

## FINDING FUNDING IN ALL THE RIGHT PLACES

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The cure to a nagging problem is obvious to you, but that cure costs money and those who can provide the money say no. Don't you just fume when those dunderheads won't approve a sorely needed project? You say you can't get the dollars for decent test equipment? Why can't those accounting people see what's going on? The answer is that what they see depends on what you show them.

You can write a project proposal or request for capital in such a way that "those accounting people" will actually champion your cause. How do you open their minds to your way of thinking? You have to use the right keys to get through many layers of locks. You have to know the keys that pertain to every capital request, and you need to know how to determine the keys that pertain to your particular situation. You also need to know how to avoid those red flags that say, "Kill this proposal." You need to know what words, phrases, and information have the same effect on budget approvers that the Golden Arches do on children in a vacation car. Learn about IRR, Payback, and NPV. See how to develop and present these numbers in a way that gets them—and your proposal—accepted.

Getting through the capital or purchase approval process is a credibility game. Many requests for capital die, but few requests for capital die for technical reasons. They die because people like you and me fail to make a good case in financial, managerial, and cultural terms. Knowing these terms requires effort and research on our part. You need to find funding in all the right places. Here's where to look.

### YOUR GOAL

Engineers often get lost in the vast ocean of the design process, because they lose sight of that lighthouse that is the goal of the project. The first thing you must do is define exactly what you should accomplish and why. List the benefits of this goal as you go, and come back to them later. You will need to have this goal in mind so you keep your design from becoming bloated or more complicated than necessary. You also need it to make sure your design is adequate.

### YOUR COMPANY'S BUSINESS NEEDS

#### Determine if this fits with long-term goals

What business are you in? Don't consider spending funds on a project that doesn't fit the corporate vision. The likelihood of changing a corporate personality via a capital request is slim. You may be able to do so, but you take great risk in the attempt. If you want to pursue something that doesn't quite meet the company's long-term goals, find an influential someone to champion the issue on your behalf. You may be able to demonstrate your idea on a very small scale, and then use that to help you pursue further funding. But don't follow Nike's old slogan of "Just do it" when it comes to writing capital proposals for renegade projects.

#### Resolve all resource questions

Consider these questions. What materials, training, infrastructure, and special equipment will this require? Will this divert resources from more critical needs? Does this require additional resources? What does it take to develop and maintain the resources needed? Can we rely on those who supply proprietary technology? What are the "off the shelf" options? What about reorder times, service response times, and any other potential delays—will you be captive to them?

### **Determine if this is this sustainable**

Don't embark on, say, a massive battery testing program that requires every maintenance person to work every weekend. If your proposed project ties up valuable resources routinely, rethink it. Maybe you can use a service firm or special test equipment. Maybe you can use another technology to achieve the same results. If sustainability appears questionable, then include a sustainability analysis summary with your proposal. Keep the original analysis on file.

### **YOUR PROJECT OPTIONS**

Make sure you look at other ways of doing things. The fact that you do this instantly raises your credibility. Make it your practice to compare three possible options to achieving your goal. This takes a lot of your time, but it makes you look like a person who researches thoroughly. You give the accurate impression that you know what you're talking about. If you can't come up with three approaches, start contacting vendors. You'll find at least one who will give you something goofy to make your idea look good. Keep that information in your back pocket in case you need it later. But keep contacting people until you come up with three options that appear roughly comparable.

### **Use the SWOT method**

List the Strengths, Weaknesses, Opportunities, and Threats for each of the options you are looking at. Be objective—don't favor your initial idea. You can soften things for the final "presentable" analysis if you are going to include it with your proposal. Keep this analysis on file for at least one full year after you've paid the final invoice related to your project. You may need this analysis at performance appraisal time if there are problems with executing your project.

These SWOT items might include things that don't come to mind right away. Do some digging, talk to some people. Will this option leverage your existing resources? Will it simplify parts ordering and stocking? Are there intangibles associated with it, such as good will with a particular vendor or consultant? Look very closely at equipment reliability and the associated downtime costs.

### **Quantify total cost of each approach**

Cheaper isn't always less expensive. You have to consider purchasing and transportation costs, of course. But factor in your installation costs and the picture may change. In many cases, you can see a dramatic change when you factor in maintenance, administration, upgrade, and downtime costs. To keep a level playing field, total all costs for a standard period, such as 40 years. Then divide by 40 to come up with an annualized cost. Only then will you have meaningful cost numbers. You should ask your accountant if the company has a standard period for annualizing costs. They may prefer a 30-year period. On the other hand, if you are at a facility that has 20 years of useful life left, then you should use 20 years.

