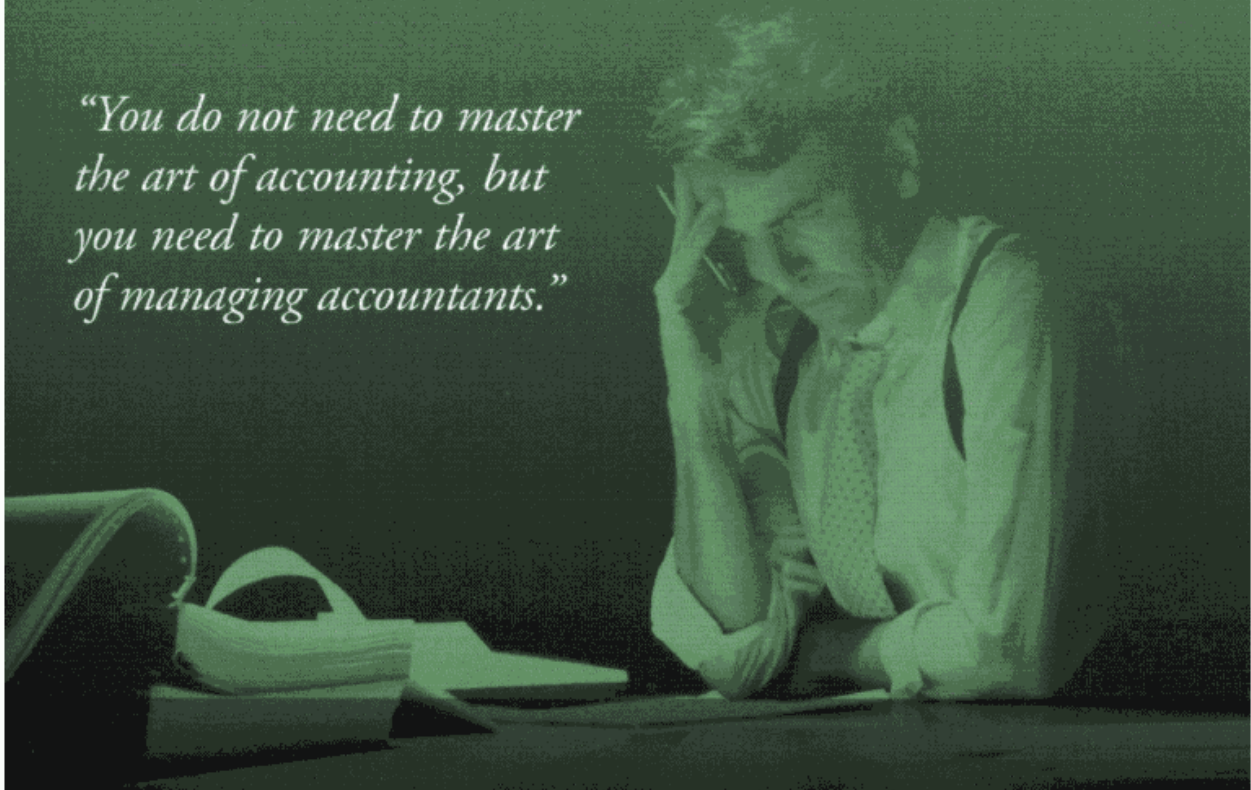


# PLANNING AND FINANCING

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*"You do not need to master  
the art of accounting, but  
you need to master the art  
of managing accountants."*



HUGO DAEMS



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# **PLANNING AND FINANCING**

## **The Nuts and Bolts of Modern Strategy**

### **Table of Contents**

<b>TABLE OF CONTENTS</b>	<b>III</b>
<b>TABLE OF FIGURES</b>	<b>IX</b>
<b>ACKNOWLEDGMENTS</b>	<b>XI</b>
<b>INTRODUCTION</b>	<b>XIII</b>
<b>CHAPTER 1 – DESCRIPTION OF STRATEGIC PLANNING</b>	<b>1</b>
1. What is a “plan”?	1
2. What differentiates STRATEGIC from TACTICAL?	1
3. The Strategic Business Plan	2
<b>CHAPTER 2 - HOW TO MAKE A PLAN IN 12 EASY STEPS</b>	<b>3</b>
1. Establish your Goal	3
2. Define all crucial Difficulties and Opportunities	3
3. Create Job Descriptions	3
4. Sequencing the Tasks	4
5. Define a Time Schedule	4
6. Assemble your first Functional Organization Chart	4
7. Select Staff	4
8. Collect Cost Data to prepare your Budget	5
9. Compose a Financial Forecast	5

<b>10. Establishing Leadership</b>	<b>6</b>
<b>11. Provide clear Employment Contracts</b>	<b>6</b>
<b>12. Establish Controls</b>	<b>7</b>
<b>13. Conclusion</b>	<b>8</b>
 <b>CHAPTER 3 - THE FEASIBILITY STUDY</b>	 <b>9</b>
<b>1. Technical Feasibility</b>	<b>9</b>
<b>2. The Market</b>	<b>9</b>
<b>3. Permits and Licenses</b>	<b>9</b>
<b>4. Political Stability</b>	<b>9</b>
<b>5. Availability of Supplies</b>	<b>9</b>
<b>6. The Labor Market</b>	<b>9</b>
<b>7. The Site</b>	<b>10</b>
<b>8. Investment in Plant and Equipment</b>	<b>10</b>
<b>9. The Life of an Asset</b>	<b>11</b>
<b>10. Inventories and Working Capital</b>	<b>11</b>
<b>11. Minimum Cash Balance</b>	<b>12</b>
<b>12. Operating Data</b>	<b>12</b>
a. Variable or Direct Production Costs	12
b. Production Volume	12
c. Fixed Costs	13
d. Income Taxes	13
e. Internationalization	13
 <b>CHAPTER 4 - PROFITABILITY AND FEASIBILITY MEASURES</b>	 <b>15</b>
<b>1. Definition and Timing of Cash Flow</b>	<b>16</b>
<b>2. Differential Cash Flow</b>	<b>17</b>
<b>3. Pay Back Period</b>	<b>18</b>
<b>4. Discounted Cash Flow Calculation</b>	<b>19</b>

<b>5. The Net Present Value (NPV)</b>	<b>19</b>
<b>6. What discount factor should one use?</b>	<b>22</b>
<b>7. Limitations to the NPV method</b>	<b>22</b>
<b>8. The Internal Rate of Return</b>	<b>24</b>
<b>9. Cash Flow versus Funds Flow</b>	<b>26</b>
<b>10. The IRR On Investment (IRROI)</b>	<b>26</b>
<b>11. The IRR On Equity (IRROE)</b>	<b>26</b>
<b>12. Limitations to the IRR methods</b>	<b>27</b>
a. No Root	27
b. Negative root	28
c. Multiple Roots	29
d. IRR Before and After Taxes	31
e. Contiguous and Continuous Discounting	31
f. Transactions at the beginning or at the end of a period	33
g. Impact of Duration on Profitability Measures	35
 <b>CHAPTER 5 - PLANNING WITH INFLATION</b>	 <b>39</b>
<b>1. Optimizing Financing Structures without Inflation</b>	<b>39</b>
<b>2. Optimizing Financial Structures with Inflation</b>	<b>40</b>
<b>3. Exposing the Inflation Problem in Business</b>	<b>41</b>
a. A Forecast assuming NO Inflation	42
b. A Forecast assuming 10% Inflation per year	44
<b>4. Common Inadequate Defense Strategies</b>	<b>48</b>
<b>5. The Benefits of Debt Financing</b>	<b>49</b>
<b>6. Strategic Debt / Equity Planning</b>	<b>49</b>
a. Demonstrating the relation between Borrowing, Inflation, and Asset Life	50
b. Testing the Theory with 2 Replacements in a 30 year Forecast	52
<b>7. Conclusion</b>	<b>57</b>
 <b>CHAPTER 6 – STRUCTURING A FINANCING PACKAGE</b>	 <b>59</b>
<b>1. Feasible Debt Structures</b>	<b>59</b>
a. The “curt” Schedule:	59

b. The grace period:	60
c. Graduated Loan:	60
d. Multiple payments per period:	60
e. Creative combinations:	60
<b>2. The different Loan Repayment Structures</b>	<b>61</b>
a. Interest Only Loan	62
b. Amortized Loan	63
c. Simple Interest Loan	64
<b>3. The different Interest expenses.</b>	<b>68</b>
a. For an Interest Only Loan	68
b. For an Amortized Loan	69
c. Simple Interest Loan	70
d. Interest payments compared	72
<b>4. The Combinations of Loan Structure and Interest Expense</b>	<b>74</b>
a. For an Interest Only Loan	74
b. For an Amortized Loan	75
c. For a Simple Interest Loan	76
d. The combined costs compare as follows:	77
<b>5. Impact of the Loan Format on the ROE</b>	<b>80</b>
a. Influence of the Interest Rate on the ROE	81
b. Influence of the Loan Repayment Schedule on the ROE	82
<b>6. Conclusion</b>	<b>84</b>
 <b>CHAPTER 7 - FUNDING YOUR PROJECT</b>	 <b>85</b>
<b>1. Anatomy of a Financing Document</b>	<b>85</b>
a. IDENTITY	86
b. AUTHORITY TO BORROW	86
c. PURPOSE OF THE LOAN - LEGALITY AND LICENSES	86
d. CAPACITY TO SERVICE DEBT	87
e. EXISTENCE OF ADEQUATE COLLATERAL	87
f. POLITICAL ENVIRONMENT	87
g. POLICIES	87
h. PRODUCT VIABILITY	88
i. OPERATING DATA	88
j. FINANCIAL DATA	89
<b>2. Conventional Sources of Money</b>	<b>90</b>
<b>3. Additional Sources</b>	<b>90</b>
<b>4. Sources of Collateral</b>	<b>93</b>



<b>CHAPTER 8 - THE SENSITIVITY ANALYSIS</b>	<b>95</b>
1. The importance of documentation format	95
2. Maximizing Project visibility by means of format	95
3. Conventional and New formats of Classic Financial Reports	95
a. Description of the SMELTER PROJECT'S INPUT DATA	98
b. Conventional Format for Financial Reporting	100
c. Revised Format for Financial Reporting	100
4. The Financial Synopsis Report	104
5. The Sensitivity Reports	105
<b>CHAPTER 9 - CONTROLLING INFORMATION OVERFLOW</b>	<b>113</b>
1. Information becomes “overflow” when it is hard to digest.	113
2. What is a Strategic Planning Graph?	115
3. How to produce a Strategic Planning Graph	116
GRAPH 1 - Example of a Strategic Planning Graph	116
GRAPH 2 - How to produce a single Y-axis Graph	118
GRAPH 3 - Adding a second Y-axis on your Graph	120
GRAPH 4 - Producing a multiple Y-axes Graph	122
GRAPH 5 - Producing a multiple curve Graph	124
<b>CHAPTER 10 - HOW TO USE A S. P. G.</b>	<b>127</b>
1. Reading the Result of simultaneous changes in many assumptions	127
GRAPH 6 - An Example of Strategic Target-Planning	130
GRAPH 7 - If Flags on the Y-axis are unevenly distributed	134
GRAPH 8 - If equal and unequal Flags are mixed	136
2. Manipulating the variables Volume, Price and Cost per unit	138
GRAPH 9 - Reading the Result of such changes	140
GRAPH 10 - Targeting with such changes	142
3. Debt and Equity valuation	144
GRAPH 11 - The limit for a Loan repayment term	144
GRAPH 12 - An exercise in understanding Leverage	148
4. Valuing a Business	150
1. The market value of the assets.	150
2. The book value of the business.	150
3. The value of a going concern with an S.P.G.	150

<b>5. Calculating the value of a going concern:</b>	<b>148</b>
RAPH 13 - Valuate a Business using the NPV method	148
GRAPH 14 - Valuate a Business using the Strategic Planning Graph	156
 <b>CHAPTER 11 - THE REAL WORLD AND STRATEGIC PLANNING</b>	<b>159</b>
 1. A Fish Cannery	160
2. Port development	161
3. Aqueduct Power Supply	162
4. Uranium Mining Project	163
5. Comparative Study for a major bank	164
6. A Greek Cannery	165
7. Steel Mill	166
8. Hydro-electric Power facility	167
9. Arbitrage Deals	168
10. Pioneering the STRATEGIC PLANNING GRAPH	169

## **Table of Figures**

FIGURE 1 - PROJECT DURATION AND THE ROI	37
FIGURE 2 - INFLATION AND DISTRIBUTION OF AVAILABLE CASH	47
FIGURE 3 - PERCENT OF INVESTMENT TO BE BORROWED	51
FIGURE 4 - LOAN REPAYMENTS FOR AN INTEREST ONLY LOAN	62
FIGURE 5 - PRINCIPAL REPAYMENT FOR AN AMORTIZED LOAN	63
FIGURE 6 - LOAN REPAYMENTS FOR A SIMPLE INTEREST LOAN	64
FIGURE 7 - PRINCIPAL REPAYMENT SCHEDULES COMPARED	67
FIGURE 8 - INTEREST PAYMENTS FOR AN INTEREST ONLY LOAN	68
FIGURE 9 - INTEREST PAYMENTS FOR AN AMORTIZED LOAN	69
FIGURE 10 - INTEREST PAYMENTS FOR SIMPLE INTEREST LOANS	70
FIGURE 11 - INTEREST PAYMENTS COMPARED	71
FIGURE 12 - TOTAL INTEREST EXPENSE	73
FIGURE 13 - FINANCING COSTS FOR AN INTEREST ONLY LOAN	74
FIGURE 14 - INTEREST AND PRINCIPAL FOR AMORTIZED LOANS	75
FIGURE 15 - FINANCING COSTS FOR A SIMPLE INTEREST LOAN	76
FIGURE 16 - TOTAL DEBT SERVICE COMPARED	77
FIGURE 17 - COSTS OF THE DEBT STRUCTURES COMPARED	79

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Most of all I thank Andrée, my best friend and spouse for more than 50 years, for helping me structure PLANNING AND FINANCING in a way that those not trained in economics, accounting or finance can not only understand and digest this new approach but can also use the contents to make their venture a success.



# INTRODUCTION

This book is concise and leaves out all unnecessary elaborations or deviations from the subject. It is complete because it covers also important gaps left by formal business education courses and it introduces a new approach to planning and optimizing with a Strategic Planning Graph.

This book is designed for three groups of readers:

1. Advanced students of Business Management
2. Project Managers and Engineers involved in taking calculated risks
3. Managers and Engineers interested in an opportunity to update antiquated routines, used to resolve problems with long-term ramifications.

## **What every business manager needs to know:**

- How to make a Plan,
- How to measure the effectiveness of a Plan
- How to optimize a Plan,
- How to fund your project and
- How to survive with inflation.

**You do not need to master the art of accounting, but you need to master the art of using accountants.**

Grab this opportunity to compare your own experiences with observations on inflation and debt structuring.

You can use a computer to its fullest extent, go beyond the barriers of information overflows and package the necessary data in a new and more functional format, so that choices and their results can be seen at once on a single Strategic Planning Graph.

Learn how to produce and use this unique tool, the STARTEGIC PLANNING GRAPH.

You must plan before you take off, because anything you perceive as worth doing has the potential of going wrong. Early planning is always beneficial, it reduces the risk of failure. However, just “having a plan” may not be good enough - some plans work and some do not. Twelve easy steps, outlined in the following pages, will create a winning plan.

Any plan has to be measured. Universal profitability measures are commonly known. We will explain the proper use, and possible misuse, of different profitability measures.

Be aware of hidden dangers resulting from inflation and how to cope with them in your planning efforts.

To make full use of one's own knowledge requires much more time than the normal methods of decision-making permit. More importantly, even if more time is allocated to the planning stage, one can become tired of performing lackluster routine work... and lose efficiency that way.

Fortunately, modern technology provides more speed in data manipulation. This leaves more time for the planner to optimize his project.

Indeed, if the advantages, offered by modern technology, are properly used, anybody can play a more appropriate role than before. In addition, because no two minds think alike, there always appears to be more than one way that leads to success. Different minds perceive different solutions. However, the fact that one finds more than one solution does not eliminate the need for "a plan" because, by comparison, there are more than a hundred ways to go wrong without it.

Most importantly, this document will demonstrate how to harness computer generated "information overflow" and mold it into a most useful business planning tool.

The final step is always to select the proper money source and attract the necessary funding.

Compare your own experiences with the contents of this document and in doing so you will discover the quintessence of successful planning.

We will start by dissecting a PLAN. The building blocks and the tools that are needed to create a good business plan will be described first, thereafter it will be seen more plainly how to put the nuts and bolts together into a proposal, how to measure it and how to compare the original idea with its alternates.

"Your improved planning effort will result in a safer flight..."

# **CHAPTER 1 – DESCRIPTION OF STRATEGIC PLANNING**

## **1. What is a “plan”?**

The word “plan” is derived from the Greek word “planasthai” which means wandering around without obstacles, like the “planets” do. The later word “PLANUS” became the old English word “PLAIN,” meaning “level country,” or “an area that is free from impediment to the view.” Still later, it also meant “something that is evident to the mind.”

For our purposes, a PLAN indicates an orderly arrangement of all parts of an objective, so one can see and understand the whole project from beginning to end and wander around it in one’s mind and visualize its execution or theorize improvements to it.

So, for the manager, a PLAN is the formulation of a program of actions, a method of doing things to reach a goal, expressed in “plain” language, so that it is simple to understand by all concerned and therefore makes it easy to coordinate the actions of everybody with those of the leader.

A PLAN consists of clear goals, policies, and procedures to get from where you are to where you want to be.

## **2. What differentiates STRATEGIC from TACTICAL?**

The root of the word “STRATEGIC” is the old word “strath,” which meant originally “a flat, wide river valley.” A STRATH became to mean more generally “an easy way to move troops in a mountainous terrain”. If a general happened to be familiar with all the STRATHS of an area, he had an advantage in figuring out an efficient way to move and position his forces, transport all needed support and meet the enemy in combat under favorable conditions. The old Roman Emperors appreciated a very “Strath-wise” general; they called him a “Strath-egist.” A STRATEGIC PLAN is a cleverly contrived idea for gaining an end.

- “Strategic” changes are changes in the scheme itself. They are difficult to make during the operation. However, a final scheme should incorporate some flexibility.

- “Tactical” changes, on the other hand, are “amendments in the method to execute your scheme or in the method of employing your forces”. Tactical changes may become imperative as actual conditions and unforeseen circumstances materialize. The tactical plan is less fundamental than the strategic plan.

An example will make the difference between strategic and tactical decisions more obvious. Suppose you need to travel to the next city because of an emergency. You will have to go via the highway in spite of the fact that it will be crowded. That is the project. Now what is the PLAN?



You decide to drive your old beat-up pickup rather than your new Mercedes. You assume that you can take more risks with the old clunker. You also assume that high-strung drivers will challenge your tattered pick-up less than your Mercedes because repairing a dent in a Mercedes is more expensive. The decision to drive your pick-up is a “strategic” decision.

Driving over the speed limit or changing lanes to pass a slower car are “tactical” decisions.

### 3. The Strategic Business Plan

The serious business planner faces the task of collecting data, followed by analysis and synthesis. The planner must study all possible successions of available “STRATHS.” Every choice must be quantified, compared with all alternates, and then ranked. The boss must not become confused by endless error-prone calculations.

