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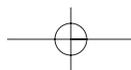
## Business on Purpose

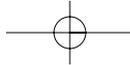
Reduced to the simplest of terms, a business exists for one purpose: to make money for its owners. This book is about making sure that the activities and decisions in a business's software organization contribute to that purpose. Before you can understand how to align the software activities and decisions with the business's purpose, you need to understand how the business works in a financial sense: where does the money come from and where does it go? Of course, software is also developed in and for not-for-profit organizations: government agencies, universities, charities, and so on. Even though these organizations aren't intending to make a profit, this chapter shows that it's still important to align the software activities and decisions to these organizations' goal.

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### **Why Are Companies in Business, Anyway?**

Let's start by asking what might be the single, most fundamental question to a business, "Why are we in business in the first place?" You might want to think a company is in business because it's fun, it's educational, or because it's a way to have a positive impact on society. These are all good secondary reasons, but the primary reason is simple: to make a profit for the owners of the company.





Granted, the idea that profit is the primary reason to be in business may sound crass, but the plain truth is just that. Whether we like it or not, a company that doesn't make a profit for its owners doesn't stay in business very long, regardless of how fun, educational, or socially uplifting it might be. If you don't believe this, then try explaining the "dot-com crash" of 2001. Did those companies go out of business because they stopped being fun? Being educational? Being socially responsible? Or, did they simply not make enough money to stay in business?

Given that the ultimate goal of a company is to make a profit, it should follow that the decisions made inside the company should be guided by that same goal. When faced with two or more possible courses of action, the company should generally choose the one that leads to the higher profit.

Sometimes there may not be any profit in a business decision; it may be a case of minimizing the loss. A company may be forced to make changes to its accounting software because of a change in tax law. Or a company may have to port software off of obsolete hardware. Consider the alternatives: If the company doesn't comply with the new tax laws, they could be liable for serious legal and financial penalties. It's cheaper to comply than not comply. If the software isn't ported to new hardware, then operating and maintenance costs on the old hardware could quickly exceed the cost of the new hardware and the porting effort combined. Even in cases like these, the long-term decision is largely based on maximizing profit. Sometimes the best outcome is simply the least-worst outcome.

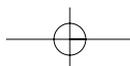
The phrase "should generally choose" is important. Of course everyone needs to recognize that profit isn't the only factor in making decisions. This is where the secondary factors—fun, education, social impact, etc.—come in. Issues such as ethics, concern for the customer, concern for the employees, concern for the environment, corporate citizenship, and so on can play a part in the decision-making process. All these other things being equal, however, the ultimate decision criteria will end up being profit.

Let's take a quick tour of the (somewhat simplified) financial view of a company and see how it goes about making money for its owners.

## WHERE DOES THE MONEY COME FROM?

For-profit companies bring in money by selling products and services, and sometimes by making investments in other companies. A computer hardware manufacturer brings in money by selling and leasing its products as well as by offering repair services and service contracts. A software company that sells a computer-aided design (CAD) package brings in money by selling the CAD software package along with training and consulting on the use of that package. The CAD software company may also bring in money by performing custom modifications to the software for specific customers, for instance adding a data-transfer interface to a computer-aided manufacturing (CAM) system used by a particular customer. The big automobile makers not only sell and service cars and trucks, they also invest in other companies such as rental car companies.

The sum total of all the income a company brings in is often called its **gross revenue**.



## WHERE DOES THE MONEY GO?

Figure 2.1 shows where the gross revenue typically goes in a for-profit company. Each successive step down the figure shows a factor that subtracts from gross revenue and gives an approximation of how much impact that factor typically has on profit.

### 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. The components of the cost of goods sold are as follows:

- **Materials**—The cost of the raw material inputs. A furniture company buys wood, cloth, glue, fasteners, and such to build the furniture. 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.

