# A Guide to Profitable Decision Making

Hewlett-Packard's introduction to basic financial concepts every business manager should know



### DECISIONS the single most important factor facing a manager

As a manager, your key function is to make decisions quickly and profitably. It is a function with which you are faced every hour of the day. And it all affects that important goal: profitability.

## What makes a good decision-maker?

Briefly, you can become a good decision-maker or a better one—if you have an understanding of the basic concepts of business finance... and the ability to apply these principles to the problems you face.

The purpose of this guide is to provide you with a concise look at some of these concepts, together with illustrations of their application.

Understanding these financial concepts does not require any sophisticated mathematical knowledge or an advanced business degree. All you need is a little arithmetic and a knowledge of a few basic business terms.

## This guide is about time and money

As you will soon see, there is a very direct relationship between time and money. An understanding of this relationship will aid you in becoming a more effective manager.





#### THESE BASIC FINANCIAL CONCEPTS ARE VITAL TO MAKING MORE EFFECTIVE, MORE PROFITABLE DECISIONS

Money value and time are inseparable. You cannot begin to solve a financial problem without an understanding of this irrefutable fact.

It's a fundamental error to forget that any money you invest should bring you a return that's consistent with the time period involved. And also, any time you make an investment that doesn't bring you the maximum possible return, it is costing your company money.

Many business managers make the mistake of examining only the total dollars involved in a financial decision and forget that timing can be equally important. That is why sometimes the "obvious" answer to a decision may end up being the most costly.

The concepts that follow, in many cases, represent alternative means of looking at the relationship between time and money. But each represents an approach that can help make you a better manager.

### Interest represents the time value of money

Interest, by definition, is the amount of money paid a lender for the use of his money capital.

In practice, payment of interest is calculated in terms of a fixed percentage of the amount loaned for an agreed-upon period of time. This interest rate is directly proportionate to risk, and it fluctuates depending on the supply of and the demand for money, as well as governmental requirements.

The calculation of the exact amount paid for interest may be done in one of two basic ways:

 Simple interest, where the percentage is figured only on the amount borrowed.
Compound interest, where the percentage is figured on both the amount borrowed and on any interest that has previously accrued.

For example, let's suppose you were to invest \$10,000 for 3 years, at 10% *simple interest* per year. At the end of the 3 years, you would get back the \$10,000 plus \$1,000 interest for the first year, \$1,000 interest for the second year, and \$1,000 for the third year, for a total interest of \$3,000.

However if the 10% interest rate were compounded yearly, the total interest would be higher. For example, you would receive 10% of \$10,000-or \$1,000-at the end of the first year. The second year you would receive 10% of \$10,000 *plus* 10% of the previous interest of \$1,000, for a total of \$1,100. At the end of the third year you would receive 10% of \$10,000, plus 10% of all the previous interest, for a total of \$1,210. Thus, by compounding the interest rate annually, you have earned \$3,310 over three years ... or \$310 more than would be earned by simple interest.

Compounding the interest rate in shorter time periods results in even greater total interest. If your \$10,000 had been compounded *monthly* using the same 10% annual rate, the three-year total would have been \$3,481.82.

The \$10,000 you invested is called the PRESENT VALUE of your capital. The amount you receive back later is called the FUTURE VALUE. The difference is interest (whether simple or compound) and represents the TIME VALUE of your money for the three year period.

#### INTEREST COMPARISON FOR \$10,000 INVESTED FOR 3 YEARS



The real value of an income or expense item depends upon when payment actually occurs

> Interest is constantly changing the value of money. Because of this simple fact, the obvious answer isn't always the most profitable one.

One quick way to determine the validity of a situation regarding time and expenditure is to examine the PRESENT VALUE. PRESENT VALUE is a way of relating everything to the same time frame, so that the real value of an income item or expenditure can be determined.

For example, would you rather have \$1,000 paid to you now . . . or a year from now? Obviously, it's better to have it paid to you now, so you can invest it and earn money on it.