### **Run a cost-benefit analysis**

It's likely that the options that meet your goals will have additional benefits. You may not need all of these benefits. Count only the benefits you plan to use. Assign a dollar figure to them. You may need to submit a list of dollar figures and benefits to your accounting people for accuracy verification or "best opinion" statements. Make a little form that is easy for them to use.

Once you've hammered out the value of the benefits, total them up. Annualize them the way you did the costs. Then annualize total benefits by the annualized total cost of each option. You'll wind up with a benefit/cost ratio. The higher the number, the better. If your accounting people prefer cost/benefit ratios, just inverse the number and you'll have what they want. Do not include both in your proposal—doing so creates confusion.

### **Select the best option**

This may not be readily apparent. At this point, you'll have the costs nailed down. But there are other factors. Review your SWOT analysis and look for any place where you have wide differences. If a difference is in an area that is critical to your operations, you may have reason to disqualify a particular option. If that option is not even a contender, then you may need to look for another one so that you do, indeed, perform a fair evaluation of the best options. Don't throw in something that is obviously very poor if you have other reasonable options available. Imagine shopping for a company car. You have put together a proposal for a Mercedes. Why? "Well, I looked at used Yugos and a 1963 Beetle, and they just were not suitable. So it's the Mercedes." Hmm. Why wouldn't a Buick Regal or Honda Civic be good candidates? You must protect your credibility throughout the proposal process. Be careful you don't blow it with lopsided evaluations.

## YOUR PERFORMANCE ASSUMPTIONS

These are the basis for your calculations. Base every assumption on solid information, not on guesses. Question the validity and accuracy of each assumption—can you defend it? Assign percentage of accuracy (confidence factor) to assumptions that may appear questionable. This way, if an assumption turns out to be wrong you are not in the position of having said it was 100% correct. Unless you assign a confidence factor to questionable assumptions, all your assumptions become questionable.

## YOUR CALCULATIONS FOR FINANCIAL RATIOS

Check your math many times. Include the ratios (and the calculations and spreadsheet formulas you used to get them) as a separate attachment. In addition to cost-benefit analysis, there are two major methods that financial and managerial folks use to rank projects, one way to resolve conflicts between the two, and two variations on the method most executives favor. These appear in just that order, here.

### Cost/benefit or benefit cost analysis

Earlier, we covered how to do this. You need to include your analysis in your final paper (unless accounting tells you not to). This shows you thought the proposal through. Even if you are not including this information for presentation, do the analysis and file it away. If you bomb one project because of a poor analysis, then your future proposals carry the stain of that. Once you've done this analysis, you should recheck the numbers and the information that drives them to make sure you are on the right course.

### Payback

Payback isn't a ratio, but I include it here because many people use it. Just think of it as the expected number of years to recover the original investment.

In the days before calculators and computers could do IRR calculations, this was a common number for managerial and financial decisions. It's easy to calculate, especially compared to the other methods. However, it has fallen out of favor because it has little practical value. It's also a vague way to think of capital investments, so don't include it in your proposal unless your accounting people or higher-ups specifically request it. Still, you may want to calculate payback before you get too deeply into the project. If something has a 20-year payback, you might want to save writing the proposal for that project for a day when you have fewer things to do.

### NPV

This stands for Net Present Value, meaning a dollar is worth more today than it will be in the future. The NPV method is the gold standard by which most financial types evaluate funding proposals. You express NPV in terms of absolute dollars.

Forget doing NPV calculations manually--the formula is far too complicated. With a financial calculator, you can type in the cash flows and wait a few seconds while it crunches the numbers and handles the formula behind the scenes. Even better is the electronic spreadsheet. You can save the numbers instead of typing them in once, and you can modify them later for "what if" scenarios. Also, on any modern PC, the calculation is instant.