The staff can be another cause of frustration. Because, when the plan is finally optimized, it must be communicated. The leader must prepare text, tables, graphics and whatever else is necessary to enlighten the staff and inform every participant.

As you already know, you can expect plenty of “suggestions” when others see your Business Plan. The bad ones can be discarded but the good ones may cause rework and delay. Perhaps too much delay. The fear of these hurdles is the cause that many entrepreneurs have rashly reached the conclusion not to get involved with strategic planning. Practical as they are by nature, they prefer immediate action. You have, I am sure, on more than one occasion, heard them say the following:

*“I don’t need a business plan. That’s for the Fortune 500 clan. Useless stuff. Harvard MBA’s and Philadelphia lawyers invented business plans. I don’t know what this country has come to. Today you approach a Finance House and you can expect that classic question: “Did you make a business plan?” Just like when you come back from a vacation in Florida, you can expect one asking: “Did you catch a fish?” ... I have no time for that nonsense. If you want to swim, jump into the water! Our forefathers had no computerized plans. They built this country with a shovel and, look at the score, they did not do so badly!”*

That reasoning is convincing as long as all the business failures of the past, caused by lack of planning, remain cloaked.

Making a good business plan can indeed take a lot of effort, particularly if you are not sure of what you are doing. Reading what follows should help you.

# **CHAPTER 2 - HOW TO MAKE A PLAN IN 12 EASY STEPS**

## **1. Establish your Goal**

To start, you need to know the answer to two simple questions:

1. Where am I now?
2. Where do I want to be next?

Think about those two questions very carefully. In addition, write down the answers in detail. Vague goals will be an impediment to the planning effort. It may be particularly difficult for the established manager, who is an employee of a going concern. He must free his mind from restraints caused by his personal swivel chair comfort, he must think unconfined by the social expectations of his co-workers, and he must make his decisions without fear of rocking the boat, however close to his retirement date he may be.

Time and again responsible leaders who want to improve their activity continue to need a clear answer to the same two questions:

1. What is not as yet the way I want it? and
2. How do I want it?

With a clear answer to both questions you can establish the direction of your desired course. You can start working on “how to get from here to there”.

## **2. Define all crucial Difficulties and Opportunities**

Now you can make a list of opportunities and obstacles that you will obviously be faced with, if you want to go from where you are to where you want to be. Describe each one in detail, and on a separate sheet of paper.

Besides the everlasting problems of time and money, the hurdles may include specific people, or perhaps your own make-up and perceived obligations, or perhaps unchangeable conditions, or your own lack of knowledge in a specific field. By being specific and writing everything down, you are forced to think things through. It is much easier and cheaper to deal with a problem when it is still on paper, than after you have started with the execution of your plan. Once you have progressed without a plan and things do not work out the way you expected, all you can do is put out fires and see your precious time go up in smoke, and you may have to watch your irreplaceable money evaporate with it.

## **3. Create Job Descriptions**

When you have a stark description of all expected problems as well as of all the short-lived opportunities, you can start defining a clear-cut formulation of all the work that needs to be done to neutralize each one of those problems and to take advantage of fleeing opportunities.

Next you will translate each formulation of a perceived problem into a precise job description. Attach it to the sheet of paper that described the problem or the opportunity the job deals with. Make sure you left nothing uncovered.

Remember to include an exact portrayal of all the routine work that needs to be done to keep your wagon rolling, once you get it moving.

## **4. Sequencing the Tasks**

At this point you have the necessary material to sequence the jobs at hand. Some work is to be finished before other work can start and some work can be done concurrently with other assignments. Depending on your degree of sophistication, you may apply “critical path techniques” or call on the advice of a specialist to minimize the time and money required to reach your objectives.

You will also combine certain assignments. Some tasks should be linked closely to others so as to streamline the effort, where others may have to be kept separate to obtain maximum efficiency.

## **5. Define a Time Schedule**

The next step is to make an estimate of the lead time required for certain jobs such as market studies, bid preparation, engineering and design, or the preparation of documentation to obtain permits and financing. Find out how long it will take to implement procedures or control systems. You must also assess the duration to completion for each segment of the plan after its execution starts, such as construction period, start-up and training times.

## **6. Assemble your first Functional Organization Chart**

The result of the phase you just completed is that you have an exhaustive set of key job descriptions for the immediate future as well as for the long run. All these jobs can now be identified and formatted into a “Functional Organization Chart”.

Not all job descriptions need to be included in a single chart. It is actually good practice to separate your plan into two or more phases. Such separation allows you to make two or more sequential Charts. Such a set of charts results in a “Phased Plan”, each phase having a different functional organization chart. The phasing may turn out to be a most important aspect of your plan because you may want to change key players between phases. Those adjustments in personnel or in assignments for your staff members keep your organization dynamic which may be necessary to keep it effective.

## **7. Select Staff**

The next step is to select the right person for each of the jobs covered by your Functional Organization Chart. Staffing will result in your Executive Organization Chart.

In spite of what some younger members think of themselves, there are in reality few men around that are expert in everything. Like when playing chess, you must carefully choose the right piece to make each move across the checkerboard in a fitting manner, or you will never get a shot at the opposing king.

With proposed names of people for each job description you have the necessary material to make a preliminary Executive organization chart, a staff that will bring you from where you are to where you want to be.

Complement your abilities by selecting dedicated individuals who are strong where you are weak, even if they are weak where you are strong. To rate the credibility of your potential staff and advisers, you must find evidence from their past performance and past loyalty, not just evidence of self serving smooth talk, cunning resumes and social references. Avoid making premature commitments.

## **8. Collect Cost Data to prepare your Budget**

Now you must place a dollar figure on your key people; on the staff they will need, on the supplies they will use and on expenses they will incur. You can collect data on what is required as equipment and facilities to execute the jobs. You must emphasize efficiency, not appearances. You must be frugal, but not at the expense of productivity.

## **9. Compose a Financial Forecast**

You had a vision, a goal that would seem like a good idea. You studied the opportunities and the difficulties you can expect. You wrote fitting job descriptions. You have preliminary Functional and Executive organization charts.

At this point you are ready to test your plan and discuss it privately with each specialist that was carefully selected from within your organization or that may be brought in from the outside.

Keep in mind that you will always look for increased efficiency and that you will need a certain amount of flexibility to take advantage of suggestions and opportunities that may come your way or that you create as you go. Therefore you may even allow some ambiguity and not spell out everything in its smallest detail.

You have discussed the plan with your prospective staff. You know who will be your key support and you checked out if your key players can work together as a team. You have obtained informal acceptance of the estimated time and costs that will precede the benefits you anticipate. Now you are ready to make a financial forecast for your plan. That means finding out whether or not your plan is financially viable and profitable.

If your project is unrealistically profitable, it will be short lived, because it will attract untimely competition, competition that will be satisfied with a smaller profit. Your patent will not protect you from an alternate version of your idea. If the profits seem out of line, you may want to change some parts of the plan.

If the costs of your plan are larger than the benefits, the plan is not viable. You must find out why it does not work as expected and you must study better approaches or “straths” to strengthen the plan, so that your purpose prevails.



The exercise of making revisions can consume so much time that the planning effort is prematurely stopped.

Some may try to persuade you to abandon the revisions for personal reasons. On the other hand, you may find yourself overwhelmed with suggestions and you may face a multitude of alternates prepared by an ambitious technical staff who uses computers to make instantaneous alternates. This is exactly where you may become so confused that you decide that it is just as good to simply gamble on your first choice.

As you will soon see, the new tools available for strategic master planning eliminate this madness. But even if the new tools are used and the financial forecast shows a feasible and profitable future, your plan needs a few more steps before it is complete.

## **10. Establishing Leadership**

Put your goals down in writing, concisely and clearly, so that every member of your staff knows what you want and expect. It will facilitate decision making at all levels. A plan, launched from the top, will invoke a feeling of belonging among all employees. Your announced plan will create that magic corporate spirit. You have defined your goal and everyone's efforts can be measured based on how well one's course of action brought the venture closer to that goal.

You must write your policies as a general guide for future tactical choices. And you must see to it that everyone involved understands what is happening.

Of course, you will have to delegate a part of the decision making process to your staff and therefore your policies must include guidelines and limitations to the power you delegate. Your policies are necessary to preserve order and direction in your absence. Order stems from intelligence and provides efficiency.

Unfortunately, all forms of organized effort, like all forms of discipline, limit freedom by their very purpose. Intuition and initiative, on the other hand, spring from freedom, which leads to innovation. So while your policies should provide order through limitation of freedom, they should at the same time provide for the necessary flexibility to allow and reward improved efficiency. Needless to say then that writing policy requires a lot of thought.

Make certain that your policies include training of replacements for unexpected happenings to your key staff members.

## **11. Provide clear Employment Contracts**

So far, we have a "Tentative Functional Organization Chart" that was already overlaid by an "Executive Organization Chart". Staff has been interviewed and can now be hired. Contracts can be signed. These employment contracts must spell out what your employee is expected to do for you and what the staff members can expect you to do for them.

Where necessary, you must include time limits and budget limitations to their job description. Penalties and rewards can be very useful to secure co-operation. Remember, however, that public recognition is stronger than money.

It should be made clear to all the members of your staff that failure to perform as expected and as agreed to by them, may cause termination.

Your key executives may write the procedures, make forecasts and propose budgets. That is part of the tactics, and tactics are merely ways of implementing the strategic plan. Tactics can be changed quickly. Your targeted goals, and your policies cannot, they are a part of your strategy and should remain unaltered for a long time, so that they can function as a beacon for your staff to steer by.

## **12. Establish Controls**

It is obvious that a strategic plan is only useful if its authority comes from the very top of the organization. But it is not enough to create a perfect plan and then sit back and hope that all will come out automatically as “strategized”.

Unexpected circumstances, misunderstandings, normal human shortcomings, reactions from within as well as from the outside will call for your constant attention and guidance.

Regular contacts with employees at all levels, formal and informal, will promote communications up and down the organization chart. David Packard of the Hewlett-Packard Company called it “Management by walking around”, and he did not do too badly.

Contact with clients and with suppliers will keep you informed about impending changes. Intelligence gathering about your competitors will help avoid unexpected obsolescence.

The most important control, however, is by comparing actual performance with your approved budget. This must be done at regular intervals at the corporate level as well as at the level of major components of your organization.

It is not sufficient to compare monetary values alone. Progress must be measured against the time schedule of your plan as well.

Any significant deviation from your plan must be explained by the responsible staff member and suggested corrective action must be submitted and accepted by all key staff members before you approve it.

You will not contradict your staff when you converse with their subordinates, and you want your staff to enjoy the freedom and the satisfaction of executing their assigned share of the action as they see fit. You manage only the deviations from the plan, the necessary changes to the plan and the conflicts between staff members. That is called “Management by Exception” and it does wonders.

Your planned tactics may have to be updated again and again. Adjustments in timing, personnel, budgets and expectations call for your ardent leadership, and lots of calculations of expected or desired “What If..?” projections.

Fortunately, modern technology can reduce error prone number crunching substantially.

## 13. Conclusion

The most important benefit of a Strategic Business Plan, is that it gives a stable and streamlined direction to the efforts of your team.

For combat preparedness, soldiers are trained to obey. No one expects an opportunity to vote for or against a military command. Soldiers know that the sortie is a part of a well thought out strategy.

In ancient Greek mythology, the leaders of the State would make a sanctified medium inhale smoke until the holy person hallucinated and uttered incoherent sounds. The high priests would interpret those supernatural sounds as coming from the gods and it was believed that they could thus determine whether the gods would support their plan or not.

The importance of this custom was not what the oracle said, but rather that it provided a means to make people act together and move swiftly in the same direction. It avoided paralyzing arguments.

If you must delegate the planning effort to outsiders, take heed. The worst business plan is one that is made to serve the purposes of an unrelated firm. This happens quite often in cases where an engineering firm or an other consulting firm places the emphasis on its own potential profits at the expense of a trusting client.

If the planning effort is made by yourself, take care not to be imprisoned by the comfort provided by an obedient and loyal staff. It is without doubt a difficult task for the business planner of an established organization to recognize and commit to paper the weaknesses of his loyal immediate staff. One of them may really be paid “to occupy a position” instead of being paid “to perform a job that is necessary to reach a specific goal”. In a wallowing firm, smart old-timers often continue to occupy their position simply because they have learned to manipulate their boss. They support their “buddy” unconditionally when he meets with shareholders and bankers. For “the boss”, their value comes from their obedience and loyalty only, and their allegiance is often disarming, even if they lack all drive.

Most often the lack of drive stems from lack of leadership and direction, because there is no master plan. Today, troops must be motivated by a well thought out strategic business plan instead of by Ancient Greek oracle smoke.

Although you will soon agree that progress has been made with the means available to make plans, very often you will still need a guiding hand from Heaven to... *“grant the serenity to accept what you cannot change, the courage to change what you must change and the wisdom to know the difference”*.

As a leader, however, you will never let perfection become the enemy of progress. If the financial measures of a well thought-out plan come out right, go do it.

# **CHAPTER 3 - THE FEASIBILITY STUDY**

To be profitable and fundable a business project has to be studied from several angles.

## **1. Technical Feasibility**

The technique to be used must be proven and the related equipment must be guaranteed, not only at the pilot plant stage but also at the full plant size stage because larger scale plants may hold many surprises.

The technique must be properly licensed and protected.

The application of the technique should be as flexible as possible and allow for adjustments, improvements, modernization, replacement and operating expansions or contractions.

## **2. The Market**

Describe the industry wherein your product fits. Describe the competition, both existing and expected. Describe your plans to avoid early obsolescence. How will your product or service be advertised, packaged, warehoused and distributed. How will payment be secured?

## **3. Permits and Licenses**

Even if all permits and licenses have been obtained, the public perception of your presence and business activity must be favorable. Public opinion is a silent license that can be influenced by the media and the media can be paid, used and manipulated by small groups or even by a single influential person.

## **4. Political Stability**

Governments of underdeveloped countries and emerging countries can make surprising decisions. This may include preventing the repatriation of profits, forcing domestic reinvestments of profits, freezing and confiscation of assets. Revolutions and mob action can be very costly indeed.

## **5. Availability of Supplies**

Where will the needed supplies come from? Transportation, storage and costs must be described including their dependability and stability. Raw materials and spare parts inventories have to be matched with uncertainties of supply.

## **6. The Labor Market**

The availability of trained or trainable labor is of course an obvious requirement.



Is the workforce of homogeneous cultural background? Racial discrimination may be illegal, but cannot be legislated away. As one moves down the line of command, cultural differences including racial, religious, gender and sexual orientation become more important.

Religion and morality can be the cause of more than expected absenteeism. An unfamiliar religion can cause surprising consequences and should be taken into account.

The physical size of manual labor may influence the kind and size of tools or equipment you purchase.

Union activity is one major factor. Labor can be a fixed cost with periodic increases in cost faster than the inflation rate. Beyond wages and salaries one must count the many fringe benefits that can become too burdensome to survive.

If hiring new immigrants does not bring the desired financial solution, then moving overseas is sometimes an answer to avoid the grip of labor unions, particularly for a labor-intensive industry. Each one of the above considerations is at least equally important overseas. The distance from the market and the cost of transportation may be dampening factors. Comparative inflation rates and the ensuing changes in parity of currencies are to be included in your financial forecast.

## **7. The Site**

The climate, the rainfall, the composition of the soil, the environmental impact, the availability of water, power and labor, the needed infrastructure and the proximity to roads, harbors or airports needs to be studied and described because it will influence the viability of the project.

## **8. Investment in Plant and Equipment**

It is not sufficient to have a single figure defining the capital investment cost. The spending curve must be spread over the periods of time it will take to complete the erection. The burn rate may have to be phased and stretched out over time to be synchronized with market expansion or to allow the necessary internal cash flow to mature.

Of equal importance is the need to categorize buildings and equipment into groups by their expected life. This distinction is necessary to include the replacement of assets in your projections and to calculate a proper depreciation rate.

Finally the investment has to be broken up by currency.

The bid packages should not only include a description of the required specifications. It should include the expected useful life, the maintenance cost, the necessary spare parts inventory and a proposed financing package.

Depending on the effort made to estimate the amount of the investment, a contingency factor should be included to absorb the errors of the estimate. The more precise and certain the estimate, the less the required contingency factor.

## 9. The Life of an Asset

The life of an asset can be defined in more than one way:

The Useful life:

The functional obsolescence of an asset will not depend on the warranties of the manufacturer. It will mainly depend on the intensity of its use and on the amount of maintenance provided.

The Technical life:

The technical life depends on the industry. The functional life of essential equipment used in the basic metals industry has typically outlived its technical life. The aluminum and steel industries work with outmoded plants and the rigidity of their design inhibits timely modernization. The high tech industry must allot sufficient funds for R&D and build extremely flexible facilities and stay in the game.

The reserves prospected may limit the maximum life of an asset.

The allowable Depreciation, Amortization or Depletion periods for tax purposes.

If an asset cannot be expensed at once, it can be capitalized and then depreciated or amortized (expensed) over time. These tax laws allow for limited management of the balance sheet and income statements and thus optimize the company's image in the market place. The short term advantages of using tax laws to "manage" the balance sheet and income statements can help the outcome of some profitability measures and even the financing plans. You must somehow decide which method to use; Sum of the digits, Declining balance, a Volume related or other legal method.

Leasing Contracts:

When an asset is leased it is not capitalized and it is not depreciated either. Only the cost of leasing appears on the income statement. Lesser assets could make for weaker balance sheets and lesser borrowing power. On the other hand it can be an answer to a lack of financing power. Although leasing costs usually more than owning, it can be an important way to avoid premature aging, stay more flexible and adapt faster to technology changes.

## 10. Inventories and Working Capital

Now that we know the investment in Plant and Equipment, we can concentrate on the investment needed to put the facility into operation.

Count all inventories and their handling methods:

Raw materials inventories

Inventories in process

Finished goods inventories

Packaging and shipping costs

Inventories in transit

Inventory shrinkage, drayage, pilferage and returns

The following items need to be funded as well:

Accounts receivable

Possible hedging costs

Bad debts

## **11. Minimum Cash Balance**

The minimum cash balance on hand should never be “zero”. It must be a realistic amount, proportioned and related to the cash flow movements and the possibility of delays. It is a contingency buffer in case a cash inflow does not materialize in the expected amount or at the expected time.

## **12. Operating Data**

### **a. Variable or Direct Production Costs**

Make a flow chart of the material entering your site, until the finished product is shipped.

Quantify all material that goes into the production facility and define the cost.

Estimate the cost of power used in the process at every station of the production line.

Make a manning schedule for every station, until the product is shipped.

Define the labor cost, including benefits, fringes, taxes, bonuses and other incentives for hourly and piece workers.

It may be necessary to include some pre-operating costs such as early training and start-up costs.

### **b. Production Volume**

Estimate the production in units, in volume or in weight expected to be paid for by your clients at the end of a run. This may be a batch process or a time period. You must take into account that a loss may occur between the volume entering the finished goods inventory and the volume that is paid for by your clients. Depending on the product in question, count on some shrinkage, theft, damaged goods, returns and bad debt.

Calculate the total production cost per unit, per batch or per period. This cost will increase or decrease with the volume produced during the cycles of seasons or as a result of expansions or contractions of the business.