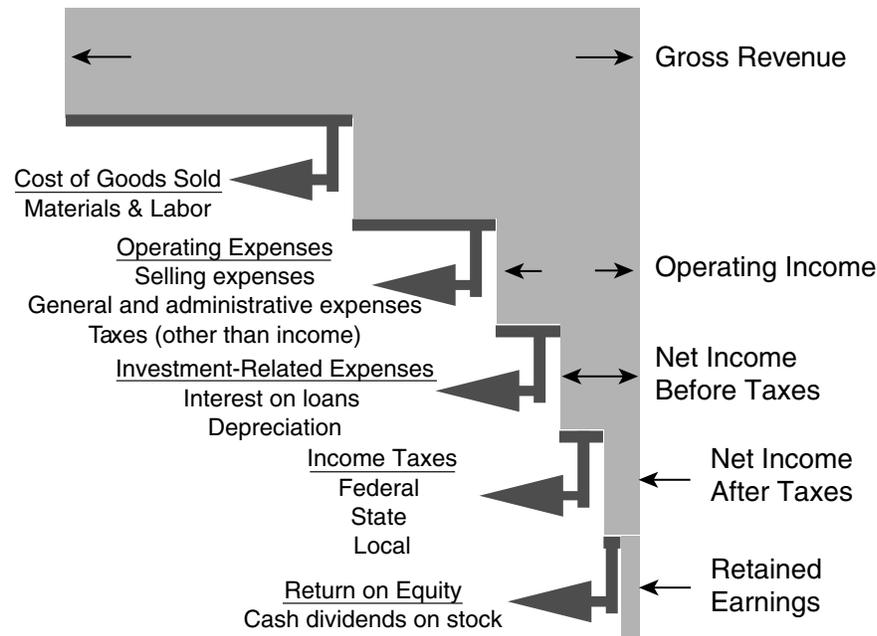
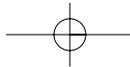


FIGURE 2.1 Where the money goes in a typical corporation



- **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

The next drain on gross revenue is operating expenses. Operating expenses are all the additional costs necessary to run the company beyond just producing the products and services. Operating expenses usually include things such as the following:

- **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.
- **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.

After the operating expenses are taken out of gross revenue, the remainder is called operating income. Keep in mind that there is no guarantee that at this point, or any point beyond this, the remaining income is actually positive. The company might not bring in more money than it spends. One airplane manufacturer stopped selling commercial airplanes when they realized that their airplanes could only be sold for about \$1 million but they cost more than \$1.2 million to produce. They were losing about \$200,000 on every airplane they sold. A company's operating income could be zero, or even negative.

### Investment-Related Expenses

The next drain on income derives from expenses related to the company's investments. This includes interest and depreciation:

- **Interest**—The typical corporation is at least partially financed through borrowed money (loans). Part of the payments on those loans goes to paying back the principal (the money that was borrowed) and the rest goes to paying interest. Loans, loan payments, interest, and separating interest from loan payments are covered in detail in Chapters 5 and 6.

- **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.) over the life of that asset. If the company invests \$1 million to buy a special high-performance computer, the entire \$1 million doesn't leave the company right away. The company will "carry" the asset for several years and write off a portion of the original value year by year. Don't worry about the details of depreciation right now; they are discussed in Chapter 14.

Any expenses related to investments the company makes in other companies (such as buying and selling the other company's stock) are also included in investment-related expenses. After subtracting all of the investment-related expenses from the operating income, the corporation is left with its net income before taxes. Again, net income before taxes isn't guaranteed to be a positive number.

### Income Taxes

The next drain is income taxes. Federal, state, and local income taxes can add up to take more than 50% of the net income before taxes. Income taxes are discussed in Chapter 16. The remainder after income taxes are subtracted is called net income after 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.)

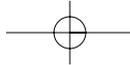
What's left after all of the above has been taken out is called retained earnings. This is, along with new loans and equity capital (issuing more stock), the money that the corporation has available to invest in future growth and expansion (i.e., beyond just continuing as is).