The NPV analysis is one of the *Discounted Cash Flow* methods that arose in response to the "We hate the Payback Method" attitude that began to dominate the financial world near the end of the polyester 70's. Yes, VisiCalc changed the world every bit as much as Marcia Brady did. To implement NPV calculations, you need to determine your cash flows. To chart your cash flows, simply draw a time line and write down the positive or negative cash amount for each month. Positive is incoming (i.e., savings and revenue), while negative is outgoing (i.e., costs). When you submit your proposal, submit your cash flow diagrams also. If you are not familiar with NPV, it's a good career move to go out and spend 40 tax-deductible dollars on a managerial finance book so you know all about this. It's an even better move to go to a college bookstore in the fall or spring and spend maybe 20 such dollars on a used textbook. As a bonus, you're likely to find useful notes the student jotted down in the book—look for the most beat-up book.

### IRR

The Internal Rate of Return is the silver standard for financial types, but the gold standard for managers. You express IRR in terms of a percent.

IRR uses the same basic equation as does NPV. Financial types prefer the NPV because the IRR uses kind of a back door approach that involves polynomial equations. This leads to inaccuracies when the cost of capital is in certain ranges, when projects are mutually exclusive, or when projects in some way compete for funding. If you are competing with another

project, you may want to leave IRR out of the picture, because that picture will be a distorted one. You will have conflicts between IRR and NPV whenever the projects differ in size (or scale), or in the time patterns of cash flows. When there is a conflict, you are better off going with NPV.

Managerial people (actually, by a factor of 3:1) prefer the IRR method because of its being a percentage return the same way mutual funds and savings accounts express their returns.

The flaw in this method is it does not reflect reality. Which do you think nets you more profit: a 25% return on \$100,000 or a 100% return on \$1? Thus, you may want to provide a statement of actual value even if the IRR is the only number some executive wants to see.

You should know how to derive both IRR and NPV from a given set of cash flows. Get that textbook if you have doubts about either.

### **RRA**

In the case of IRR/NPV conflicts, the fundamental question is "How beneficial is it to have cash flows come in earlier rather than later?" The answer depends on what your company can do with additional funds and the opportunity cost rate at which your company can invest differential early years' cash flows. Is there a catch to determining this by using just the NPV or IRR numbers you already have? You bet there is. The NPV method assumes that you can reinvest the cash flows at the cost of capital. The IRR method assumes that you will invest the cash flows at the Internal Rate of Return.

It is now obvious that the logical choice is the NPV method because you aren't likely to have a bunch of projects with the same IRR just waiting to be done. Also, the cost of capital is relatively stable and will vary over a small range. There is little sense to going through elaborate calculations if they give a distorted picture of the situation. Thus, NPV wins out to those who appreciate accuracy.

### **MIRR**

The Modified Internal Rate of Return is an attempt to resolve the inaccuracies of the IRR method. The formula for this is incredibly complex, but high-end financial calculators have this function. You will also find it on electronic spreadsheets. Its advantage is it assumes (as does the NPV) that you are investing project cash flows at the cost of capital. This method is now supplanting the normal IRR. MIRR will always lead to the same conclusion for competing projects that are of equal size. If projects differ in size, you're back in NPV territory.

### **Multiple IRR's**

When you use the regular IRR method, you can have negative cash flows once a project goes into operation. This means you have multiple IRR's. It happens with "nonnormal" projects. Such projects have a large cashflow sometime during (or at the end of) their lives. This makes the IRR method go bonkers. You can resolve the problem by going to an NPV or MIRR method.

## **YOUR ACCOUNTANT**

### **Ask what is the best format, if no standard format exists**

People like to see information presented in certain ways. Find out what their preferences are, and cater to them.

### **Ask what are the words and phrases that raise red flags**

You may consider a statement innocuous, but that doesn't mean it's OK to use it. Certainly, cliché words such as "solution," "paradigm," and "optimized" raise eyebrows because people throw them about so flippantly. Before you visit your controller or accountant, make a list of words that seem trite. Bring it with you. Ask if any of these are a problem. Even if the accountant says no, a higher-up manager may say yes—but you don't want to go around asking managers about word choices. The accountant will alert you to the ones that bring the most chuckles when the managers tell their project proposal horror stories. Keep the language simple—just make your point without trying to sound like an ad for a dictionary. If you must use technical jargon, then add a page that lists words and definitions. If only a word or two needs clarification, try to put a short explanation in parentheses (those roundish brackets in which you can put short explanations).

### **Ask for a copy of a request that did well**

Here, you'll probably find writing styles and word choices that you should keep in mind as role models. You'll also find format, length, and content to emulate. However, just because a request for funding gets approved doesn't mean the proposal was great. The executive who reviewed it may have said, "Why can't these silly engineers write an executive summary?" Chances are, the exec will read the summary and look at the MIRR figure. And that's about it. He or she will let the accountants and lower managers who've already signed off worry about the full version. If the summary reads well, then the exec is likely to sign the paper immediately rather than throw it in a folder with 25 others to look at when time permits. So, read that request that did well—and improve on it.