During an extended construction period it is possible that the production during the first period or the first few periods is not yet at capacity and that operating losses occur, which must be financed as well.

Decide on the method of inventory costing which can be LIFO, FIFO or Average Costing.

**c. Fixed Costs**

Fixed costs are not tied to the production volume. It is a cost incurred for a given period and includes:

Wages other than piece workers, including benefits, fringes, taxes, bonuses and other incentives for exempt and non exempt staff.

Legal costs.

Royalties.

The cost of outside consultants.

The cost of maintaining the site.

Heating, cooling and lighting the facility.

Janitorial services.

Security services.

Insurance costs.

Local taxes, dues, licenses and permits.

Office supplies.

Telephone, fax and other communication expenses.

Travel, lodging and entertainment costs.

**d. Income Taxes**

Taxation in the country must be studied and researched in detail. Reporting requirements must be explained.

Temporary tax incentives, deferrals and tax loss carry-forward must be taken into account.

Transfer prices may influence the tax burden when high tax regions are to show little profit by shifting the profits to lower tax regions.

**e. Internationalization**

Taxation can drive domestic operations out of the country because an off-shore setup can sometimes provide legal domestic tax avoidance. It is argued that such form of tax avoidance may be legal but is unpatriotic and should therefore be prohibited and punished.

Union activity is an other major reason business leaves the country. The Norris-LaGuardia Act, the Fair Labor Standards Act (FLSA of 1938), the National Labor Relations Board NLRB, and the Labor-Management Regulations Act of 1947, better known as the Taft-Hartley Act regulate strikes and boycotts that put serious restraints on labor as well as on employers.

Business has a choice of going overseas and benefit from advantageous foreign taxes and labor laws, or lose market share because of imports.

Competition of imported products can prevent selling at the necessary (above cost) prices for domestic products. In fact, the consumer, more so than the business managers, enjoys that freedom of choice, which is generally more price-driven than patriotic. One can observe that the parking lot of a domestic automobile manufacturing plant is full of foreign cars and that their striking labor drives a Toyota to the picket line.



## **CHAPTER 4 - PROFITABILITY AND FEASIBILITY MEASURES**

A business plan, even if it includes detailed operating data, does nothing by itself. Its purpose is to facilitate the decision making process. The “plan” should be quantified using conventional standards, so it can be measured and compared with other possible choices. The outcome must in any case show that the plan is feasible and profitable.

The plan must be measured over a time span that includes every period that may play a role in it. It is by comparing the viability or the profitability measures resulting from alternate courses of actions that the manager is able to pick the best one and thus optimize his plan.

Note that viability and profitability is not the same thing. A project can be viable but not sufficiently profitable. This would be the case for a venture that can repay debt but does not give a sufficient return to attract the equity put at risk.

Also, a project may be profitable, but not viable. This may be the case for a project that cannot service its debt over the term requested by the lender because the expected loan term is too short.

Classic profitability measures are:

- The Pay Back Period
- The Net Present Value
- The Internal Rate of Return on Investment
- The Internal Rate of Return on Equity

Viability measures are:

- The Minimum Equity required
- The Minimum Loan required
- The Minimum Loan Repayment Term

In addition to using classic measures, there is a need to control the cash flow so that the project can endure the replacement of major investments in spite of inflation.

Finally the financing structure, particularly the loan repayment schedules will need attention. The borrower will nearly always try to have the longest possible loan repayment period. The lender, on the other hand, will usually choose the shortest possible loan recovery time.

One new important measure for planning and negotiating purposes is the shortest possible loan repayment term that the forecast of the expected cash flow can support. In this book that shortest loan term will be called the “CURT” schedule, and will be

covered in the chapter that covers the loan repayment structures. Should a loan be offered that is to be repaid over a period of time shorter than the cash flow may support, one must either renegotiate the repayment schedule or reject the plan and make a revised one.

First we will review the differences between the diverse classic ways one can use to calculate the value of a business decision. Each one of these measuring tools has a different purpose.

Thereafter we will discuss new ways to plan for survival. A business can indeed be profitable and yet fail to survive because of bad planning.

Is it possible to get on the wrong track, once you are beyond the back of an envelope routine, by choosing the wrong method to measure profitability?

Can the best valuation method include combinations of more than one measure?

Is all one measures strictly dollars and cents, the yardstick of greed?

Can inadequate sequencing of cash flows into successive periods be the first faux-pas?

The answers are yes, yes, yes, and... yes!

Because so much confusion exists in this valuation “art”, it is interesting to compare notes.

## **1. Definition and Timing of Cash Flow**

The first step is to define the “CASH FLOW” generated by the project or by the decision in question. Count “cash” only. Assume that all your income is materialized only when cash becomes available to you and that all your investments and expenses are taking place when you actually commit to the expense. No receivables, no accruals, no deferred bookings, no depreciation and no amortization or depletion allowances are counted as part of your cash flow. Count only cash when earned as “cash IN” and cash committed as “cash OUT”. Loans draw downs or deferred payables are not part of the cash flow. When financing with loans or deferrals are included, the forecast is a FUNDS FLOW not a CASH FLOW. For cash flow calculations, everything is financed with equity.

If the consequences of your decision extend over more than one period, you must define the cash flow for each one of the periods separately. Suppose that progress payments on a 6.6 million building are made over a two year period as follows: in year one 3.6 million and in year two 3 million. One would obviously not measure correctly if 6.6 million appears in one lump sum. Prepared with data presented in the correct sequence, we can properly evaluate and compare alternate opportunities and make intelligent choices.

“CASH FLOW” results from algebraically adding “cash OUT” and “cash IN” on a period by period basis.

### EXAMPLE 1

An investment of 2,500 is expected to generate both income and expenses as portrayed in the table below.

	Investment	Year 1	Year 2	Year 3	Year 4
Investments	-1,000	-1,500	0	0	0
Sales revenue	0	2,000	4,000	4,000	4,000
Operating Expenses	<u>0</u>	<u>-1,500</u>	<u>-3,000</u>	<u>-3,000</u>	<u>-3,000</u>
<b>CASH FLOW</b>	<b>-1,000</b>	<b>-1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>

## 2. Differential Cash Flow

Differential Cash Flow is obtained if one counts income, investments and expenses that are coming about “only” because of the decision you want to evaluate. Any income or expenses that would occur even if the decision were not made, are ignored and considered what is called “sunk” cash flow.

Profitability measures define the return on a project by measuring differential cash flows that are generated INTERNALLY. “Positive” internal cash flow comes from revenues generated by the project or by the decision. “Negative” internal cash flow comes from investments and expenditures made because of the project.

To make the concept of INTERNAL cash flow easier to understand, it may be useful to explain EXTERNAL cash flows.

EXTERNAL cash flows are flows that are “not” generated by the project, even if they are part of your ongoing business. External cash flows, for instance, would be those generated outside the project, such as investments in stocks and bonds that have nothing to do with the decision you want to measure. Suppose the company decides to purchase a certificate of deposit with available cash and earn 2% on that deposit. That is a cash flow that is completely independent from the project you need to measure. It is an EXTERNAL cash flow and must be excluded from your study.

Cash flow that would have occurred without the project or is simply not necessary to execute the plan, is EXTERNAL.

For an independent new venture one can count all the forecasted transactions, because everything is Differential. (Different from doing nothing.)

In a going concern, however, one cannot include existing transactions, because those transactions would have taken place without the decision you are measuring. Existing cash flows are therefore not part of the Differential Cash Flow. That is exactly why they are called “sunk revenues and sunk costs”.

Differential Cash Flow, as its name implies, will then include only the “difference” between cash flows materializing without the decision and those caused by the



decision. Such differences would embrace increases or decreases in investments, expenses and income, caused exclusively by the plan you are analyzing.

In the following pages we will cover the most important methods of valuating such differential cash flow by describing their technique and by giving an indication of when to use each one of them.

### 3. Pay Back Period

This method measures the time it will take to earn back a differential investment with its DIFFERENTIAL CASH FLOW. The method assumes that the investment is totally financed with equity capital.

The PAY BACK period is an easy measure that allows one to check how that period compares with the useful life of the investment. It is used to check if the investment can be recovered before the end of its useful life.

Differential cash flows for the PAY BACK period are defined for every period. However, cash flows beyond the period wherein the investment is recovered are not counted. This method does therefore not measure profitability very efficiently. The PAY BACK PERIOD is only concerned with measuring the risk of not fully recovering the investment because of rapidly changing external conditions.

*The Pay Back period calculation includes taxes.*

#### EXAMPLE 2

		Cash Flow	Cumulative Cash flow
	Investment	-1,000	-1,000
Period 1	Income	250	-750
Period 2		250	-500
Period 3		250	-250
Period 4		250	0
Period 5		<u>250</u>	250
	<b>Total</b>	<b>250</b>	



The above example has a PAY BACK PERIOD of four periods, because the investment is fully recovered at the end of the fourth period.

## 4. Discounted Cash Flow Calculation

The purchasing power of cash decreases as time goes by. A dollar received today is worth more than the same dollar received a year from now. If a dollar received a year from now is worth less than if that dollar were received today, then it is interesting to define that next year's dollar in today's value. Discounted at 5%, the discounted value of next year's dollar may be only 95 cents in today's value.

For a cash flow consisting of more than one period of transactions, the farther out in the future the cash flow occurs the deeper it should be discounted. A common formula to find the present value of 1 at compound interest or discount rate is:

$$(1 + r)^{-n}$$

r is the discount rate

n is the number of periods

### EXAMPLE 3

The present value of 100, 4 years from now, discounted at 2.5% per year would be:

$$\frac{100}{1.025 * 1.025 * 1.025 * 1.025} = 90.59$$

## 5. The Net Present Value (NPV)

The NPV is useful if you wish to include the timing or the futurity of cash flows. This is done by discounting all cash expenditure and revenues in the future by a chosen percentage. This discount factor is used to discount the yearly "net" (discounted) differential cash flows and then making their sum.

The NPV measures are particularly useful to compare alternate opportunities or to gauge the sensitivity to changed assumptions. This method makes it possible to optimize a long term plan. Indeed the timing or phasing of cash flows may influence the decisions you plan to make.

The outcome depends on the discount rate used. By changing the discount rate, one changes the net present value. When one chooses to use the NPV method to compare alternates, one must of course use the same discount factor for all alternates.

The Net Present Value is the sum of the discounted values calculated for every period of the project.

#### EXAMPLE 4

##### INCREMENTAL CASH FLOW OF A PROJECT

	Original value	Discount Factor 5%	Present Value
Investment	-1000	1.00000	-1,000.00
Income Year 1	250	.95238	238.10
Year 2	250	.90703	226.76
Year 3	250	.86384	215.96
Year 4	250	.82270	205.68
Year 5	<u>250</u>	.78353	<u>95.88</u>
<b>Total</b>	<b>250</b>		<b>82.38</b>

To find the Net Present Value we use the same formula as before:

Note that the investment is made at the beginning of year one and is therefore not discounted. However, the revenue of year one is counted at the end of the year and is therefore discounted.

$$r = 5\%$$

n, the number of the period being calculated

Using the formula  $(1 + r)^{-n}$

The discount factor =

for the investment the discount factor is 1 (note that the investment at the beginning of the periods is not discounted)

for year 1 is  $1/1.05$

for year 2 is  $1/(1.05 * 1.05)$

for year 3 is  $1/(1.05 * 1.05 * 1.05)$

for year 4 is  $1/(1.05 * 1.05 * 1.05 * 1.05)$

for year 5 is  $1/(1.05 * 1.05 * 1.05 * 1.05 * 1.05)$

The Net Present value of the cash flow in EXAMPLE 4 is 82.38, which represents the sum of the discounted cash flows for every year of the project.

Let us now compare several alternate courses of action and choose the more desirable one. This may be the alternate with the highest NPV.

### EXAMPLE 5

#### Alternate 1

		Discount factor 5%	NPV
Investment	-1,000	1.00000	-1,000.00
Income Year 1	200	.95238	190.57
Year 2	200	.90703	181.41
Year 3	200	.86384	172.77
Year 4	200	.82270	164.54
Year 5	<u>400</u>	.78353	<u>313.41</u>
<b>Total</b>	<b>200</b>		<b>22.69</b>

#### Alternate 2

		Discount Factor 5%	NPV
Investment	-1,000	1.00000	-1,000.00
Income Year 1	0	.95238	0
Year 2	0	.90703	0
Year 3	0	.86384	0
Year 4	600	.82270	493.62
Year 5	<u>600</u>	.78353	<u>470.18</u>
<b>Total</b>	<b>200</b>		<b>-36.26</b>

The returns, when not discounted for futurity, show both alternates to be of equal value (200). The Pay Back Method would rank both alternates to be of about equal value (4.5 years for Alternate 1 and 4.8 years for Alternate 2). The NPV method looks at the futurity of money. Discounted at 5%, the comparison indicates that Alternate 1 is a much better choice. The ranking of our two alternates becomes clearer when discounted for futurity.

As long as the same discount factor is used to measure the alternates, the magnitude of the discount factor does not modify the ranking of alternates. By defining the percent discount factor one defines the monetary distance away from “zero profit” or the break-even point in discounted PRESENT VALUE currency.

## **6. What discount factor should one use?**

Discounting for futurity does not only mean that one discounts the projected cash flow to find its value in present day money when discounted for inflation. The discount factor can be the desired return on the investment. If that desired return is 15% or more, then the Net Present Value of your cash flow, discounted at 15%, should be zero or more. If the outcome is negative, you will not make 15% per year, it will be a lower return.

## **7. Limitations to the NPV method**

Although the NPV method will give satisfactory results in most cases, one has to realize its pitfalls also. When comparing alternate courses of actions, the NPV method has its limitations when different investments are involved, as we can see in the following example:

### EXAMPLE 6

#### Alternate 1

		Discount factor 5%	NPV
Investment	-1,000	1.00000	-1,000.00
Income Year 1	250	.95238	238.10
Year 2	250	.90703	226.76
Year 3	250	.86384	215.96
Year 4	250	.82270	205.68
Year 5	<u>250</u>	.78353	<u>195.88</u>
<b>Total</b>	<b>250</b>		<b>82.38</b>

#### Alternate 2

		Discount Factor 5%	NPV
Investment	-2,000	1.00000	-2,000.00
Income year 1	500	.95238	476.20
Year 2	500	.90703	453.52
Year 3	500	.86384	431.92
Year 4	500	.82270	411.36
Year 5	<u>500</u>	.78353	<u>391.76</u>
<b>Total</b>	<b>500</b>		<b>164.76</b>

If the cash flows are not discounted alternate 2 seems better than Alternate 1. (500 versus 250).

The Pay Back method would have ranked Alternate 1 as equal to Alternate 2.

The NPV indicates also that Alternate 2 is a better choice than alternate 1.(164.76 versus 82.38). However, is Alternate 2 really a better choice?

The NPV method requires that you use the same discount factor for all alternates. If more than one alternate is studied, the above example demonstrates that the NET PRESENT VALUE may indeed not be the best ranking tool, even if the same discount factor is used for alternates 1 and 2.

In the above example, the investments and the revenues of Alternate 2 were exactly double that of Alternate 1. Of course, the Net Present Value of Alternate 2 is double that of Alternate 1. Yet Alternate 2 is not better than Alternate 1, they are of equal strength as will be seen below.

## **8. The Internal Rate of Return**

The Internal Rate of Return (IRR) is also a discount factor used to arrive at an NPV. But here, the user cannot predefine an arbitrary percentage used for discounting. The IRR is the discount factor that will bring the NPV exactly equal to zero.

The IRR does not only indicate how much profit the investment will yield. The IRR indicates also how much risk the cash flow can sustain, before resulting in a negative NPV and going under.

If a discount or adversity factor larger than the IRR is applied to the cash flow, the NPV of the project will show a loss.

If the discount factor for all alternate choices is arbitrarily defined beforehand, that discount factor may be greater or smaller than the IRR and will result in a negative or positive NPV.

If for each alternate, one can find a discount factor that brings the Net Present Value equal to ZERO, one has found the IRR of each alternate. Instead of the net present value method for ranking purposes of different investments, one should select the IRR method and find the discount factor that makes the NPV equal to zero. Then we can compare the discount factors and rank the alternates correctly "by merit". If our Alternate 1 is compared to Alternate 2, using the IRR method, one would show the same ZERO net present value for both alternates and it would be evident that the 7.93% IRR of Alternate 1 is not better than the 7.93 % IRR of Alternate 2.

If the discount factor is smaller than the IRR, both alternates will show a positive NPV, as was the case in the above example which used a 5% discount factor. If one uses a discount factor that is larger than the IRR, the NPV will come out as a negative figure for both alternates.

We compare Alternate 1 and 2 using the IRR method:

### EXAMPLE 7

#### Alternate 1

		Discount factor 7.93%	NPV
Investment	-1,000	1.00000	-1,000.00
Income Year 1	250	.92652	231.63
Year 2	250	.85844	214.61
Year 3	250	.79536	198.84
Year 4	250	.73692	184.23
Year 5	<u>250</u>	.68276	<u>170.69</u>
<b>Total</b>	<b>250</b>		<b>0.00</b>

Present value of 1 at Compound Interest is  $1/(1 + r)^n$

If  $r = 7.93038\%$ , the above example results in an NPV of zero. That 7.93038 figure has been found by trial and error, or by using a computer program or a preprogrammed calculator.

#### Alternate 2

		Discount Factor 7.93%	NPV
Investment	-2,000	1.00000	-2,000.00
Income year 1	500	.92652	463.26
Year 2	500	.85844	429.22
Year 3	500	.79536	397.68
Year 4	500	.73692	368.46
Year 5	<u>500</u>	.68276	<u>341.38</u>
<b>Total</b>	<b>500</b>		<b>0.00</b>



The IRR discount factor that brings the NPV down to zero for Alternate 2 turns out to be 7.93% as well. This means that both alternates have the same strength.

## **9. Cash Flow versus Funds Flow**

One can measure the IRR for two different sets of data. The Cash Flow assumes that the whole project is financed with equity capital and leaves out all the influences caused by borrowing.

The other way includes the effect of borrowing. When loans are added to the Cash Flow it becomes a Funds Flow.

Note that you can include only equity and the debt service. The loan draw out is never counted, because the money does not belong to the business and is therefore not part of the “Internal” flow.

## **10. The IRR On Investment (IRROI)**

The IRROI (mostly mentioned as ROI for short) measures the Internal Rate of Return on the total Investment. Here we must assume that all cash requirements are covered with equity. If everything is covered with equity and loans are ignored, then loan repayments, although paid with internally generated money, are to be ignored as well. Interest payments or other financing costs associated with borrowing are of course also ignored. These exclusions are necessary because the timing of the debt repayment and the cost of borrowing would influence the discount factor that brings the NPV equal to zero. The IRROI measures profitability on the INVESTMENT proper, excluding the financing structure.

## **11. The IRR On Equity (IRROE)**

The IRROE (mostly mentioned as ROE for short) measures the Internal Rate of Return on the Equity portion invested in the project. Again you do not count the loan draw out, because that is still external cash. However, you will include as negative cash flow, the loan repayments, including all the costs associated with borrowing, when those outflows occur. Such payments are made from internally generated income.

The same technique as the one explained above for the example of DIFFERENTIAL CASH FLOW is then applied and is used to determine the earning power of the Equity. Here again the profitability is expressed as a compounded percentage rate that brings the NPV equal to zero.