For the same reason, it is more profitable, in many cases, for you to buy now and pay later.

Let's assume you can buy a piece of equipment and pay cash and it will cost you \$10,000. Alternatively, the seller will allow you to wait 90 days and pay \$10,200.

It might seem that you save \$200 by paying right away. But if your cost of capital is 1% a month (which is not unusual) are you still better off? The answer is no. By subtracting the 1% monthly cost of capital from the FUTURE VALUE of \$10,200, we find that its PRESENT VALUE is only \$9,900.02. This compares to the \$10,000 PRESENT VALUE under the other alternative. So you can actually save about a hundred dollars by waiting and paying what seems to be more.

The important point to realize here is that when considering alternative investment decisions, one must examine them all at the same point in time. This is normally done by examining costs in terms of today's dollars. This is known as the PRESENT VALUE concept of analysis and requires that we *discount* any future expenditures or receipts by a stated interest rate. *Discounting* is simply calculating interest in reverse. Instead of starting with a known amount of money today and asking what it would be worth in the future at a given interest, you ask how much money would I have to have today to receive a given amount in the future.

As an example, we showed previously that \$10,000 invested today and compounded annually at 10% would give you \$13,310 at the end of three years. If you decided instead that you wanted \$10,000 three years from now and knew you could receive 10% compounded annually on any investment you made today, how much would you have to invest? The answer is found by calculating the interest in reverse, *discounting*, and finding that you should invest \$7,513.15 today.

### Cash flow: the third ingredient

Two important factors, PRESENT VALUE and FUTURE VALUE, have been considered in examining the time value of money. The third important factor to consider is the CASH FLOW or timing of PAYMENTS involved in a financial decision. Many investments return not just one lump-sum future payment, but instead return funds over a period of time. This is known as CASH FLOW.

A good example of this can be seen when you take out a mortgage on your home. Instead of repaying the loan in one large sum at the end of the loan, your bank will ask you to repay it in monthly installments that include payment of both interest and principal. These payments are the CASH FLOW the bank receives in return for its investment in your mortgage.

If the time period and interest rate remain constant, there is a direct relationship between PRESENT VALUE, FUTURE VALUE and CASH FLOW PAYMENTS. To dramatize the point, let's assume you had 3 payment options to repay a loan with a 10% annual interest rate compounded monthly:

- A) Paying \$10,000 today.
- B) Paying \$322.67 per month for 36 months . . . a total of \$11,616.12.
- C) Paying one lump-sum payment of \$13,481.82 at the end of three years.

Because of the different CASH FLOWS involved, the final payouts differ. But the PRESENT VALUE of all three alternatives is identical—\$10,000. And the FUTURE VALUE of all three is identical— \$13,481.82.

Under alternatives A and B, you actually pay less than this amount. But because the lender has the benefit of your CASH FLOWS, what you pay still has the same FUTURE VALUE as the single lumpsum payment at the end of three years.

Thus one can see that given a known time period and interest rate, once one of the three ingredients is given—PRESENT VALUE, FUTURE VALUE, or CASH FLOW PAYMENTS—the other two can easily be determined. This concept gives us a powerful tool to enable us to be able to consider alternative investments in the same time frame. Return on investment is the common denominator to evaluate business expenditures

> Many times an investment proposal will specify two of our three ingredients, such as PRESENT VALUE and CASH FLOW. Now you can calculate the interest rate, or *rate of return*, that equates these two factors. This gives you a common denominator for comparing alternative investments.

A typical example would be two real estate investment opportunities—Project A and Project B —each requiring an investment of \$100,000 and each ending after 5 years.

Project A would return a CASH FLOW of \$27,000 per year for 5 years—a total of \$135,000. Project B would return no CASH FLOW during the first 4 years, then pay \$150,000 at the end of the 5th year. Which offers the better return on investment?

A manager without a true understanding of the rate of return on investment might say that Project B's return is better, because of the additional \$15,000.

However, when you figure out the actual rate of return, Project A's is 10.9% per year, while Project B's is only 8.5% per year— a 28% difference!

