text{Gross Revenue}}$$



HOW EXPENSIVE SOFTWARE IS



HOW EXPENSIVE IS SOFTWARE?

- **Labor** is usually the dominant cost on a software project.
- **capital costs** for buying equipment small percentage of the overall software project cost.
- The average **annual salary of a software professional** in the United States in 2001 was approximately \$60,000 [Copeland01]
- **Five-person-year project** (five people working for one year or one person working for five years) would seem like it costs \$300,000

FULL TIME EQUIVALENT

- Refer to the actual annual cost of the employee
- Sometimes called a "fully burdened salary,"
- The FTE includes salary, benefits, plus all of the overhead costs for management, facilities, equipment, and so on
- The U.S. FTE was at least \$125,000 per year and could have been as much as \$300,000 per year.



▪ Question
/Answer



SOFTWARE PROFESSIONALS

- If you are working as a software professional,
 - Think about how much the project(s) you are involved in will cost.
 - What is your company's FTE rate?
 - How many people work on your project?
 - How long has your project been running?
 - Do the math and see how much it has cost so far.
 - How much longer until the project finishes?



WHAT DOES SW MANAGERS NEED TO DEAL WITH?

- **People:** customers, users, architects, designers, programmers, testers, lawyers, venture capitalists, suppliers, politicians, ...
- **Products:** requirements, design, code, documentation, plans, tools, data, facilities, equipment, ...
- **Projects:** proposals, presentations, contracts, deliverables, budgets, schedules, milestones, ...
- **Resources:** time, money, space, communications, skills, ...
- **Technology:** software, hardware, domain technology, COTS, OSS, ...
- **Organizations and Cultures:** top management, marketing, sales, development, finance, customer/user organizations, ...
- **Changes in all of the above**

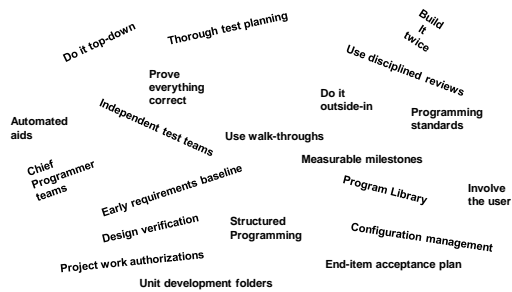


SOFTWARE MANAGEMENT GUIDELINES

- Extensive combinations of advice
- Management frameworks
- Maturity models
- People management theories: X, Y, Z



SORTING OUT SOFTWARE ADVICE



THEORY X AND THEORY Y*

Theory X and Theory Y (Douglas McGregor)

Theory X

The assumption that employees dislike work, are lazy, dislike responsibility, and must be coerced to perform.



Theory Y

The assumption that employees like work, are creative, seek responsibility, and can exercise self-direction.



* D. McGregor, *The Human Side of Enterprise*, 1960.

MASLOW'S HIERARCHIES OF NEEDS

Basic Need
Safety Need
Social Need
Esteem
Self actualization



THEORY Z: JAPANESE-STYLE MANAGEMENT

- People work best toward goals which they have helped establish
- Once people have bought into goals, you can trust them to perform
- If people share a common set of values, they can develop workable project goals