## 12. Limitations to the IRR methods

### a. No Root

Because the IRR method needs periods with net negative cash flow and net positive cash flow, the technique will only work if at least one of the periods shows a negative and at least one shows a positive differential cash flow.

Some decisions do not call for an investment, as in the case where one considers an option to simply increase a selling price. The differential cash flow, anticipated to result from such decision, must again be defined for each period. When discounted for futurity as in the INTERNAL RATE OF RETURN methods, there is no negative cash flow in the forecast, and therefore one cannot search for the discount rate that makes the negative cash flow equal to the positive cash flow.

In such case, use the NPV method. The expected discount rate must be defined beforehand, then the cash flow values are discounted, using that predetermined discount rate, which is like a predetermined or expected Rate of Return. Whatever the outcome, the total is the NET PRESENT VALUE of your decision.

The following example would not have an IRR:

Assuming that a price increase will generate 200 more revenue per year. No investment was required.

### EXAMPLE 8

Investment	0
Earnings year 1	200
year 2	200
year 3	200
year 4	200

No root can be found because it is impossible to make the discounted cash flow equal to zero.

### b. Negative root

If the net returns over the life of the asset do not cover the investment, there will be a negative root.

Instead of discounting or marking down the cash flows, a negative IRR rate marks the cash flows up to make the outcome equal to zero.

#### EXAMPLE 9

The IRR of the following example is -2.28%

Investment	-1,000
Earnings year 1	200
year 2	200
year 3	260
year 4	<u>280</u>
<b>Total</b>	<b>-60</b>

$$\text{IRR} = -2.28\%$$

The discount formula becomes  $1/[1 + (-.0228)]^n$

Year 1 = $1 / (.977)$
2 = $1 / (.977 * .977)$
3 = $1 / (.977 * .977 * .977)$
4 = $1 / (.977 * .977 * .977 * .977)$

#### APPLICATION

	Not discounted	Discount Factor for -2.28%	NPV
Investment Not discounted	-1,000	1.000000	-1,000
Earnings end year 1	200	1.023332	205
year 2	200	1.047208	209
year 3	260	1.071642	279
year 4	280	1.096645	<u>307</u>
		<b>Total</b>	<b>0</b>

### c. Multiple Roots

It is possible to study more than one sequential investment in the same study. Sometimes swings in investments and in revenues, particularly when the IRROE includes swings in loan repayments, can cause the IRR calculation to find more than one root. If more than one root are found, one must study each investment separately and find the respective roots.

The following example is a cash flow with two roots. One is 10.96% and the other root is 319.21% The discount factor for the first root will be

$$(1 + .1096)^{-n}$$

The discount factor for the second root will be

$$(1 + 3.1921)^{-n}$$

The same cash flow can be discounted to zero by using more than one discount factor, as shown in the example that follows.

#### EXAMPLE 10

	Not discounted	Discount Factor for 10.96%	NPV
Investment not discounted	-200	1/1.0000	-200
Income year 1	810	1/1.1096	730
2	410	1/1.2312	333
3	-1220	1/1.3661	-893
4	0	1/1.5188	0
5	0	1/1.6820	0
6	<u>56</u>	1/1.8663	<u>30</u>
<b>Total</b>	<b>144</b>	<b>Total</b>	<b>0</b>

	Cash flow Not Discounted	Discount Factor for 319.21%	NPV
Investment not discounted	-200	1/1.000000	-200.00
Income year 1	810	1/4.192100	193.22
2	410	1/17.57370	23.33
	-1220	1/73.67070	-16.56
4	0	1/308.8350	0.00
5	0	1/1294.667	0.00
6	<u>56</u>	1/5427.375	<u>0.01</u>
<b>Total</b>	<b>144</b>	<b>Total</b>	<b>0</b>

The above examples cover more than one sequential investment. If each project were studied separately, the multiple root problem would most probably disappear.

It is however possible that a single project shows multiple roots. All the roots are real, but which one is to be used for planning purposes? If a small change is made in one of the assumptions used in the forecast, a single root will most certainly result, probably near the functional root. The other roots are mathematical flukes and can be ignored for your planning purposes.

#### d. IRR Before and After Taxes

The IRROI, does not take borrowing into account and calculates the return on the investment proper. If the project requires a loan along the way, the IRROI ignores it. By the same token, an IRROI after taxes gives a meaningless image because the omission of all financing costs causes the tax burden to be overstated. An IRROI after taxes should only be calculated for projects that have no borrowed financing costs. If the project is 100% financed with equity, the IRROI after taxes would be valid but would be identical to the IRROE after taxes.

#### e. Contiguous and Continuous Discounting

The “contiguous” method discounts one time for each period. The “continuous” method discounts more than one time during each period.

The “contiguous” method assumes 1 discount per period and defines the present value of 100 at 5% compound discount rate as follows:

#### EXAMPLE 11

Period 1	$100 \times 1.05^{-1}$	95.2381
Period 2	$100 \times 1.05^{-2}$	90.7029
Period 3	$100 \times 1.05^{-3}$	86.3837
Period 4	$100 \times 1.05^{-4}$	82.2702
Period 5	$100 \times 1.05^{-5}$	<u>78.3526</u>
<b>Total</b>		<b>432.9477</b>

It is possible that discounting at the end of each period is not satisfactory because money is received and disbursed throughout the period. Should one use a more “continuous” discount method? If one assumes 4 discounts per period, (as e.g. quarterly payments), it finds the present value of 100 per year for 5 years at one fourth of 5% compounded discount rate per quarter to be as follows:



### EXAMPLE 12

Period 1	Quarter 1	$25 \times 1.0125^{-1}$	$= 24.691$	
	Quarter 2	$25 \times 1.0125^{-2}$	$= 24.387$	
	Quarter 3	$25 \times 1.0125^{-3}$	$= 24.085$	
	Quarter 4	$25 \times 1.0125^{-4}$	$= 23.788$	
	Subtotal			96.951
Period 2	Quarter 1	$25 \times 1.0125^{-5}$	$= 23.494$	
	Quarter 2	$25 \times 1.0125^{-6}$	$= 23.204$	
	Quarter 3	$25 \times 1.0125^{-7}$	$= 22.918$	
	Quarter 4	$25 \times 1.0125^{-8}$	$= 22.635$	
	Subtotal			92.252
Period 3	Quarter 1	$25 \times 1.0125^{-9}$	$= 22.356$	
	Quarter 2	$25 \times 1.0125^{-10}$	$= 22.080$	
	Quarter 3	$25 \times 1.0125^{-11}$	$= 21.807$	
	Quarter 4	$25 \times 1.0125^{-12}$	$= 21.538$	
	Subtotal			87.780
Period 4	Quarter 1	$25 \times 1.0125^{-13}$	$= 21.272$	
	Quarter 2	$25 \times 1.0125^{-14}$	$= 21.009$	
	Quarter 3	$25 \times 1.0125^{-15}$	$= 20.750$	
	Quarter 4	$25 \times 1.0125^{-16}$	$= 20.494$	
	Subtotal			83.525
Period 5	Quarter 1	$25 \times 1.0125^{-17}$	$= 20.241$	
	Quarter 2	$25 \times 1.0125^{-18}$	$= 19.991$	
	Quarter 3	$25 \times 1.0125^{-19}$	$= 19.744$	
	Quarter 4	$25 \times 1.0125^{-20}$	$= 19.500$	
	Subtotal			<u>79.476</u>
		<b>Grand Total</b>		<b>439.983</b>

One can further argue that the period of one year should be divided into 50 equal parts, perhaps weeks and then discount each  $1/50^{\text{th}}$  by a discount factor of  $1/50^{\text{th}}$  of 5%.

If one assumes 50 discounts per period, one finds that the present value of 100 per year for 5 years at one fiftieth of 5% compounded discount rate per quarter to be as follows:

### EXAMPLE 13

$$(100 / 50) \times 1.001^{-250}$$

Period 1	50 weeks discounted at one $50^{\text{th}}$ of 5%	99.745
Period 2	50 weeks discounted at one $50^{\text{th}}$ of 5%	92.742
Period 3	50 weeks discounted at one $50^{\text{th}}$ of 5%	88.220
Period 4	50 weeks discounted at one $50^{\text{th}}$ of 5%	83.920
Period 5	50 weeks discounted at one $50^{\text{th}}$ of 5%	<u>79.829</u>
	<b>Total for the 5 periods</b>	<b>444.456</b>

One can see that the more one approaches the perfect “continuous” discount method, the less the original value is discounted.

One can argue that even daily data are not sufficiently detailed to reach a perfect Net Present Value, because sales are coming many times per day and per hour.

Cash deteriorates when it is in your registers or in your bank account. For the purposes of planning, cash flow should be discounted over a number of periods that are synchronized with the timing of your accounting periods or with major equity contributions and expenditures such as expansions, loan repayments or dividend payments.

One can easily exaggerate the search for perfection and thereby let perfection stand in the way of progress.

#### f. Transactions at the beginning or at the end of a period

It is necessary to distinguish between the beginning and the end of each given period. Investments and loan proceeds must be counted at the beginning of a period. Revenues and Cash expenditures for operations are counted at the end of each period.

#### EXAMPLE 14

An investment of 100 returns 110 by the end of the year.

There is obviously a 10% profit. If no distinction is made between the beginning and the end of the period, the net cash flow for the period is:

$$-100 + 110 = 10$$

By distinguishing between the timing of the investment and that of counting the revenue, one can assume that a full period has elapsed between the investment of 100 and the income of 110.

Investment at beginning of period (not discounted) is -100

Revenues at end of period are discounted by 5%. The NPV becomes:

-100 NPV not discounted	-100.00
110 NPV discounted at 5% = $110 \times 1.05^{-1}$	<u>104.76</u>
<b>Total NPV at 5%</b>	<b>4.76</b>

The ROI is 10%

Because :

-100 X 1.00 (not discounted)	-100
$110 \times 1.10^{-1}$	<u>100</u>
<b>Total NPV at 10%</b>	<b>0</b>

Making a difference between beginning and end of a period is important for cash flow calculation. In general money for investments are made available at the beginning or during the period, but the net cash available from earnings may become available only after an investment made earlier in the period.

To avoid spending cash in your forecast that is as yet not available, one must count investments from internally generated cash and new equity investments as well as loans drawn at the beginning of the period and all net cash from operations, loan repayments and dividend disbursements at the end of the period.

### **g. Impact of Duration on Profitability Measures**

We need a complete set of data to make informed decisions. It appears that adding periods of positive cash flow could increase the profitability measures and perhaps influence the ranking of alternates.

In the following pages we will see how far into the future is far enough for each of the key financial measures.

#### **For the Capacity to repay Debt:**

It is obvious that one must cover a sufficient number of periods to include the complete loan term. We must include a sufficient number of periods to cover outlays for replacement of assets because during the loan term the cost of replacements may severely interfere with planned cash flow and capacity to service debt.

#### **For the PAY BACK method:**

What is the minimum number of years to be included?

When an investment is measured using the PAY BACK technique one must obviously go far enough to see the total investment recovered. Going beyond that period is useless, because it will not change the outcome. Having to go beyond the useful life of the asset, means the project does not earn back its investment.

#### **For the IRR Methods:**

It appears quite obvious that the net present value of a cash flow must become higher if one includes more periods.

If the Internal Rate of Return (IRROI or IRROE) method of measurement is used, the time span should be equal to the useful life of the longest lived asset.

The useful life of an asset is not always easy to determine. Some assets are never fully depreciated or amortized, perhaps because the yearly maintenance seems to keep them operational forever. Perhaps the asset is an intangible. How far into the future is far enough to result in a believable outcome for our long term planning purposes?

The farther out into the future one goes, the higher the resulting profitability rate is expected to be. Does that mean that an investment can be made twice as profitable by doubling the periods studied? Can an undesirable project be made to fall within the acceptable ranges by simply increasing the number of periods studied? Is there a maximum time span beyond which one should not count?

As a rule of thumb, one should cover the useful life of the longest lived asset under consideration and not longer since at the end of that time span, the asset is supposed to be replaced and the new investment has its own profitability rate. When the life of an asset is difficult to estimate, there is indeed some room for manipulation. Let us take a look at how much room there really is to inflate the outcome.

Several calculations were made for a five year period. Successive investment values were elected in such a way that they would show a rate of return going from 5% to 50% in increments of 5%.

The values of the successive investments are shown on For each of the investment values the project's lifetime is successively extended from the original 5 years to 40 years, in steps of 5 years. The number of periods covered is shown in the first column of the following table.

### Impact of Project's Duration on the resulting IRR

Invested	261	190	168	150	134	121	111	102	94	87
Lifetime										
<b>5</b>	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
<b>10</b>	19%	23%	27%	31%	35%	40%	44%	48%	53%	57%
<b>15</b>	22%	26%	29%	33%	37%	41%	45%	49%	53%	58%
<b>20</b>	23%	26%	30%	33%	37%	41%	45%	49%	53%	58%
<b>25</b>	23%	26%	30%	33%	37%	41%	45%	49%	53%	58%
<b>30</b>	23%	26%	30%	33%	37%	41%	45%	49%	53%	58%
<b>35</b>	23%	26%	30%	33%	37%	41%	45%	49%	53%	58%
<b>40</b>	23%	26%	30%	33%	37%	41%	45%	49%	53%	58%

The results show e.g. that, if a project with an investment of 150 covers 5 periods, it has a 20% Rate of Return, and that same project would show a 31% Rate of Return if the forecast covered 10 periods.

The results of 80 such trials are presented in the following table and one can observe a diminishing rate of increase for the profitability measures as the life of the project is expanded.

From the above table we can conclude the following generalizations:

- The longer the original number of periods covered, the less the addition of periods will change the resulting Internal Rate of Return.
- The higher the Internal Rate of Return, the less increasing the project life will change the results.

The following rule of thumb may be helpful in defining how far out in the future is far enough.

1. If the original number of years is less than ten, adding periods will alter the outcome substantially.
2. If the number of years covered is 10 to 15, adding periods will still alter the outcome noticeably. The lower the original result, the more adding periods will influence the outcome.
3. If the original lifetime covered 15 or more years, extending the project is like adding cosmetics. It may, perhaps, veneer bad looks but it will never turn a toad into a prince.

### IMPACT OF PROJECT'S DURATION on the Internal Rates of Returns

*Changing the Project's life influences the ROI when life is shorter  
than 15 years  
or if the original ROI is lower than 20%*

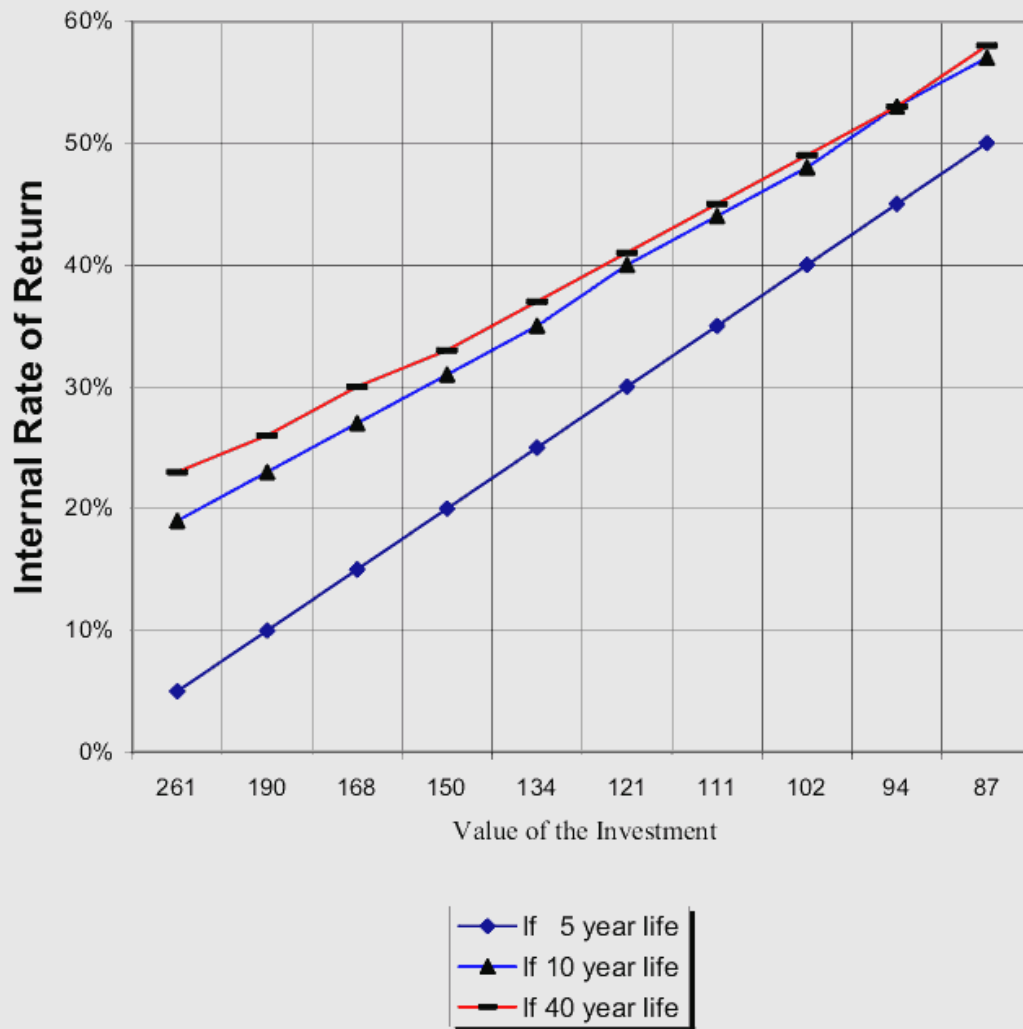


Figure 1 - Project Duration and the ROI





# **CHAPTER 5 - PLANNING WITH INFLATION**

Managing a business so that it can survive under inflationary conditions requires a plan that allows turning the corner and continues operating beyond the period wherein a major asset has to be replaced. Few managers ever worry about major asset replacement. Instead, they announce higher dividends with pride, and they are rewarded for it.

If decisions are based exclusively on maximizing profitability, and forget survival in the long run, we may eventually go astray.

Decisions must of course be based on digestible information. Too much paper becomes quickly confusing. We saw that one can cut off the forecasted time span at a point where extending the project life would add little to the NPV. Yet, it is necessary to direct the financial forecasts so that the full time span of the major investment is made visible. It will be demonstrated in this document how that can be done.

Conventional yardsticks by themselves, used to measure long term profitability, may be misleading even if they cover the complete useful life of a major asset. These gauges do not consider whether there will be enough cash available to finance major asset replacement.

It should be clear that the financial ratios, commonly used to value credit worthiness of a borrower, can be even more dangerous indeed than the classic profitability ratios. They could produce damaging results for all parties involved just because the lender's ratios are based on too short a term. The lender wants his money back and is not concerned with the company's long term survival.

## **1. Optimizing Financing Structures without Inflation**

It is conclusive that your forecast should cover the complete loan repayment term, because during that term the business may have to replace or maintain some assets with cash from operations. Any foreseeable cash expenditure cannot disrupt the planned loan repayment structure.

During the early stages of a loan repayment period, the banker's financial ratio's may be barely satisfactory. But, when a forecast stretches far enough into the future it will show at what time those ratios improve. If the forecast covers a complete business cycle, it allows to sequence all the parts of the plan that require new loans.