## 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.

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

Even in the best of financial times, it's unusual for the profit margin of many companies to be much more than about 10%. The profit margin in a lot of companies can be as low as 2% or even less. With such a slim margin, it should be easy to see how making every investment count is an important goal—money wasted in expenses eats directly into the



profit margin, which means less for the owners (which, through stock-ownership plans, are often the employees themselves) and less available for future software projects and the like.

### HOW EXPENSIVE IS SOFTWARE?

Labor is usually the dominant cost on a software project. Although there may be capital costs for buying equipment such as new computers, this is almost always a relatively 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]. A five-person-year project (five people working for one year, one person working for five years) would seem like it costs \$300,000. That's a lot of money, to be sure. But it's not an overly shocking amount. It isn't the whole story either.

Many companies use the term **full-time equivalent** (FTE) to refer to the actual annual cost of an 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. In 2002, the U.S. FTE was at least \$125,000 per year and could have been as much as \$300,000 per year in high-rent districts such as Manhattan and Silicon Valley. The five-person-year project actually costs at least a half-million dollars and, depending on location, could cost as much as \$1.5 million. Paraphrasing a quote often attributed to the late Senator Everett McKinley Dirksen (R., Illinois, 1951 to 1969):

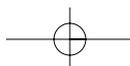
a few million here, a few million there, and pretty soon you're talking real money.

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? Do the math and see how much the project is likely to cost when it completes. Is it likely that the company will get more benefit out of the project than it cost? From a stockholder's perspective, has the money been spent wisely? Developing and maintaining software is expensive. You have to be careful to get the most value out of your limited resources.

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## Business Decisions in For-Profit Organizations

Management's role in the typical for-profit company—from the manager of a software project all the way up to the executive management and board of directors—is to make the operational and strategic (investment-level) business decisions that will maximize profit over the life of the company. Decisions such as: should Feature A be developed before Feature B? Should the company move into some new market? Is it time to retire Product Y? Similarly, the role of the technical staff, and I'm talking here about technical staff in general—electrical, mechanical, structural, chemical, software, etc.—should



be to design and improve the company's products and services as well as to design and improve the means of producing and delivering those products and services. The technical staff at a computer chip manufacturing company develops new chips or they develop more efficient ways of producing those chips. The technical staff at your local electric utility develops better ways to convert coal, gas, water, or atomic energy into electricity and distribute it to your home or office.

The essence of getting the biggest bang for your technical buck, at least in for-profit companies, is to align the technical decisions with the goal of maximizing profit: Can the products and services be designed so that they can be produced with a minimum of resources? Can the means of production be designed to generate the most product from the smallest investment?

All other things being equal, the role of a technical person in a for-profit company should be to choose—from the set of technically possible solutions to some problem—the solution that maximizes the organization's objective: profit.

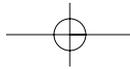
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## Business Decisions in Not-for-Profit Organizations

This should all make sense in for-profit companies, but what about not-for-profit organizations? Take the government, for example. The goal of government is discussed in detail in Chapter 18, but we should agree that the goal of government is not to make a profit. Nonetheless, the government does deliver products and services. The products are things such as public roads and bridges, parks, public buildings, etc. The services are things such as education, public libraries, fire and police protection, etc. These are delivered to the residents, but not through a marketplace. People don't buy government products and services in the same way that they buy, say, televisions and microwave ovens. There's one supplier of roads, and you use the roads that are available if you want to go somewhere. There's one supplier of fire protection, and you use that supplier if your house catches fire.

The government gets its income through taxes of various sorts: sales taxes, property taxes, income taxes, etc. Taxation is, to a degree, like putting the brakes on the economy, so taxation should be held to a reasonable minimum. Similarly, an independent charity organization is usually funded through private donations, which it has to work hard to get. The proverbial bottom line is that the government and nonprofit organizations also have to deal with limited resources.

The role of business decisions in not-for-profit organizations is still to maximize the delivery of products and services while keeping resource use to a minimum. So although the measure of success isn't profit in this case, there's still plenty of reason to pay attention to maximizing the benefit while using a minimum of cost.