This is because Project A's CASH FLOW of \$27,000 per year is very important. It means that part of the initial investment is being returned every year. So, based on the amount of investment capital remaining in the project each year, it's a better return on investment.

Of course, not every investment with an annual CASH FLOW is better. It depends on what the alternatives are and what percentage of the investment is returned each year.

### A true measure of loss or gain must consider inflation

Inflation is virtually inevitable in our economy. Because of it, we must account for inflationary trends in planning purchases, personnel compensation, investment potential, and many other financial decisions.

If, for example, inflation was running at a 7% annual compounded rate, it would obviously not be wise to take advantage of an investment that would only yield a net return of 5% compounded annually. As inflation becomes worse, investors require higher interest returns, because they anticipate repayment of their funds in substantially reduced purchasing power.

It's a hard fact to accept, but money can be worth less every year . . . even when it is invested and is supposedly appreciating in value.

Therefore, the rate of appreciation must exceed the inflation rate in order to show a *true* gain.



#### Introducing Mr. Robert Cooper, and how he uses these basic financial concepts to make the right decisions for the Cooper Company



Bob Cooper is a modern manager... the President of the Cooper Company (a fictitious firm with true-to-life problems). As the chief executive officer of his company, he is constantly faced with decisions that can affect the growth and profitability of his firm.

In the short time that he has been in business, his company has grown to annual sales of \$500,000. It's currently growing at the rate of 10% per year. Through careful planning and smart decision-making, Bob has been able to generate enough pretax profit to yield him a 15% return on his total asset base . . . the amount of capital in the business. So he uses this figure as the minimum acceptable return on any future investments.

Bob did not go to business school, but he is familiar with basic financial concepts. On the following pages, you'll have the opportunity to experience some of the problems that Bob has had to face, and see what decisions he made.

Put yourself in his shoes as you read along. For the time being, don't worry about *how* the answers were worked out. Just concentrate on the solutions and their importance.

The production manager of the Cooper Company requests the purchase of a new machine that would increase productivity and reduce labor costs compared to the current model. The machine costs \$25,000 and would have higher maintenance costs. But due to the labor and material savings, he estimates it would result in the following net savings over the next four years.

Year	Labor and Material Savings	Additional Maintenance	Net Savings	
1	\$13,900	\$ 800	\$13,100	
2	11,800	1,000	10,800	
3	11,600	1,200	10,400	
4	10,800	2,100	8,700	

The net savings look attractive. But Bob decides to do a *discounted cash flow* analysis to find its present value and see if it's really a good investment. He uses a cost of capital of 27% (cost of money plus the company's acceptable rate of return) to see if the purchase can be justified.

Solving for the present value of this cash flow yields \$25,432.44. The present cost of the machine is \$25,000, so the net present value of this investment is positive—meaning that it will cover the cost of capital and return a little more than the 15% desired rate of return. Therefore, the purchase is justifiable according to the company's profit criteria.

Growth over the past few years has been so good that the Cooper Company needs to expand into another building. An adjacent building has recently been put on the market for \$100,000. Bob decides it is priced right and meets the company's requirements, but he is unsure about the financing. After calling a few banks, he finds the following options are available for 20-year, 90% mortgages:

A) 8% interest plus 4 points, with monthly payments of \$752.80.

B) 8¼ % interest plus 1 point, with monthly payments of \$766.86. (One point equals 1% of the mortgage amount to be paid at the time of loan origination.)

Bob realizes that paying points at the beginning of the mortgage effectively raises the interest rate, because you really are borrowing less but still make monthly payments based on the total loan amount. Because of this, he decides to choose the loan with the lowest true interest rate.

Using his pocket financial calculator, he finds the *true annual interest rate* of option A to be 8.55%, while option B's is 8.39%. Therefore, the lower cost mortgage is option B, even though its stated interest rate is higher.