A graduated loan repayment schedule may sometimes facilitate fitting a loan repayment schedule into the forecasted available cash flow. Such a schedule lets one repay smaller portions of the loan at an early stage, when the project has not as yet

reached full capacity. A graduated loan repayment plans to increase the repayment amounts, scheduled for a later time, when the project has reached full capacity. Indeed, graduated loan repayment schedules may allow for a very convenient financing arrangement at the outset.

Suppose the graduated loan repayment schedule provides for increasing debt service every five years. However, if the increase is too tightly fitted into the available cash flow, it may be necessary to save cash ahead of time in preparation for those increased repayments. Should the lender not impose restrictive covenants, the debt to equity ratio may be sacrificed to pay dividends. The conventional three or five year forecast may not reveal this hurdle. Ill-planned dividend payments or expansions may turn out to be catastrophic.

By the same token, the business needs to be prepared to replace a major asset at the end of its life. That requires even more foresight than planning for the higher repayments called for with a graduated loan.

Generally, financial Institutions do not like inflation to be taken into account in your forecast. They want to be “conservative” and eliminate the advantages portrayed by inflation when a loan repayment schedule is fitted into an inflated cash flow.

Increases in profits, due to inflation, are actually canceled out by the erosion of the purchasing power of the currency. Basic profitability measures should therefore not take inflation into account and should be stated in a constant currency. Otherwise the measuring stick used is an elastic one, which could be terribly misleading.

But, how smart is it for the business manager to exclude inflation from his financing plan all together and account for replacement of assets in constant dollars?

## **2. Optimizing Financial Structures with Inflation**

Is Inflation good or bad?

Inflation has a real influence on the necessary funding of an investment that stretches over several years and must by all means be included to cover the cost at completion. But what is to be done to cover inflation when the business is required to pay for later replacement of an asset?

If a business is truly a going concern intended to continue forever, then some thought must be given to the replacement of its major asset.

Inflation plays indeed a most important role. It is properly avoided in structuring a loan repayment schedule, but, as you will see, inflation is a major strategic component of the formula that defines the minimum debt to equity ratio for a business that wants to be truly “ongoing”.

Many believe that inflation is only hurting fixed income people. Others think that inflation is not as bad as it is made out to be. “Sure”, they say, *“the cost of labor and materials goes up with inflation, but we can raise the prices charged for our products as well. It all balances out. Furthermore, inflation has the benefit of increasing the value of our assets, while eroding the weight of our debt.”*

### 3. Exposing the Inflation Problem in Business

The trouble starts as soon as the business has to replace a major capital asset. Depreciation is mainly thought of as an expense that reduces taxable profits. It should rather be viewed as an expense designed to prevent the very asset of the business to be distributed as dividends. In other words, by the end of the useful life of the asset, cash equal to the original investment should have been retained.

The question is: “Should one have returned such cash to the investor?” and the business stops... or “Is this cash to be earmarked to replace the asset?”. Is business meant to be a continuing concern, or is it meant to be a limited edition that stops with the life of the major asset?

With inflation, business owners discover that the purchasing power of cash, retained by accounting for depreciation, does not cover the equipment’s inflated replacement cost. In reality it is the purchasing power of cash that has “shrunk”.

Very few planners ever go beyond the useful life of the major asset. While it is in many cases not necessary to go beyond that point to measure the profitability of the investment, it is surprising to see what happens if the plan is stretched a bit and you are faced with financing major replacements.

Most managers ignore the problem. Accounting for depreciation results in liquidity that by law cannot be paid out as dividends. Businesses operate with many kinds of assets. Lifetimes of different assets begin at different times, investments in different assets are staggered. The shortage of retained cash to replace a minor inflated asset can be covered with cash retained by accounting for the depreciation of longer lived assets. The inflation problem remains thereby cloaked.

*Of course, dividends may increase because of inflation, because of improved cost efficiencies or because of market expansion, which may keep this dangerous problem hidden. And so, the pitfalls caused by inflation are never noticed until it is too late. Isolating that hurdle and understanding its impact, will avoid insurmountable difficulties in the future .*

#### EXAMPLE 15

To spotlight the problem of eroding purchasing power when a major asset has to be replaced, we will look at a theoretical business venture, reduced to its bare essential elements and we will call our venture: “The Widget Factory”.

The following are twelve key assumptions about this business:

There is one piece of equipment required. It costs 5,000.

There is no working capital, no inventory

Life of the asset is 10 years

Production volume per year is 2,000

Revenue for one widget is 2.00

Production cost of one widget is 1.00

Fixed costs of the operation is 1,000 per year

Tax rate is 50%

Financing will be 100% equity

Depreciation of the asset is over a ten year period. We use the straight-line depreciation over 10 years

The machinery has no salvage value

Dividends are 250 per year

The following pages display an INCOME REPORT and a FUNDS FLOW REPORT covering each a 10 year life. There are two such forecasts, one assuming NO Inflation, the other assuming 10% Inflation per year, starting in year 2.

**a. A Forecast assuming NO Inflation**

**Income Statement – No Inflation**

Period	Revenue	Direct cost	Fixed cost	Depreciation	Income before tax	Taxes	Income after tax
1	4,000	2,000	1,000	500	500	250	250
2	4,000	2,000	1,000	500	500	250	250
3	4,000	2,000	1,000	500	500	250	250
4	4,000	2,000	1,000	500	500	250	250
5	4,000	2,000	1,000	500	500	250	250
6	4,000	2,000	1,000	500	500	250	250
7	4,000	2,000	1,000	500	500	250	250
8	4,000	2,000	1,000	500	500	250	250
9	4,000	2,000	1,000	500	500	250	250
10	<u>4,000</u>	<u>2,000</u>	<u>1,000</u>	<u>500</u>	<u>500</u>	<u>250</u>	<u>250</u>
<b>Total</b>	<b>40,000</b>	<b>20,000</b>	<b>10,000</b>	<b>5,000</b>	<b>5,000</b>	<b>2,500</b>	<b>2,500</b>

### Funds Flow - No Inflation

#### Uses of funds

#### Sources of funds

	Investment	Dividend.	Total Uses	Cash from Operations	Equity	Total Sources	Cash Balance
1	5,000	250	5,250	750	5,000	5,750	500
2	0	250	250	750	0	750	500
3	0	250	250	750	0	750	500
4	0	250	250	750	0	750	500
5	0	250	250	750	0	750	500
6	0	250	250	750	0	750	500
7	0	250	250	750	0	750	500
8	0	250	250	750	0	750	500
9	0	250	250	750	0	750	500
10	<u>0</u>	<u>250</u>	<u>250</u>	<u>750</u>	<u>0</u>	<u>750</u>	<u>500</u>
<b>Total</b>	<b>5,000</b>	<b>2,500</b>	<b>7,500</b>	<b>7,500</b>	<b>5,000</b>	<b>12,500</b>	<b>5,000</b>



**b. A Forecast assuming 10% Inflation per year**

**Income Statement – 10% Inflation**

Period	Revenue	Direct cost	Fixed cost	Depreciat ion	Income before tax	Taxes	Income after-tax
1	4,000	2,000	1,000	500	500	250	250
2	4,400	2,200	1,100	500	600	300	300
3	4,840	2,420	1,210	500	710	355	355
4	5,324	2,662	1,331	500	831	416	416
5	5,856	2,928	1,464	500	964	482	482
6	6,442	3,221	1,611	500	1,111	555	555
7	7,086	3,543	1,772	500	1,272	636	636
8	7,795	3,897	1,949	500	1,449	724	724
9	8,574	4,287	2,144	500	1,644	822	822
10	<u>9,432</u>	<u>4,716</u>	<u>2,358</u>	<u>500</u>	<u>1,858</u>	<u>929</u>	<u>929</u>
<b>Total</b>	<b>63,750</b>	<b>31,875</b>	<b>15,939</b>	<b>5,000</b>	<b>10,939</b>	<b>5,469</b>	<b>5,469</b>

### Funds Flow – 10% Inflation

#### Uses of funds

#### Sources of funds

	Investment	Dividend.	Total Uses	Cash from Operations	Equity	Total Sources	Cash Balance
1	5,000	250	5,250	750	5,000	5,750	500
2	0	300	300	800	0	800	500
3	0	355	355	855	0	855	500
4	0	416	416	916	0	916	500
5	0	482	482	982	0	982	500
6	0	555	555	1,055	0	1,055	500
7	0	636	636	1,136	0	1,136	500
8	0	724	724	1,224	0	1,224	500
9	0	822	822	1,322	0	1,322	500
10	<u>0</u>	<u>929</u>	<u>929</u>	<u>1,429</u>	<u>0</u>	<u>1,429</u>	<u>500</u>
<b>Total</b>	<b>5,000</b>	<b>5,469</b>	<b>10,469</b>	<b>10,469</b>	<b>5,000</b>	<b>15,469</b>	<b>5,000</b>

The table below shows the distribution of the cash flows generated by the investment in the Widget Factory over its 10 year life. Two results are portrayed, one in an economy without inflation and one in an economy with 10% inflation.

The cash flow went to three parties:

1. to the Widget Factory. (an amount equal to the depreciation and available to replace the asset)
2. to the Government in the form of taxes.
3. to the owners, in the form of dividends.

	NO INFLATION		10% INFLATION	
	In Money	In %	In Money	In %
Depreciation	5,000	50%	5,000	31.40%
Taxes	2,500	25%	5,469	34.30%
Dividends	<u>2,500</u>	<u>25%</u>	<u>5,469</u>	<u>34.30%</u>
<b>Total</b>	<b>10,000</b>	<b>100%</b>	<b>15,938</b>	<b>100.00%</b>

The total operating cash flow before taxes has increased with inflation. Revenues and costs grew proportionately by 10% per year because of inflation. Depreciation, however remained unchanged in spite of the 10% inflation. The result is that the share of inflation that should have accrued on depreciation (if depreciation is used as a reserve to replace the asset) was absorbed by taxes and distributed as dividends. Both grew each year by more than the 10% inflation rate.

In actual business, short sighted planners increase dividends to please the owners. The money is there! For both business managers and politicians, these facts are perceived as a welcome event, and yet inflation impoverished the WIDGET FACTORY, a fact that remains unnoticed, until the asset has to be replaced.

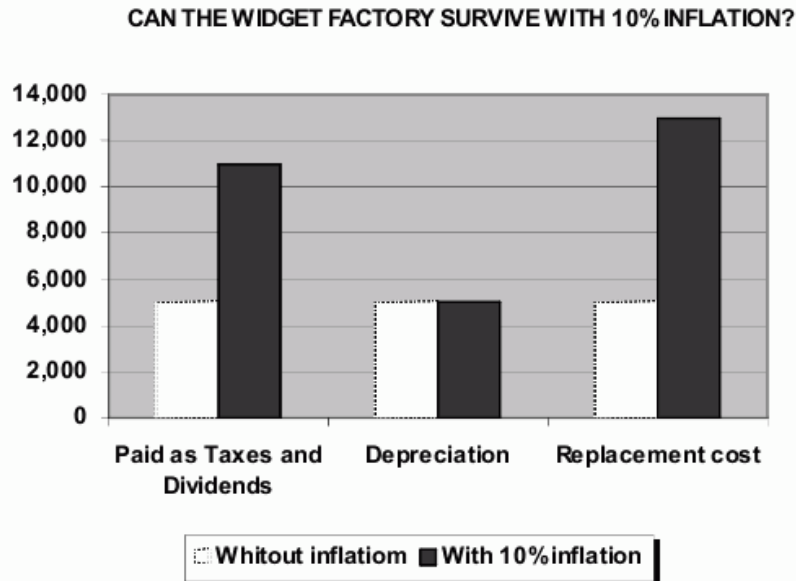


Figure 2 - Inflation and Distribution of available Cash

Because of inflation, it will cost 12,969 instead of 5,000 to replace the major asset of the Widget Factory after 10 years. In this case the cash shortage at the time we replace the asset is  $12,969 - 5,000 = 7,969$ . This is more than all the dividends paid out, which were 5,469. That means that the asset can simply not be replaced out of cash flow after taxes, even if no dividends were paid.

The classic method of measuring the profitability was used for this example and we found that the IRR after taxes was 8% without inflation and 14% with inflation. And yet, one can see that if, at the end of its life, an asset cannot be replaced with the cash it earned, the return on its investment is by all means negative.

However, the excellent financial reports and possibly fat dividends for the owners may have increased the value of their corporate shares as well as the salary of their executives. When the time comes for the widget factory to replace its asset, it will go the same way down the road as steel, aluminum, copper and other mining, metals and production industries have gone in the United States. This explains the shift from manufacturing to the service industry. The latter can survive inflation better because it is a less capital intensive industry.

## 4. Common Inadequate Defense Strategies

What could management have done better?

**First**, a solution that may come to mind is accelerated depreciation. However, over the useful life of the asset, that method of depreciation retains the same total amount of cash in the business as straight-line depreciation. At first there will be lesser taxes and lesser dividends paid out than if the straight-line method of depreciation were used. Later on, however, there will be lesser depreciation on the books. This will then result in higher profits, more taxes and lead to more dividends.

Accelerated depreciation may be helpful to service a high initial debt burden. However, these early advantages are lost and are reversed by the time that the value of the asset is fully depreciated. Accelerated depreciation brings no solution for the problem of replacing the asset.

**Second**, some companies restate depreciation in inflated terms when reporting to their shareholders. This becomes a justification to lessen dividends and in so doing they preserve more cash. As long as the tax authorities do not recognize this method of accounting as a generally accepted accounting principle to calculate taxable income, this method does not resolve the whole problem. In most cases our politicians look at it as robbing Peter to pay Paul. (Peter representing the politicians, Paul is the owner).

**Third**, under inflationary conditions, there is an advantage in acquiring shorter lived assets at lower cost.

Other things being equal, it would be better if the Widget Factory of our example could buy equipment that lasts only 5 years instead of 10 and bought it for 2500 instead of for 5000. In year 6 the new equipment would cost more but the new yearly depreciation taken on the higher cost of the replacement would be substantially higher, thereby reducing the gap between historic depreciation and escalated replacement cost. This helps saving on taxes and dividends.

When this strategy is applied prudently, the advantages of technological modernization can offset the disadvantages of reporting higher depreciation costs on long lived assets. The problem of asset replacement may be alleviated, but it is not cured.

**Fourth**, assume that replacements of capital assets have been sped up by using short lived assets. If the replacement of several different assets is also staggered, the ups and downs of the bottom line, caused by replacements and changing depreciation are somewhat stabilized.

This method would maintain the youngest possible mix of equipment. Most businesses have more types and units of capital equipment than in our example above. By managing the timing of the purchases, their depreciation can be kept from lagging too far behind the new replacement costs. This strategy prevents some cash drain to taxes, to dividends, or to consumers in the form of price reductions. It may lessen the temptation for labor to strike for a higher share of the profits. But it is not resolving the problem in the long run. If a major asset is to be replaced, these methods resolved too little to be considered a solution

## **5. The Benefits of Debt Financing**

While inflation works against those who save cash for future purchases, it works to the advantage of those who borrow. The borrower pays back the same amount of currency he took out, in spite of the fact that the purchasing power of that cash has deteriorated while the loan was outstanding.

Indeed, borrowing shifts the penalty of excess taxes, excess dividends, increased wages and depressed profits away from the borrower. The lender pays the price. But lenders are funded by savers, who in turn are labor, consumers, and beneficiaries of dividends, beneficiaries of government transfer payments or even perhaps owners of another business entity. So the bite of inflation comes full circle. Business cannot fight politicians and hope to make them understand what their legislation does to capital intensive industries. Politicians need tax revenues to purchase votes that make them survive. In the final analysis it means that business has to decide who will carry the consequences of inflation. They must choose between hampering those on the payroll of the government and those hampering the saving public.

We will study the borrowing alternate, because it is more under the control of business management.

If the “after tax interest cost of borrowing” is less than inflation, a real profit can be made by the borrower. There are, however, limitations on the use of borrowed capital. Loans come at a cost and as a company’s debt/equity ratio increases the lender senses a growing risk and will up the interest rate. Borrowing can thus quickly exceed its limit of this potential profitability.

Beyond the immediate monetary cost there is the uncertainty of a dip or an obstacle that decreases the forecasted cash flow required to service debt. Should that happen, the danger of losing everything because of defaulting on a loan may be as large of a problem as coping with the inflated replacement cost of a major asset.

## **6. Strategic Debt / Equity Planning**

This question boils down to defining the amount of historic depreciation booked during the life of the asset and subtracting that amount from the new price of the replacement. Assume that the missing funds must be borrowed. We have to find a formula that determines what percentage of the original asset should have been borrowed so that the asset can be replaced in the future again and again without having to float additional shares of stock or having to reduce dividend payments. To find this formula we have to include the expected useful life of the asset in question because its lifetime equals the time that inflation increases the new purchase price.

The following formula correlates the rate of inflation and the minimum percentage of borrowing required to neutralize the erosion of purchasing power of the business.



**a. Demonstrating the relation between Borrowing, Inflation, and Asset Life**

Assuming:  $r$  = rate of inflation (10% inflation = .10)

$n$  = number of years of useful asset life

$B$  = necessary minimum percentage of financing by debt

$$\text{Then: } B = \frac{(1 + r)^n - 1}{(1 + r)^n}$$

***The ideal percent of debt financing depends on Inflation, and Asset Life.***

The following Figure 3 shows the results of this equation in graphic form for assets with different lifetimes. The X-axis represents the inflation rate and the Y-axis represents the percentage of the original asset cost that should be borrowed to allow replacement.

From these curves it is quite obvious that the longer the life of the asset and the higher the inflation rate, the more debt is required to be able to finance replacements without penalizing the owners with re-capitalization investments.

The life of the asset defines the time span of monetary decay. The inflation rate defines the rate of decay. We must still keep in mind that the borrowing capacity of a company is limited and that inflation is not controlled by the management of the firm.

The asset life becomes a key element in planning for survival with inflation. The higher the inflation rate, the shorter the useful life of a major depreciating asset has to be. Management must take this into account, not only when an asset is purchased but already in the early stages of conceiving the specifications for engineering and design.