### **Ask for a copy of a request that bombed**

Even a perfectly presented request may fail to get approval, because of poor technical merits or lousy analysis. Don't use unsupported assumptions behind the numbers without a solid explanation of how why you made those assumptions. Compare your proposal to the one that got approval, and identify the differences. What you are doing here is tuning in to the corporate culture and the values of the people who will ultimately give you approval or rejection.

## **YOUR REQUEST**

### **Leave out history**

Those who hold the approval pen do not want to read a history on a technology. They simply want to know what it will do for them.

### **Write in the active voice**

Don't write in that stilted, boring, vague way that is so popular among engineers. Do a word search for the following: was, by, were, had, and been. These are likely candidates for passive voice sentences. Eliminate passive voice completely. Instead of saying, "The study was done and the numbers were tallied," say, "Three maintenance technicians performed the study. The plant engineer entered these in her spreadsheet." Be direct, and do not use adverbs. You don't walk quickly, you scamper. And the big one: do not use words that don't go together. For example, "very unique." Something is either unique or it isn't. Be logical in your writing, so you have the appearance of one who is logical in your thought. This boosts your credibility. If you aren't big on the writing part, consider it a career investment to take a basic writing course at a local community college. Many of these are Saturday only. You may also consider some printed and electronic courses. An excellent way to improve your writing is to use a grammar checker. Most word processors have decent ones, and you can buy stand-alone packages. Just remember, though, the worst sin is to write in the passive voice.

### **Eliminate judgment statements**

Show, don't tell. Let the numbers do your talking. If you can support the numbers and the numbers are good, then the person reading your request will know this is "an excellent project." Just stick to the facts.

### **Justify all assumptions**

If you say that buying a \$5,400 piece of test equipment will reduce labor by 30 hours a week, you'd better show where you got such information. If it's from a sales brochure, say so—and attach the brochure. If you actually measured such savings, show how you did the measurements. If you assume the cost of capital will be 7% when the project gets its funding, you'd better make sure the current cost of capital is not 11%. One thing that raises a red flag immediately is an extraordinary MIRR. The first thing a reviewer does is check the assumptions. "Oh, sure, no wonder he gets a 90% annual return. He forgot to include the cost of labor, and he's also saying that 500 MCM cable costs ten cents a foot." If your assumptions are poor, you immediately get a rejection. If you are unsure of an assumption, use the one you think is best and then provide a note that you are unsure. If you can, use a worst-case (or simply worse case) assumption and provide a separate sheet that shows the financial calculations based on the less favorable assumptions. Make sure you clearly mark this as such.

### **List reference sources and attach documentation as needed/as allowed**

A 3-inch thick proposal may not get the most eager reception. If you add just a single page listing your references, it will be enough to show your diligence.

**Prepare a half-page executive summary if you have a lot of information—format permitting**

Mentioned earlier, this summary can make all the difference in the world. Unless your company's proposal format prohibits such, write a summary of the project. List its benefits and the reason why you want to do it. Here, also, you should list the NPV and MIRR.

When you write the summary, revise it at least 5 times—on 5 different days if you can. This summary is often the only place the highest signature authority will look. Keep the language concise and make your point. Do not build up to your conclusion. State it at the outset. Here's an example of a good summary:

“We want to install a battery-monitoring system in the number 3 data acquisition UPS. We have such systems in the number 1 and 2 data acquisition UPS's, and they have prevented system crashes on 5 separate occasions. The number 3 UPS did crash, due to unknown battery condition, resulting in a 21-minute outage even though the diesels came on line on time. We can install the system with no downtime. The NPV is \$20,000. The MIRR is 34%.”

Here is an excerpt from a three-page summary from hell:

“Much has been studied in recent times regarding events that have transpired with the transprostidination of reliability decrementing occurrences in the tide-over battery system conditions readiness monitoring absence. The data that had been lost had been due to unsustainable power due to power interruptions occurring....” Blah, blah, blah.

This is gibberish, and no numbers. Steer clear of this kind of writing. Give the facts straight up. That is the theme throughout this paper. Doing that one thing—and doing it thoroughly—will improve your approval rate tenfold. Go forth and conquer.