All other things being equal, the role of a technical person in a not-for-profit organization should be to choose—from the set of technically possible solutions to some problem—the solution that maximizes the organization's objective: providing the greatest benefit at the least cost.

Notice that between for-profit and not-for-profit organizations the goals are not exactly the same, maximizing profit vs. maximizing benefit, but they are very similar. So, although there are some important differences in the business decision-making process between these two environments, most of the concepts and techniques are applicable to both.

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## Business Decisions in Your Own Personal Finances

If you're like most people, you don't have an unlimited supply of money. You work hard for the income you get, so you want to make the most out of it. Why spend more on that car or that house than you need to? But how would you know that you're getting the most out of your hard-earned income? After reading and understanding this book, you'll know how to answer that question.

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## Summary

Businesses exist for one primary reason: to make money for the owners. To do that, the business needs to bring in more money than it spends. The money coming into the business is mostly from the sales of products and services, whereas the money going out is for all kinds of different expenses:

- Cost of goods sold
- Operating expenses
- Investment-related expenses
- Income taxes

The amount of money left after all of the expenses have been paid, the profit margin, averages around 10% in a typical business.

Not-for profit organizations exist for a different reason: to maximize the benefit to some relevant population. But not-for-profit organizations also have limited resources.

Software is a lot more expensive than most people think it is. The total cost of employing a software professional in most areas of the United States is at least \$125,000 annually and can be as much as \$300,000. A five-person-year project will cost anywhere from a half-million dollars to \$1.5 million in labor costs alone. This is a big bite out of the income of any organization.



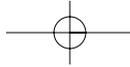
Limited resources combined with high software costs means that whether a software professional is in a for-profit or not-for-profit organization, there is always a need to align the software technical decisions with the goals of that organization. The fundamental question is, then, whether any proposed use of the organization's resources would provide the highest return or whether a higher return could be achieved some other way. The next chapter explains the fundamental concepts of making this kind of business decision.

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## Self-Study Questions

1. Assume that Zymurgenics, Inc.\* had gross revenues of \$12,500,000 last year. Various costs for labor, material, operating expenses, etc. totaled \$9,750,000. Income taxes amounted to \$1,080,200. What was their actual profit for the year? What was their profit margin?
2. If you are currently employed, what are your company's sources of gross revenue (what kinds of products and services does your company sell)? If you are not currently employed, choose a company (or have one assigned to you) and answer the same question.
3. Does the company in Question 2 have any other sources of gross revenue? (For instance, does it invest in other companies?)
4. What was the company in Question 2's gross revenue last year?
5. Using the company in Question 2, give specific examples of each of the categories of cost shown in Figure 2.1. What was the cost category and how much money was spent on it?
  - Direct labor
  - Direct material
  - Indirect expenses
  - Operating expenses
  - Investment-related costs
  - ...
6. What was the total amount of expenses (excluding income taxes) the company in Question 2 paid last year?
7. How much income tax did the company in Question 2 pay last year?
8. What was the company in Question 2's profit margin last year?

\*All references to company names are fictitious references. Any similarity of these companies to real companies is purely coincidental.

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9. If you are employed, what's your organization's FTE rate? If unknown, proprietary, or you aren't employed, assume an FTE rate of \$200,000 per year. Calculate the labor cost of a six-person-year project using that FTE rate.
10. If you are working on a project, describe that project's staffing level (how many people for how long). Using the FTE rate from the previous question, how expensive is this project (labor costs alone, ignore any hardware or vendor-purchased software)?
11. For the project identified in Question 10, is it reasonable to assume that the company will be able to recover that investment in your project (either through reduced costs or increased sales)? Explain your answer.
12. If you are employed, identify one or more software systems that are critical to the operation of your employer. What might be the consequences of a total failure in one of these systems? Could the company survive if that system failed totally? How? If you are in school, identify one or more software systems that are critical to the operation of that school. What could be the consequences of a total failure of one of these systems? Could the school survive?
13. Name at least one situation, other than what was already identified in this chapter and in the preface, where the concepts and techniques in this book would be useful in helping you make decisions about your own personal finances.