# **PERCENT TO BE BORROWED DEPENDS ON ASSET LIFE AND ON INFLATION RATE**

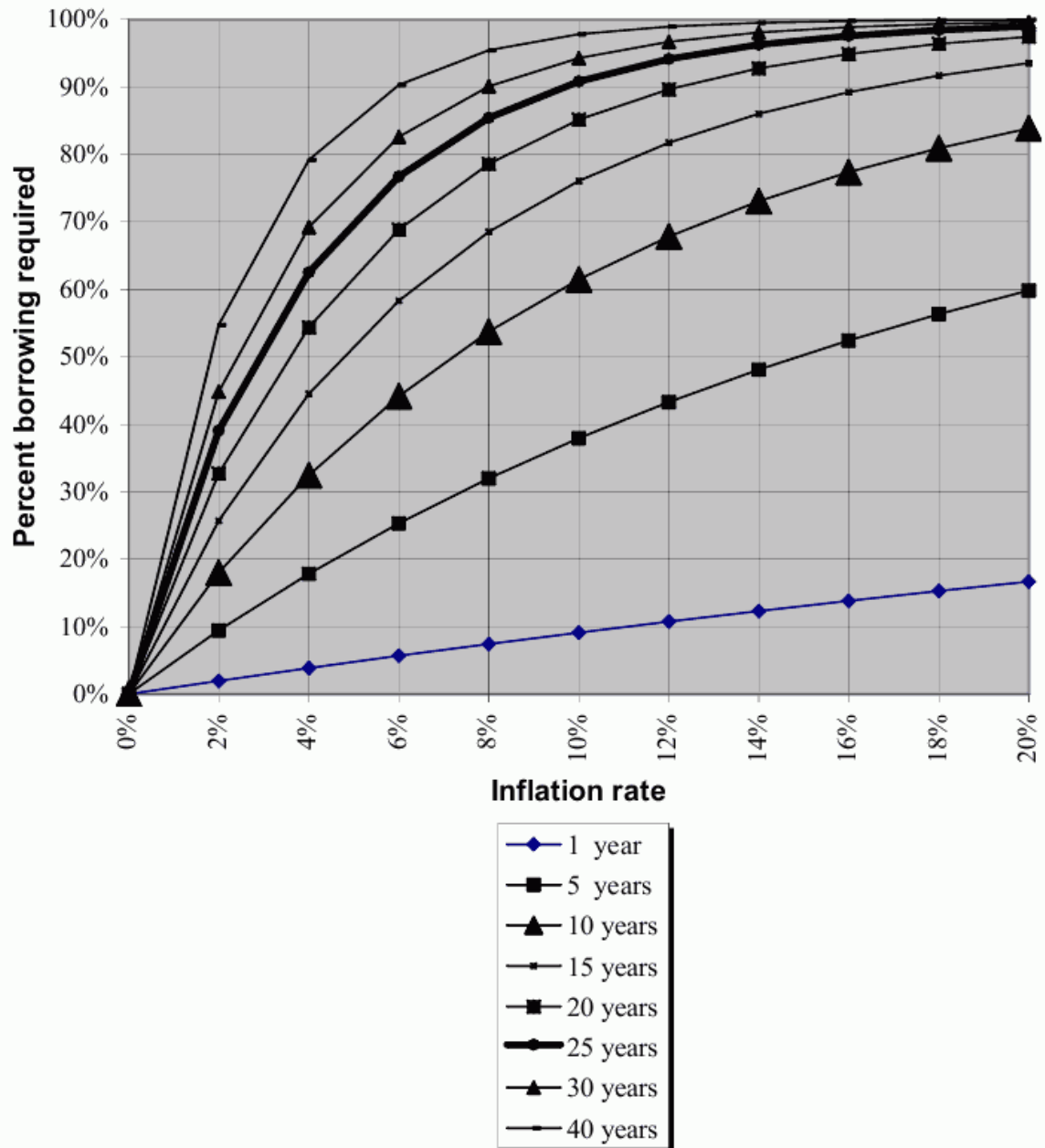


Figure 3 - Percent of Investment to be borrowed

The above figure allows you to locate the existing inflation rate on the X-axis, and to locate your maximum borrowing power on the Y-axis. The coordinate falls on a curve that identifies the sustainable average useful life of the assets to be used in your venture.

Assuming 10% inflation and your borrowing power is limited to 60%, then the maximum average life of the asset you employ in your venture cannot exceed 10 years if you want to be financially able to replace the asset at the end of its useful life.

Conversely, assume that the useful life of the asset has already been decided upon. Locate the existing inflation rate on the X-axis and draw a vertical line until it crosses the curve that represents the coordinates for that decided-upon-useful life. Draw a horizontal line from that crossing point to the Y-axis to find out what percentage you need to borrow to beat the inflation problem when you have to replace the asset.

## **b. Testing the Theory with 2 Replacements in a 30 year Forecast**

### **EXAMPLE 16**

We can test this formula against our Widget Factory's 5,000 piece of equipment with a 10 year useful life under conditions with 10% inflation per year.

If B = the percent to be borrowed, then

$$B \text{ becomes } \frac{(1 + r)^n - 1}{(1 + r)^n} = \frac{(1 + 0.10)^{10} - 1}{(1 + 0.10)^{10}} = 61.45\%$$

EXAMPLES 17 and 18 expand the project over three life cycles of a major piece of equipment. The theory expressed in the above formula is applied in the detailed projections below.

In each life cycle the additional equity requirement can be taken from the retained earnings. The inflation of retained earnings included non escalated historic depreciation and proved sufficient when the asset was to be replaced.

	Debt/Equity Ratio	First Life Cycle	Second Life Cycle	Third Life Cycle
Debt	61.45%	3,072	7,969	20,670
Equity	<u>38.55%</u>	<u>1,928</u>	<u>5,000</u>	<u>12,969</u>
Asset Cost	100.00%	5,000	12,969	33,639

The following pages show a detailed forecast for the WIDGET FACTORY over a 30 year period with 10% inflation. No additional equity capital was required.

Note that the Return on Investment remained the same for a single life cycle (see prior forecast) and for 3 consecutive life cycles of the asset. Based on the above formula the investment was leveraged with 61.45% borrowed money.

# WIDGET FACTORY

## EXAMPLE 17

INCOME REPORT Assuming 10% Yearly Inflation

Year	Revenue	Variable Costs	Gross Profit	Fixed Costs	Interest	Depreciation	Income before Taxes	Taxes	Income after Taxes
1	4,000	2,000	2,000	1,000	307	500	193	96	96
2	4,400	2,200	2,200	1,100	276	500	324	162	162
3	4,840	2,420	2,420	1,210	246	500	464	232	232
4	5,324	2,662	2,662	1,331	215	500	616	308	308
5	5,856	2,928	2,928	1,464	184	500	780	390	390
6	6,442	3,221	3,221	1,611	154	500	957	478	478
7	7,086	3,543	3,543	1,772	123	500	1,149	574	574
8	7,795	3,897	3,897	1,949	92	500	1,357	678	678
9	8,574	4,287	4,287	2,144	61	500	1,582	791	791
10	9,432	4,716	4,716	2,358	31	500	1,827	914	914
11	10,375	5,187	5,187	2,594	797	1,297	500	250	250
12	11,412	5,706	5,706	2,853	717	1,297	839	420	420
13	12,554	6,277	6,277	3,138	638	1,297	1,204	602	602
14	13,809	6,905	6,905	3,452	558	1,297	1,598	799	799
15	15,190	7,595	7,595	3,797	478	1,297	2,022	1,011	1,011
16	16,709	8,354	8,354	4,177	398	1,297	2,482	1,241	1,241
17	18,380	9,190	9,190	4,595	319	1,297	2,979	1,490	1,490
18	20,218	10,109	10,109	5,054	239	1,297	3,519	1,759	1,759
19	22,240	11,120	11,120	5,560	159	1,297	4,104	2,052	2,052
20	24,464	12,232	12,232	6,116	80	1,297	4,739	2,370	2,370
21	26,910	13,455	13,455	6,728	2,067	3,364	1,297	648	648
22	29,601	14,801	14,801	7,400	1,860	3,364	2,176	1,088	1,088
23	32,561	16,281	16,281	8,140	1,654	3,364	3,123	1,561	1,561
24	35,817	17,909	17,909	8,954	1,447	3,364	4,144	2,072	2,072
25	39,399	19,699	19,699	9,850	1,240	3,364	5,246	2,623	2,623
26	43,339	21,669	21,669	10,835	1,033	3,364	6,437	3,219	3,219
27	47,673	23,836	23,836	11,918	827	3,364	7,728	3,864	3,864
28	52,440	26,220	26,220	13,110	620	3,364	9,126	4,563	4,563
29	57,684	28,842	28,842	14,421	413	3,364	10,644	5,322	5,322
30	63,452	31,726	31,726	15,863	207	3,364	12,293	6,146	6,146
<b>Total</b>	<b>657,976</b>	<b>328,988</b>	<b>328,988</b>	<b>164,494</b>	<b>17,441</b>	<b>51,606</b>	<b>95,447</b>	<b>47,723</b>	<b>47,723</b>

### EXAMPLE 18

FUNDS FLOW REPORT Assuming 10% Yearly Inflation

Period	USES OF FUNDS				SOURCES OF FUNDS				Cumulative Cash Balance
	Investment without Escalation	Escalation	Loan Repayments	TOTAL USES	Cash from Operations	Equity Investments	Loans	TOTAL SOURCES	
1	5,000	-	307	<b>5,307</b>	596	1,928	3,072	<b>5,596</b>	289
2	-	-	307	<b>307</b>	662	-	-	<b>662</b>	644
3	-	-	307	<b>307</b>	732	-	-	<b>732</b>	1,069
4	-	-	307	<b>307</b>	808	-	-	<b>808</b>	1,569
5	-	-	307	<b>307</b>	890	-	-	<b>890</b>	2,152
6	-	-	307	<b>307</b>	978	-	-	<b>978</b>	2,823
7	-	-	307	<b>307</b>	1,074	-	-	<b>1,074</b>	3,591
8	-	-	307	<b>307</b>	1,178	-	-	<b>1,178</b>	4,462
9	-	-	307	<b>307</b>	1,291	-	-	<b>1,291</b>	5,445
10	-	-	307	<b>307</b>	1,414	-	-	<b>1,414</b>	6,552
11	5,000	7,969	797	<b>13,766</b>	1,547	5,000	7,969	<b>14,516</b>	7,302
12	-	-	797	<b>797</b>	1,716	-	-	<b>1,716</b>	8,222
13	-	-	797	<b>797</b>	1,899	-	-	<b>1,899</b>	9,324
14	-	-	797	<b>797</b>	2,096	-	-	<b>2,096</b>	10,622
15	-	-	797	<b>797</b>	2,308	-	-	<b>2,308</b>	12,134
16	-	-	797	<b>797</b>	2,538	-	-	<b>2,538</b>	13,875
17	-	-	797	<b>797</b>	2,787	-	-	<b>2,787</b>	15,864
18	-	-	797	<b>797</b>	3,056	-	-	<b>3,056</b>	18,123
19	-	-	797	<b>797</b>	3,349	-	-	<b>3,349</b>	20,675
20	-	-	797	<b>797</b>	3,667	-	-	<b>3,667</b>	23,545
21	5,000	28,638	2,067	<b>35,705</b>	4,012	12,969	20,670	<b>37,651</b>	25,491
22	-	-	2,067	<b>2,067</b>	4,452	-	-	<b>4,452</b>	27,876
23	-	-	2,067	<b>2,067</b>	4,925	-	-	<b>4,925</b>	30,735
24	-	-	2,067	<b>2,067</b>	5,436	-	-	<b>5,436</b>	34,103
25	-	-	2,067	<b>2,067</b>	5,987	-	-	<b>5,987</b>	38,023
26	-	-	2,067	<b>2,067</b>	6,582	-	-	<b>6,582</b>	42,538
27	-	-	2,067	<b>2,067</b>	7,228	-	-	<b>7,228</b>	47,699
28	-	-	2,067	<b>2,067</b>	7,927	-	-	<b>7,927</b>	53,559
29	-	-	2,067	<b>2,067</b>	8,686	-	-	<b>8,686</b>	60,177
30	-	-	2,067	<b>2,067</b>	9,510	-	-	<b>9,510</b>	67,620



No additional equity infusion from the outside was required. Internally generated cash from operations was sufficient to finance the equity portion of the replacement cost, in spite of non-inflated historic depreciation. (  $100\% - 61.45\% \text{ loan} = 38.55\%$  )

Inflation can destroy the very fiber of modern business. If a major asset remains in use for a long time, the cost of depreciation and the cost of financing that asset decrease as time goes by. When the asset is completely depreciated and the loans are fully retired, these expenses completely disappear.

In comparison, the higher depreciation and financing cost of younger assets may require product pricing that is too high to compete with some of the older facilities. An amortized plant can price its product based on its lower total costs. Aspiring potential competitors can indeed be kept out by older facilities whose depreciation and the financing costs are taken away.

By the time the old asset becomes antiquated its excessive maintenance costs and the quality of its product may reverse its advantage. Experience has proven that the long lived antiquated asset cannot be replaced because cash, theoretically retained to replace it, eroded due to the effects of inflation and the venture may stop existing.

If the useful life of the major asset is a shorter lived one by strategic policy decisions, we can keep in step with technological progress and it will theoretically be easier to cope with an inflated replacement cost. Quickly shifting to shorter lived assets could be too expensive. Therefore, applying the principles explained above as a simple matter of strategic policy may be viewed by some as being simply an academic concept. Obviously, new entries have to be linked to unique opportunities offered by technological progress or less demanding labor costs, energy cost or taxation, the total of which must offset the cost advantages of competitors who continue operating for a while with amortized facilities.

The above concept explains why the trend of new business seems to have drifted to ventures with new technology using facilities with little or no long term depreciable assets such as the service industry.

Some real merit seems to appear if business plans shift to the "limited edition" approach, where an investment will last as long as the asset life. Thereafter the venture is eliminated instead of renewed or re-capitalized. Such idea may be considered in your strategic business plan.

## 7. Conclusion

Assets must be financed with the minimum percentage of debt as we discussed or they cannot be replaced without penalizing the owners. If financial institutions let us borrow more than the indicated survival ratios shown on the preceding graph in Figure 3, we can benefit from inflation and increase profits at the expense of the lender. If that were possible we could expand the business and buy more assets.

We saw that the debt to equity ratio must be planned properly at the time an asset is acquired and that such ratio may subsequently have to be adjusted to reflect changes in inflation.

As debt is repaid, the debt to equity ratio for your business will change. Obviously, the industry standards and the rules of thumb ratios, presently used by the financial community, are insufficient and should not be a magic guide for the planner.

A well planned program of staggered acquisitions, and therefore staggered asset replacements, has many advantages.

### Staggering asset replacement

- will reduce the financial gaps between historic depreciation and inflated replacement costs
- will safeguard against excess dividend payments
- will retain cash otherwise wasted on excessive tax payments
- will keep the debt to equity ratio more stable
- will reduce the time span during which cash reserves held by the business can decay with inflation
- will keep the technology more up to date.

Taking the life of the asset into account means that your major asset must have a restricted lifetime as indicated in the above formula. If the asset cannot be replaced within the limits put by inflation and borrowing power, such asset can only be replaced later, imposing the burden of re-capitalization of the venture.



# CHAPTER 6 – STRUCTURING A FINANCING PACKAGE

You have completed the art of measuring the Profitability of your project. Now we will concentrate on the Financing Package. Two aspects will be analyzed; Feasible Loan Structures and basic Loan Repayment Structures.

## 1. Feasible Debt Structures

The Debt Structure has an important influence on attracting Equity.

Obviously, the Debt Service must fit within the limits of the available cash flow. It is equally obvious that equity contribution is limited by the expected profitability and perceived risk. Both debt and equity must fit a debt/equity ratio, acceptable to the lender. Following are the nuts and bolts for structuring such a financing package.

Detailed forecasting is very important, especially if investments and the start-up time cover several years, if inflation is to be accounted for, if pre-operating financing costs are borrowed, if training and early operating losses have to be covered, and if a minimum cash reserve is to be maintained over and beyond the need to secure the cost of all inventories and accounts receivable.

### a. The “curt” Schedule:

The loan should include capitalized interest during construction, capitalized commitment fees, and capitalized loan initiation fees. Such costs are borrowed during periods when revenues are not yet fully available. They become a part of the financing package.

The planner should also define with precision, the shortest loan repayment term he can fit into the project’s available cash flow. This knowledge will help the planner when he starts negotiating the terms of his loan. This important term limit will be referred to as the “curt” schedule.

The “curt” schedule must determine a pragmatic limit of the project’s loan repayment potential. The calculations must take into account that cash from operations is only fully available at the end of a period and cannot be expected to cover investments taking place before the end of that period. Should one attempt to shorten this “curt” repayment term, a negative cash flow will result, showing that such plan is not viable.

The “curt” schedule exposes not only the borderline where the “capacity to repay” meets “failure”. It introduces a new reference from which to measure “guided” changes to the loan structure, necessary for acceptance by the lender.

A complete forecast and much iteration may be required to find this measure. The “curt” schedule is a tool with which to plan your loan format, negotiate fitting loan repayment terms and obtain a bankable debt service ratio. It tells much more about the

project than the conventional financial ratios used by accountants and banks. This new measure should be a part of a good feasibility analysis.

**b. The grace period:**

Sometimes the project can obtain a grace period from the lender. It is a period during which no loan repayment nor interest are paid. Interest due is added to the loan amount and capitalized. This is often the case during a construction period when the project is not as yet in operation or does not earn enough cash during start-up.

**c. Graduated Loan:**

A loan repayment schedule can be graduated to fit it into a limited available cash flow. Sometimes the front end of the loan repayment schedule consists therefore of smaller payments for a few years and then later the loan repayments are increased as the project matures. These delays increase the total interest cost of the loan but a graduated loan allows you to combine the advantages of a lower cost loan format with reduced principal payments in the beginning of the term.

In other cases, one may want to do the opposite and repay the loan as soon as possible. As the cash flow expands, it is applied to higher debt repayments, thereby shortening the loan term. This method can decrease the total interest cost of the loan.

**d. Multiple payments per period:**

If multiple payments per period are made and the repayment term of the outstanding loan is thereby allowed to shorten, the total size of the interest expense can be reduced even further.

**e. Creative combinations:**

Loans can be based on fixed or variable interest rates with or without a ceiling. All formats can be converted into another format or into equity. Any “creative” combination, including leasing packages, may be tailored to fit both the capability of the borrower and the demands of the lender. Beyond the demands of the lender, the loan structure must also attract equity capital.

The following pages demonstrate the importance of the loan format. The purpose of this chapter is to provide a basic understanding of structuring a financing package. Although an almost infinite diversity of loan structures can be construed, only three of the most common loan formats will be studied and demonstrate the nuts and bolts of financial planning. The three most common loan formats covered are:

- a. An Interest Only loan
- b. An Amortized loan
- c. A Simple Interest loan

To make a meaningful comparison of the financing costs between those three selected loan formats, the different loan structure will be fitted into the cash flow of the same project.

### EXAMPLE 19

Investment of 10,000

A loan of 5,000

Repayments over 20 years

A high Interest rate of 20% per year, to dramatize the results

The yearly revenue is 2,000

The first section will demonstrate how different loan formats fit into the available cash flow. Using the above Test Project, it will be quickly discovered that the first year's Principal Repayment and the Total Interest Expense over 20 years differ as follows:

#### First Year Principal Repayment and Total Interest over 20 Years

	Principal Repayment in year 1	Total Interest Expense over 20 years
Interest Only loan	0	20,000
Amortized loan	27	15,536
Simple Interest loan	250	10,500

## 2. The different Loan Repayment Structures

Different loan formats have each their loan repayment structure. All have advantages and disadvantages. The choice of a loan format involves mainly the timing of the loan repayment. Obviously, some formats fit better into the available cash flow than others.



### a. Interest Only Loan

Only interest is paid on the outstanding balance, which remains the total loan. No periodic loan repayments are scheduled. The principal is repaid at the end of the term in one lump sum, often called “a balloon payment”.

When the early cash flow is weak this format may be chosen because the absence of periodic principal repayments makes it easier to satisfy the debt service.

An interest only loan is the format commonly used for financing by issuing a bond. Besides bond financing, this format is also commonly used for a construction loan. Once the construction is completed the format can be changed to one of the following formats.