The Cooper Company needs a new photocopier and the one that best suits its needs costs \$10,000. Bob knows leasing has really grown in the last few years as an alternate way of financing equipment, and he wonders if it might be the better option in this case.

Checking into this, he finds he can lease the photocopier for 5 years at \$210 per month. If he buys the machine he will require a 5-year loan, which would be at a 12% interest rate with monthly payments of \$222.44.

Bob realizes that the true cost of each alternative is affected by taxes. If the machine is leased, the full lease payment can be treated as an expense. If it's purchased, the machine's depreciation and the interest on the loan are considered expenses for tax purposes.

With this in mind, Bob calculates the net cash cost of each alternative with the following results:

#### PURCHASE

(Assume the machine has a 5 year useful life and no salvage value. Use sum-of-the-years'-digits depreciation and a monthly loan payment of \$222.44.)

Year	Net Cash Cost*	
1	\$ 533	
2	948	
3	1,375	
4	1,815	
5	2,270	
Total Net Cash Cost	\$6,941	

#### LEASE

(Assume monthly payments of \$210.00.)

Year	Net Cash Cost*	
1	\$1,310	
2	1,310	
3	1,310	
4	1,310	
5	1,310	
Total Net Cash Cost	\$6,550	

\*Net Cash Cost equals total payments minus the tax savings of 48%.

Looking at total cost, leasing appears to be less. But, purchase costs less the first few years. Bob knows he can make a 15% return on every dollar he puts in the business; the sooner he can reinvest money, the sooner he earns 15%. Therefore, he decides to consider the *timing of the costs*, discounting the cash flows at 15% to find the present value of the alternatives.

Doing this he discovers *leasing* has a present value cost of \$4,391, while *purchasing* has a present value cost of \$4,251. Since these are both expense items, the lowest present value is the most desirable. So, in this case, purchase is the least costly alternative.

Bob's production manager is recommending a 25% raise for George, who is one of his professional employees. Bob feels this is totally out of line. But his manager reminds Bob that George is very sharp, a hard worker, and highly regarded by his co-workers. Bob admits it would be a real company loss if George should become dissatisfied and look elsewhere.

The manager thinks inflation has eliminated any increase in real buying power for George and feels it is time to adequately compensate him for past discrepencies. Bob agrees that a 10% per year increase in real buying power is an excellent reward for an outstanding job and decides to apply this to George's salary history for the past 3 years and relate it to inflation.

#### George's salary history is as follows:

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Current	\$14,700
2 years ago	\$13,000
3 years ago	\$12,000

In the same period, inflation has been 6% per year. Considering these facts, Bob calculates what George's salary should be if he had experienced a 10% per year increase in buying power *in addition to the increase necessary to keep up with inflation.* The result is an astounding \$18,731, which would be a 27% increase over his current level. In light of the circumstances, Bob concedes that the 25% increase is advisable.



Terms on most of the company's accounts payable are 2/30, net/90. There is sufficient cash to pay them in 30 days and take the discount. However, Bob's bookkeeper suggests it might be better to buy short-term notes with a 90-day term and 10% interest. This alternative sounds attractive.

But Bob knows that the real value of expense items *depend on when payment actually occurs*. In this case, passing up the 2% discount means that the company is, in effect, paying a 2% finance charge to retain its money for an additional 60 days.

So he uses his pocket financial calculator to figure out the annual percentage rate of delaying payments for 60 days—and it comes out 12.4%.

Since the short term notes only yield 10%, obviously the company is better off to pay its accounts payable within 30 days and take advantage of the discount. One of Bob Cooper's friends, who is a Realtor, presents him with two personal investment alternatives. Each requires an initial investment of \$20,000 and will be sold at the end of 5 years. Based on studying the income and expenses for the next 5 years and considering his tax bracket, Bob determines the net cash flows he will receive for each investment:

Property A		Property B	
Year	Cash Flow	Year	Cash Flow
1	\$ 3,600	1	\$ 200
2	3,620	2	420
3	3,510	3	610
4	2,970	4	870
5	19,300	5	32,900
Total Cash Flow	\$33,000	Total Cash Flow	\$35,000

Although Property B has a larger total cash flow, Bob is not sure that the larger total compensates for the difference in timing of the cash flows. Therefore, he decides to find the *rate of return for each investment*. Using his pocket financial calculator, he finds that property A returns 14%, while Property B only returns 12%. So the larger total cash flow really does not have the best return on investment.