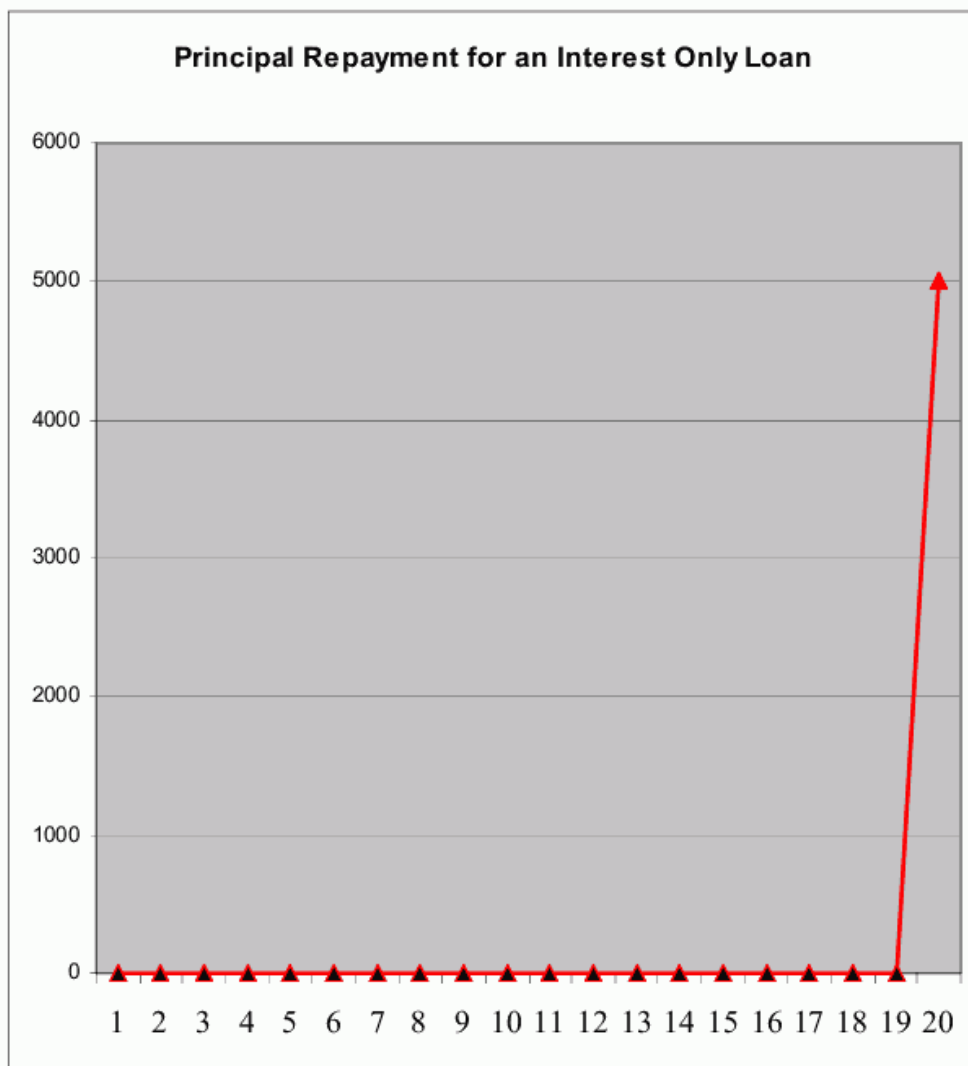


Figure 4 - Loan Repayments for an Interest Only Loan

### b. Amortized Loan

The sum of the periodic principal repayment and of the interest on the outstanding balance is calculated to be a constant amount during the term of the loan.

Initially the borrower pays only a small amount of principal repayment in addition to the interest payments. That small amount of principal repayment reduces the outstanding balance, reduces the following interest payment and allows for growing principal repayment. Many home mortgages prefer this format.

This format may be chosen because it is easier to plan for a constant debt service than for a debt service that changes every period.

The amortized loan structure has no “balloon payment” at the end of the term because at that time the loan is completely repaid.

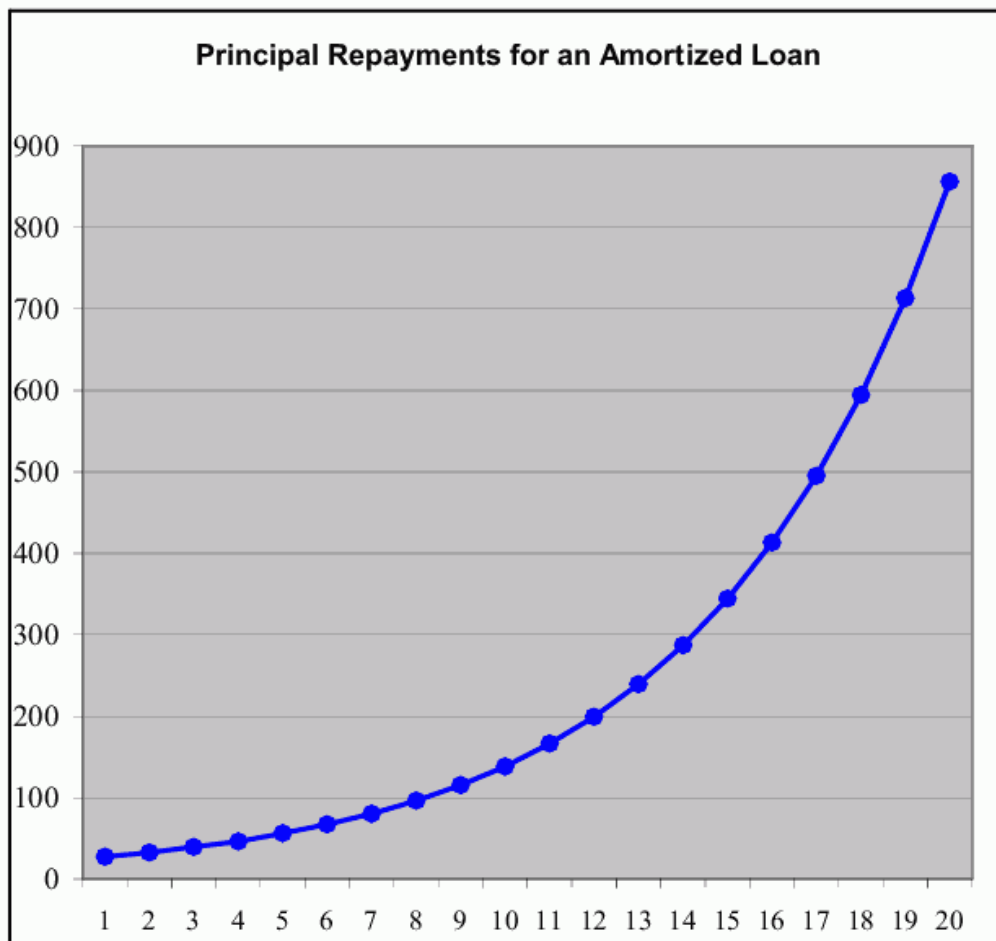


Figure 5 - Principal Repayment for an Amortized Loan

### c. Simple Interest Loan

The principal is repaid in equal amounts and the payments include interest on the remaining balance.

This format requires a different but decreasing amount of debt service every period. The disadvantage of this format is that it is the most costly at the outset. On the other hand, the advantage of this format is that the total debt service on the loan is the least costly. If the high beginning debt service fits into the early cash flow, this format will eventually result in the least total interest payments on the loan.

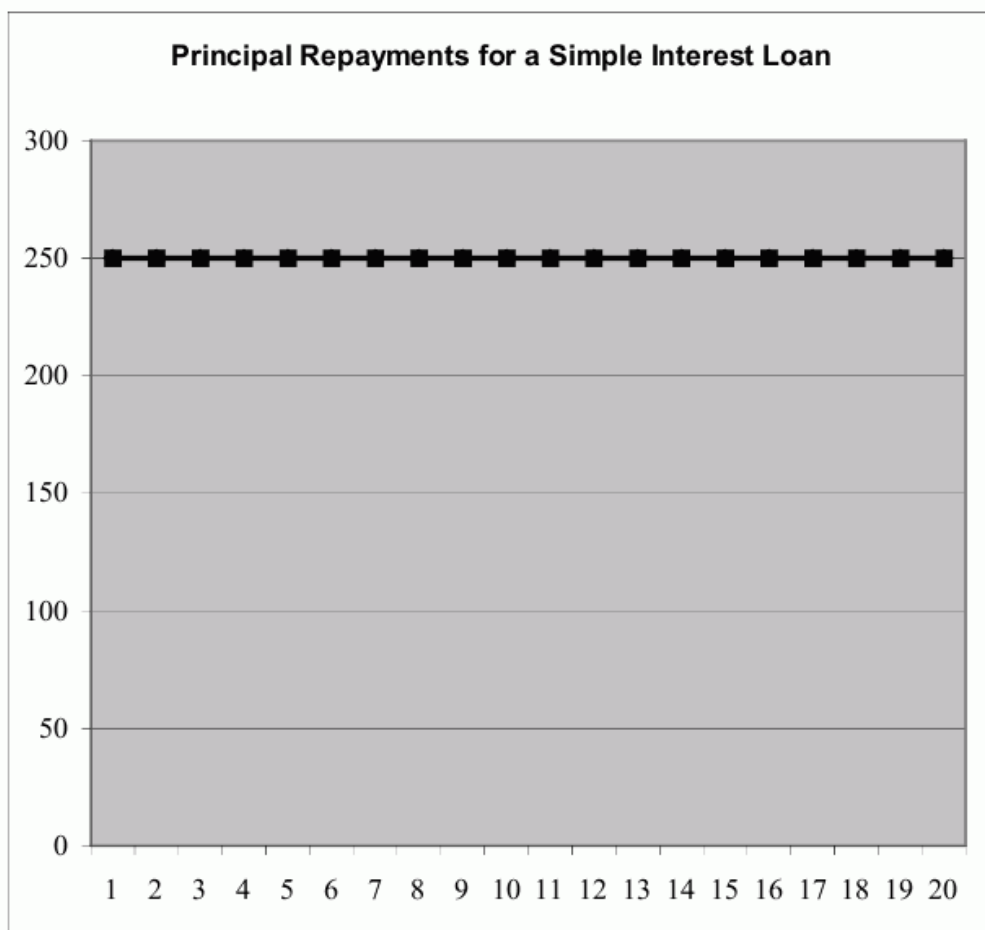


Figure 6 - Loan Repayments for a Simple Interest Loan

## **Loan Repayment Schedules Comparison**

From the following comparison it can be seen that the total loan repayments are the same for all three major loan repayment formats.

This observation could lead one to believe that the cost of the interest expense is the only important consideration to select a loan format.

As will be demonstrated in Section 5 below, the loan repayment format could impact the Return on Equity considerably, depending on the difference between the discount factor and the interest rate.

The comparison of the loan repayment schedules for these different loan structures shows clearly the diverse ways the repayment schedules may fit into the available cash flow.

#### Loan Repayment Schedules for the most common Loan Structures

Year	Interest Only loan	Amortized loan	Simple Interest loan
1	0	27	250
2	0	32	250
3	0	39	250
4	0	46	250
5	0	56	250
6	0	67	250
7	0	80	250
8	0	96	250
9	0	115	250
10	0	138	250
11	0	166	250
12	0	199	250
13	0	239	250
14	0	287	250
15	0	344	250
16	0	413	250
17	0	495	250
18	0	594	250
19	0	713	250
20	<u>5,000</u>	<u>856</u>	<u>250</u>
<b>Total</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>

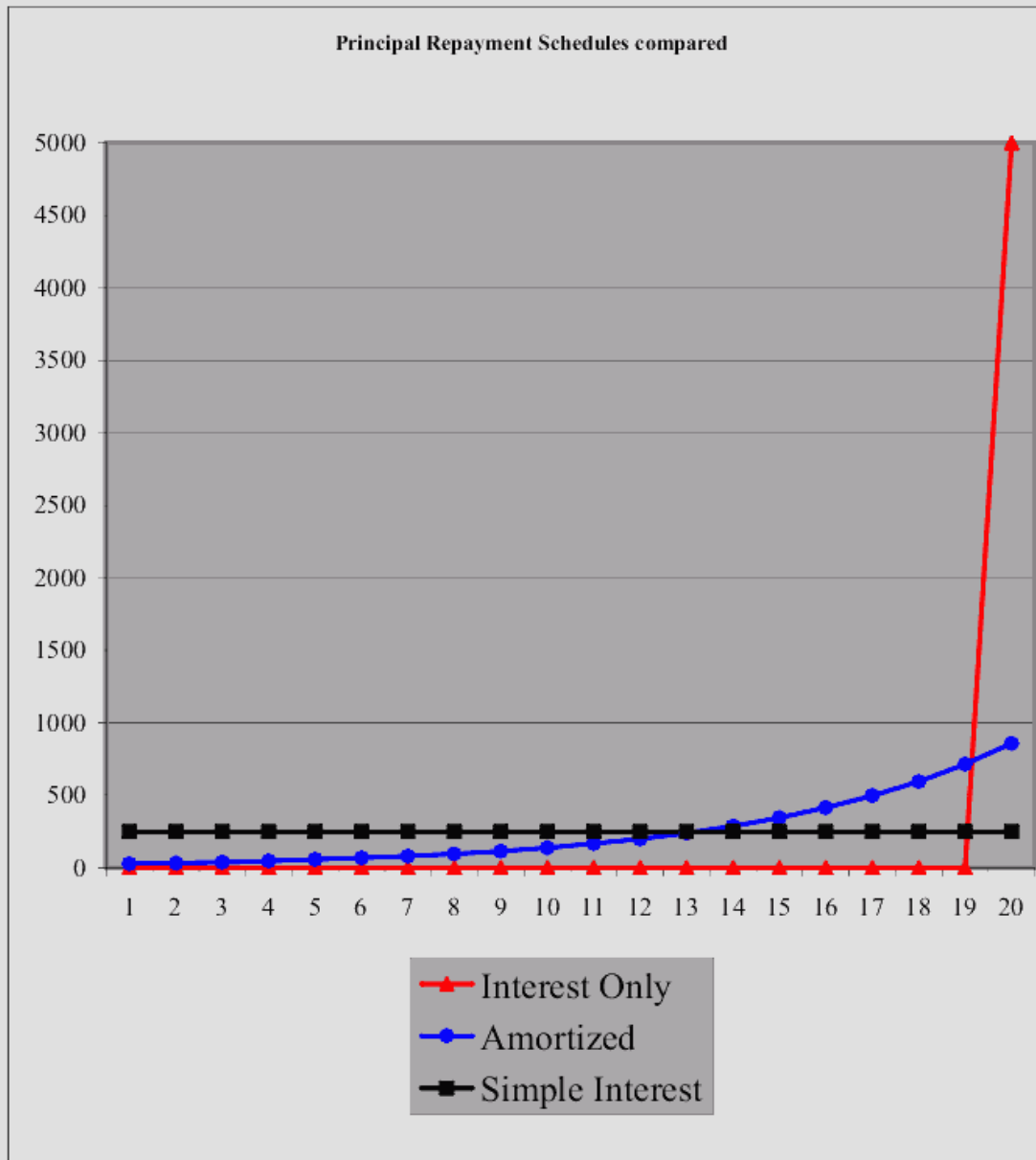


Figure 7 - Principal Repayment schedules compared



### 3. The different Interest expenses.

It is to be expected that the more one stretches the loan repayment schedule the more interest one will have to pay.

#### a. For an Interest Only Loan

Because no principal is repaid during that time, interest expense does not decrease. Total Interest expense during the life of an Interest Only Loan adds up to be 20,000.

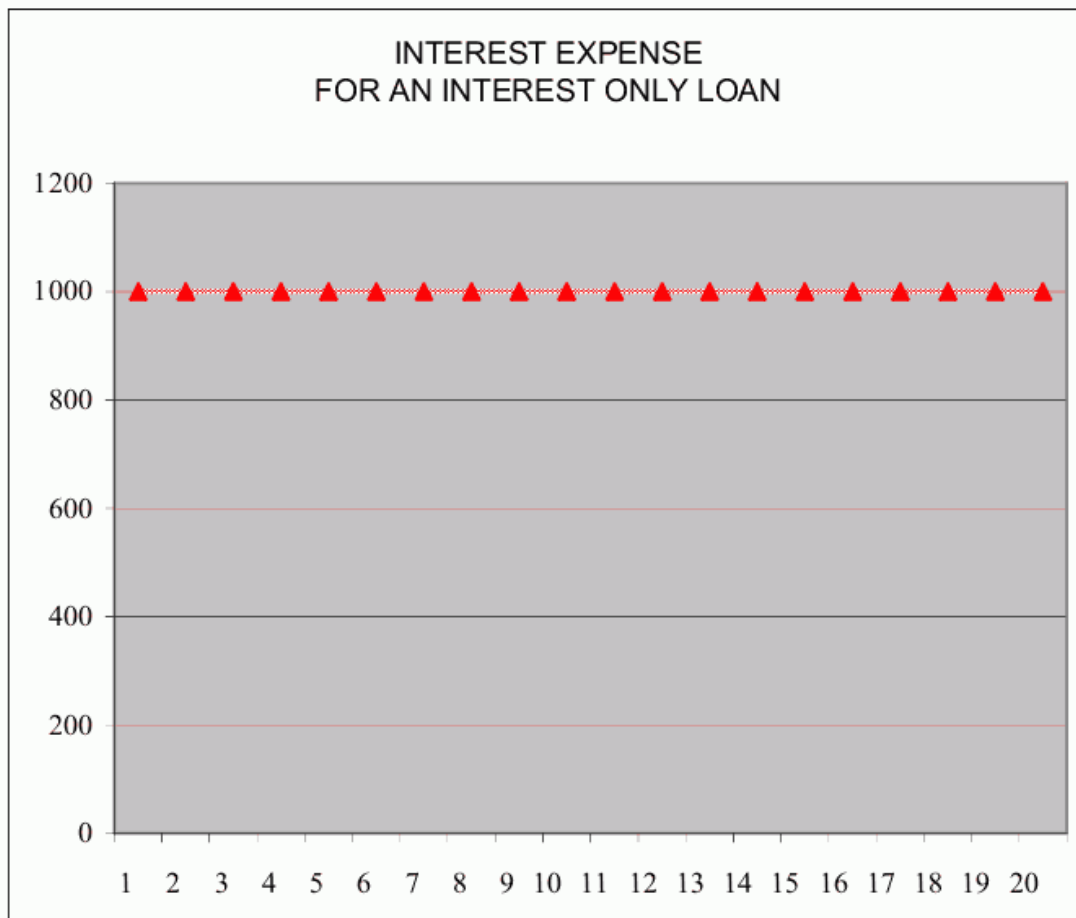


Figure 8 - Interest Payments for an Interest Only Loan

### b. For an Amortized Loan

If the same loan were in the format of an amortized loan, interest and repayment together would remain the same for each payment.