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To handle its intercity deliveries the Cooper Company has just purchased a new \$8,000 van. The van is estimated to have a useful life of 5 years with a salvage value of \$800. Knowing that the depreciation method used affects taxes, Bob decides to compare the three depreciation methods—straight line, double declining balance, and sum-of-the-years'-digits—to see which method leads to the most tax savings. Assuming a 48% tax rate he calculates the following yearly tax savings.\*

Year	Stra	aight Line D	Double Declining Balance	Sum-of-the- Years'-Digits
1	\$	691	\$1,536	\$1,152
2		691	921	921
3		691	553	691
4		691	332	461
5		6 <b>91</b>	113	230
Total Tax S	avings \$	3,455	\$3,455	\$3,455

\*Tax Savings equal 48% of annual depreciation amount.

Even though the total savings are the same, the yearly amounts are different. Being aware of the time value of money, Bob uses a present value approach to determine which method really has the most savings.

Discounting the cash flows at the company's 15% desired rate of return yields the following present values:

Straight line	\$2,316.34
Double declining balance	\$2,641.67
Sum-of-the-years'-digits	\$2,530.42

Since the highest present value indicates the greatest savings, this readily shows that Bob should use double declining balance to maximize his tax savings and minimize costs. The Cooper Company is just closing its books after completing a very good year. Bob decides a bonus would be in order for the vice president, who is the number two man in the company, and who has done an outstanding job this year.

He can't decide whether to give him \$5,000 now or give him \$480 a month for the next 12 months. He consults his accountant, and learns that both options have the same tax implications, because the bonus amount can be charged off as an expense for the current year.

Bob knows that the monthly bonus plan would cost \$5,760 instead of \$5,000. But it would have the advantage of providing extra working capital in the months ahead. By discounting the monthly payments at 27% (cost of capital plus desired rate of return), he finds that their present value is \$4,999.09.

Because the net present values under the two alternatives are so similar Bob decides to use the monthly bonus plan. He is thus able to pay a bigger bonus at very nominal additional cost to the company.



### Sound decision-making... like other things in life, is easy when you know how

Although Bob Cooper is imaginary, business problems similar to his occur every day in the real world. And they can be solved just as quickly, easily and, above all, accurately by using some of the basic financial concepts shown in this booklet.

Attempting to make business decisions *without* using these concepts can be very costly. As you have just seen in many of the problems, the "apparently obvious" solution is not always the best one. Until recently there was a "good excuse" for not applying these financial concepts—the necessary mathematical calculations were difficult to do. Or time-consuming. Or both.

But today, any decision-maker—with or without financial training—can use a pre-programmed business calculator to readily obtain the answers. It isn't even necessary to know the mathematical formulas involved. All you need do is enter the variables and press the keys! Or have your bookkeeper or assistant use the calculator to work the problems for you.

Should you buy a pre-programmed financial calculator to help you make decisions? Probably yes, because you may very well make or save far more than its cost the very first time you use it. And this, according to one of the basic concepts, would be a very nice return on investment!





#### Hewlett-Packard offers a complete selection of problem-solving tools to aid in decisionmaking — from business pocket calculators to computers

Hewlett-Packard Company is one of the world's major designers and manufacturers of electronic tools for people who measure, compute and analyze.

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These pocket calculators are pre-programmed with all the necessary equations and interest tables for solving virtually any problem involving the relationship between time and money. Calculations that would take considerable time and effort on a non-programmed calculator are easily handled with a few keystrokes that initiate all the calculations for you.

Hewlett-Packard makes decision-making easier, by providing the tools a decision-maker needs.





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