A portion of the debt service will be assigned to repay the debt. This decreases the outstanding loan progressively with each installment. As the debt repayment accelerates, the interest expense decreases exponentially. Total Interest expense during the life of such contract would be 15,536

The interest expense curve would be as follows:

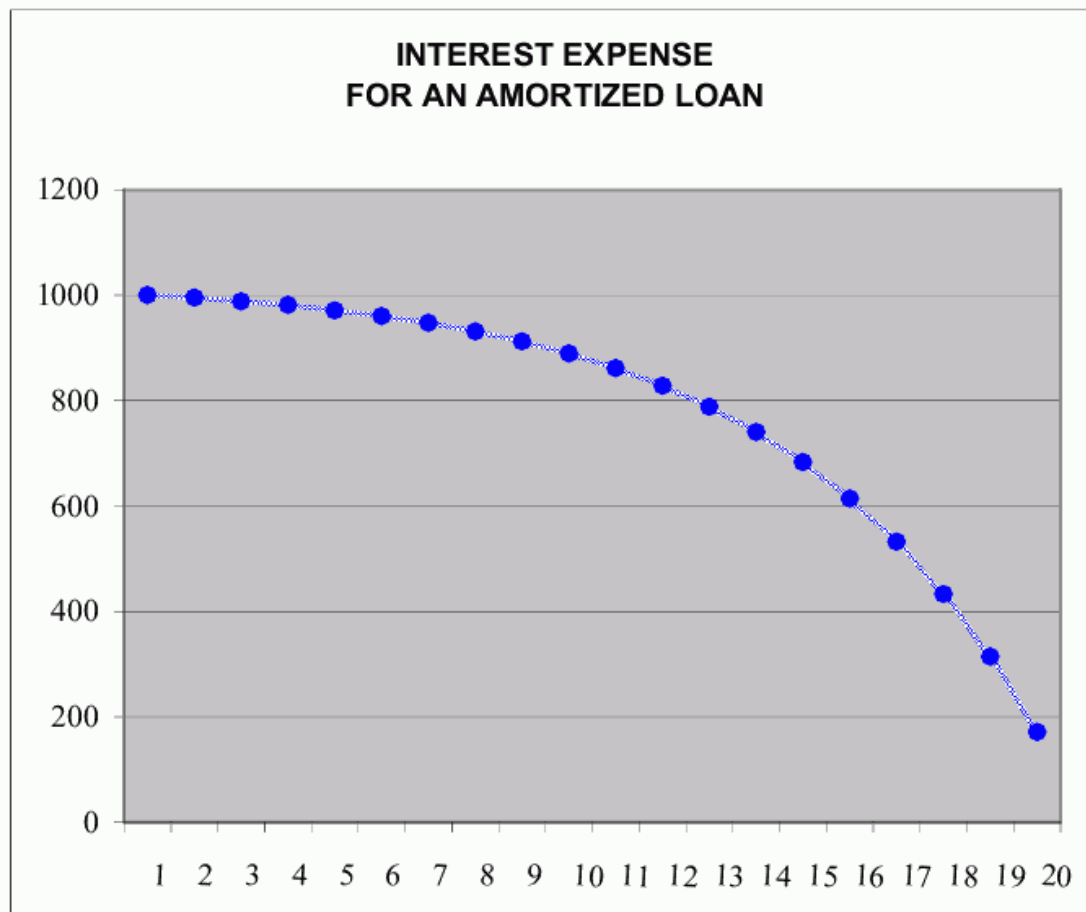


Figure 9 - Interest Payments for an Amortized Loan

### c. Simple Interest Loan

If the loan is a Simple Interest Loan the interest expense will look as follows:

Each installment has a fixed amount assigned to retire the debt. Interest cost decreases each period by the same amount. The total Interest expense during the life of such contract would be 10,500.

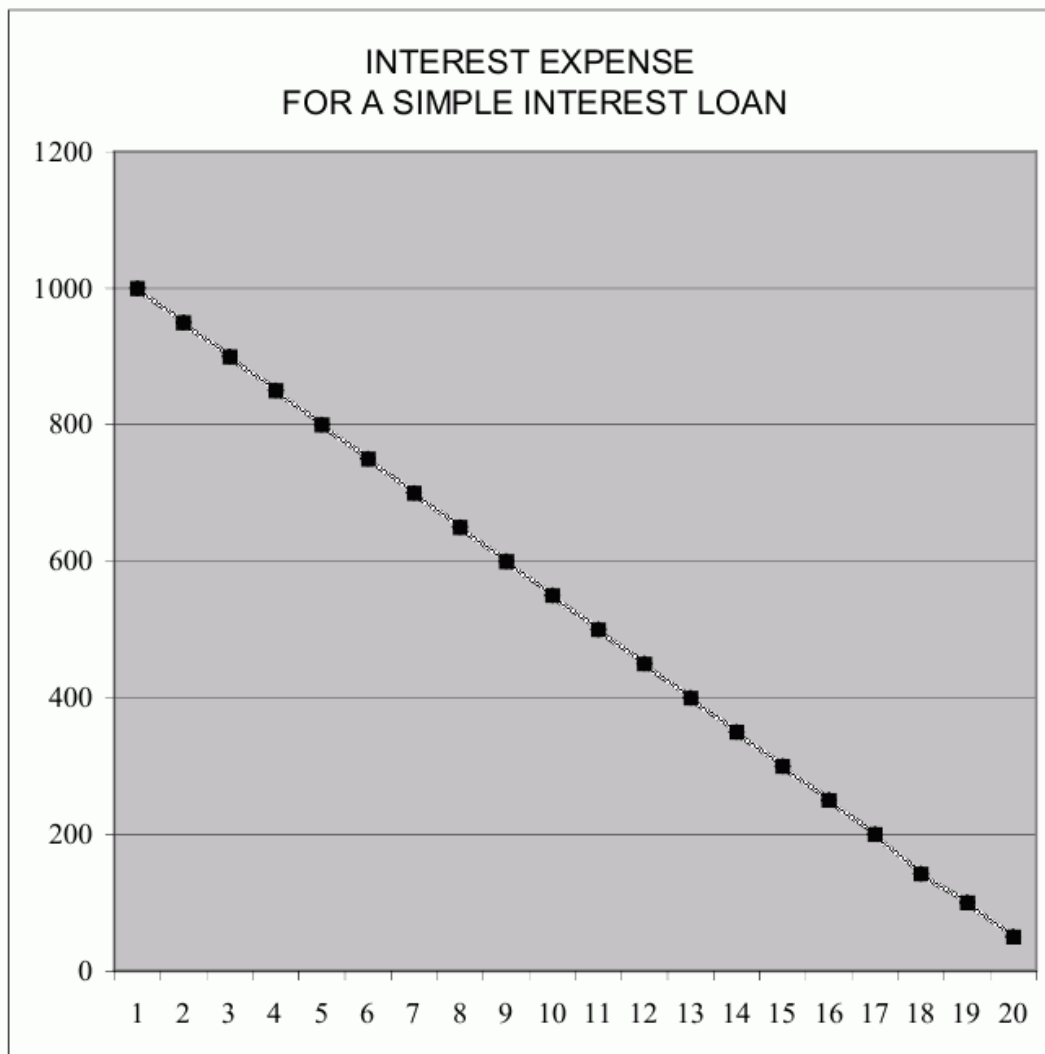


Figure 10 - Interest Payments for Simple Interest Loans

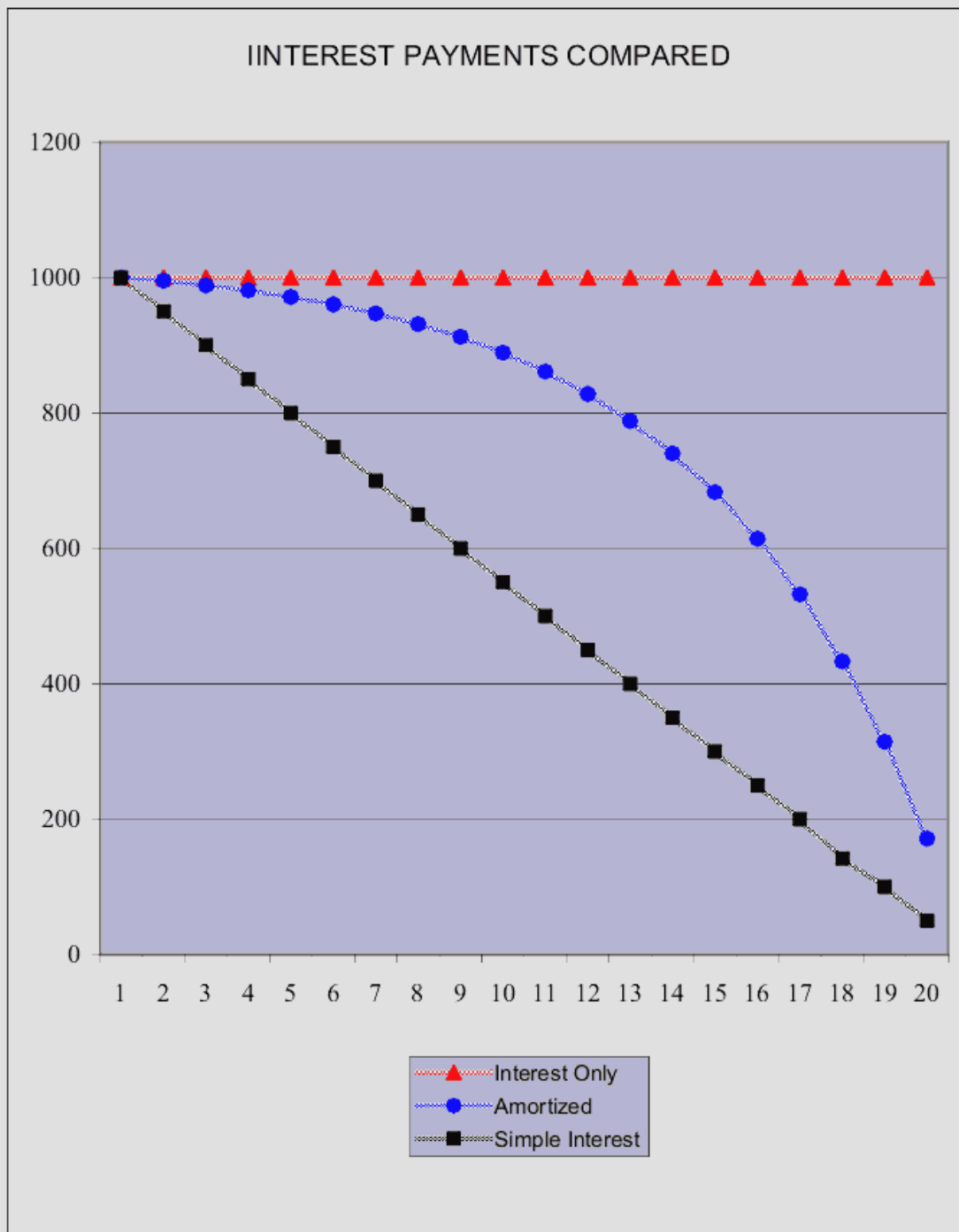


Figure 11 - Interest Payments Compared

#### d. Interest payments compared

The timing and the total cost of interest are both very different for each format. To compare those differences more easily, the following table and figure show the different cash flow for interest payments side by side.

**Interest Payments for the most common Loan Structures**

Year	Interest Only Loan	Amortized Loan	Simple Interest Loan
1	1,000	1,000	1,000
2	1,000	995	950
3	1,000	988	900
4	1,000	981	850
5	1,000	971	800
6	1,000	960	750
7	1,000	947	700
8	1,000	931	650
9	1,000	912	600
10	1,000	889	550
11	1,000	861	500
12	1,000	828	450
13	1,000	788	400
14	1,000	740	350
15	1,000	683	300
16	1,000	614	250
17	1,000	532	200
18	1,000	433	150
19	1,000	314	100
20	1,000	171	50
<b>Total</b>	<b>20,000</b>	<b>15,536</b>	<b>10,500</b>

The total interest payments made over the life of a 5,000 loan at 20% interest would compare as follows for three different loan structures:

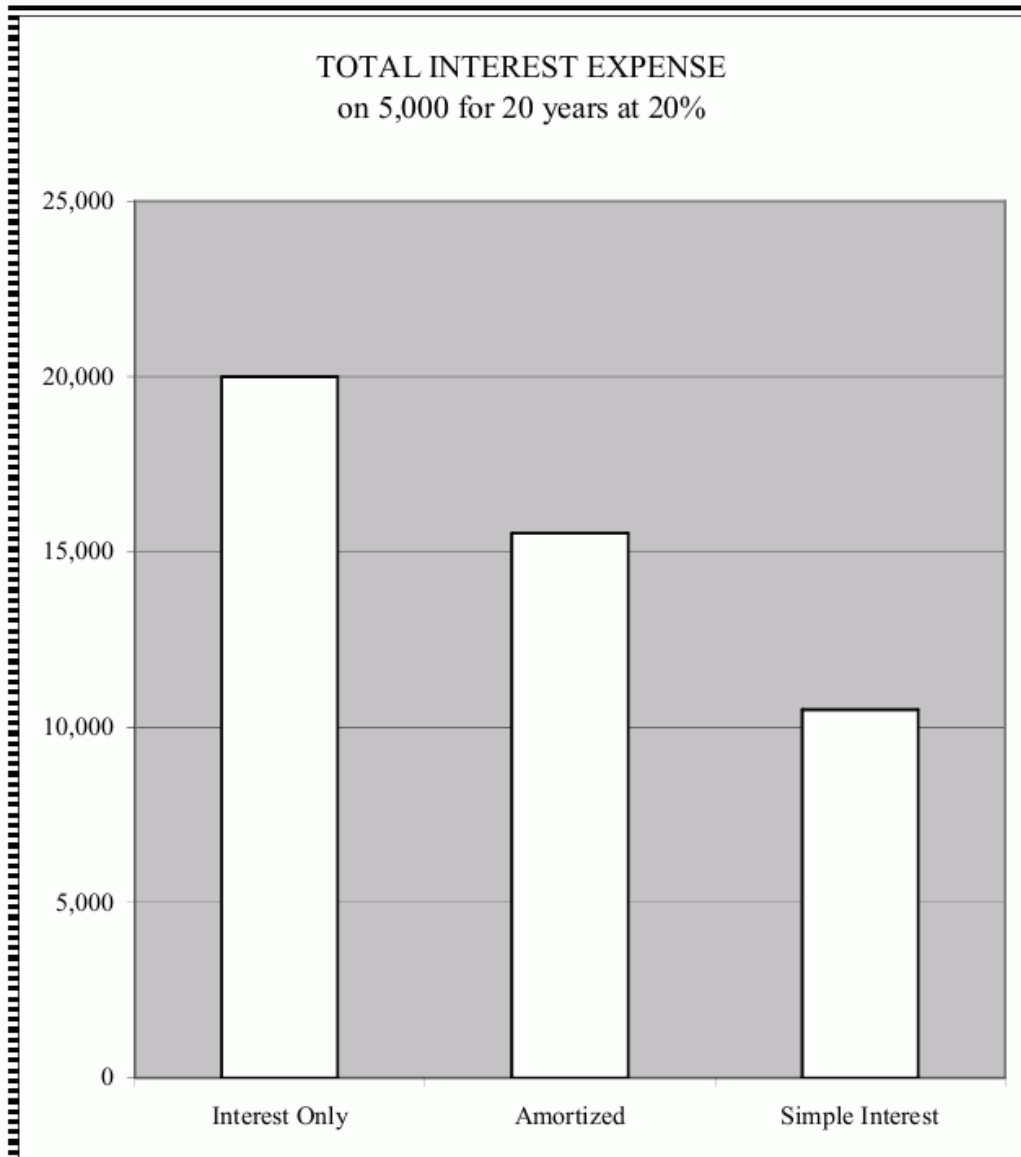


Figure 12 - Total Interest Expense



## 4. The Combinations of Loan Structure and Interest Expense

The following figures demonstrate the relation between the cost of interest and the timing of principal repayments.

### a. For an Interest Only Loan

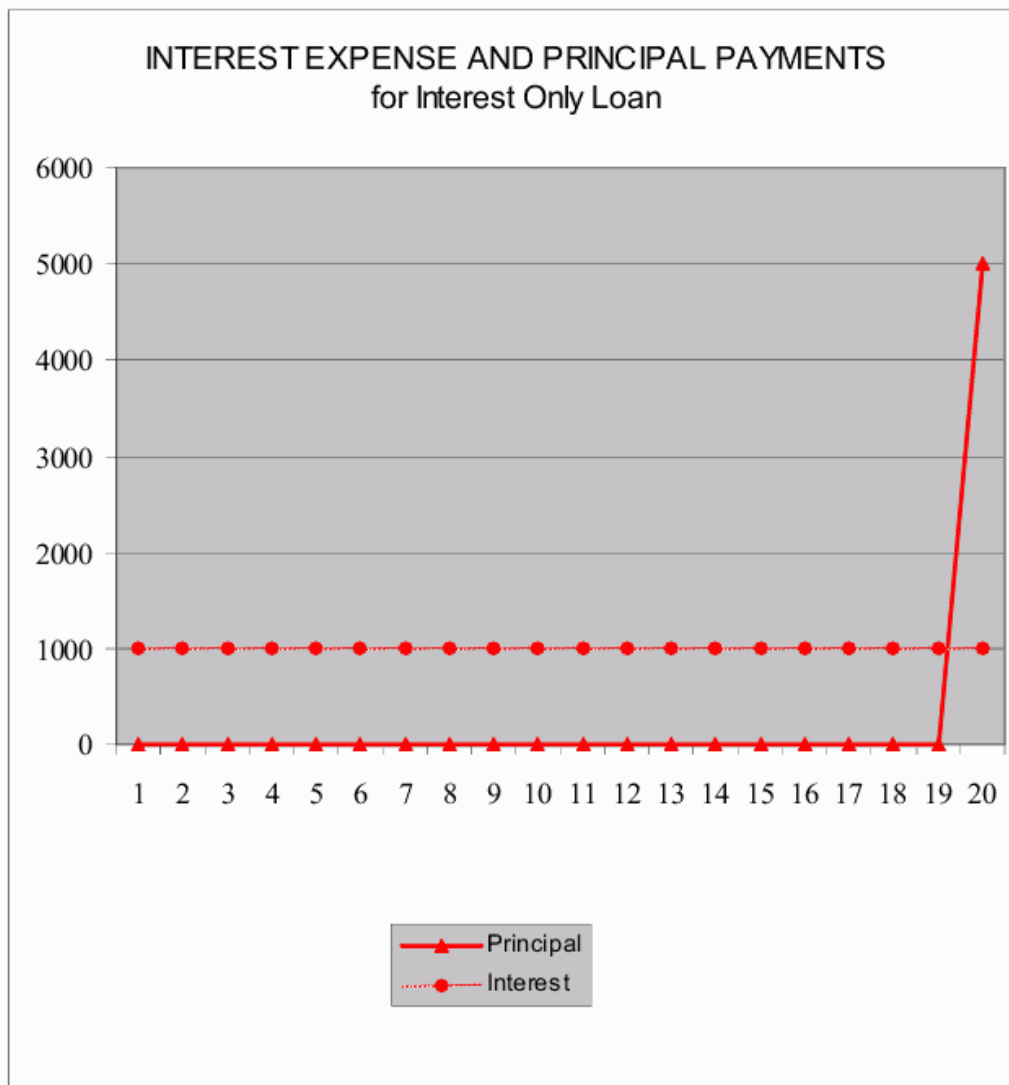


Figure 13 - Financing costs for an Interest Only Loan

**b. For an Amortized Loan**

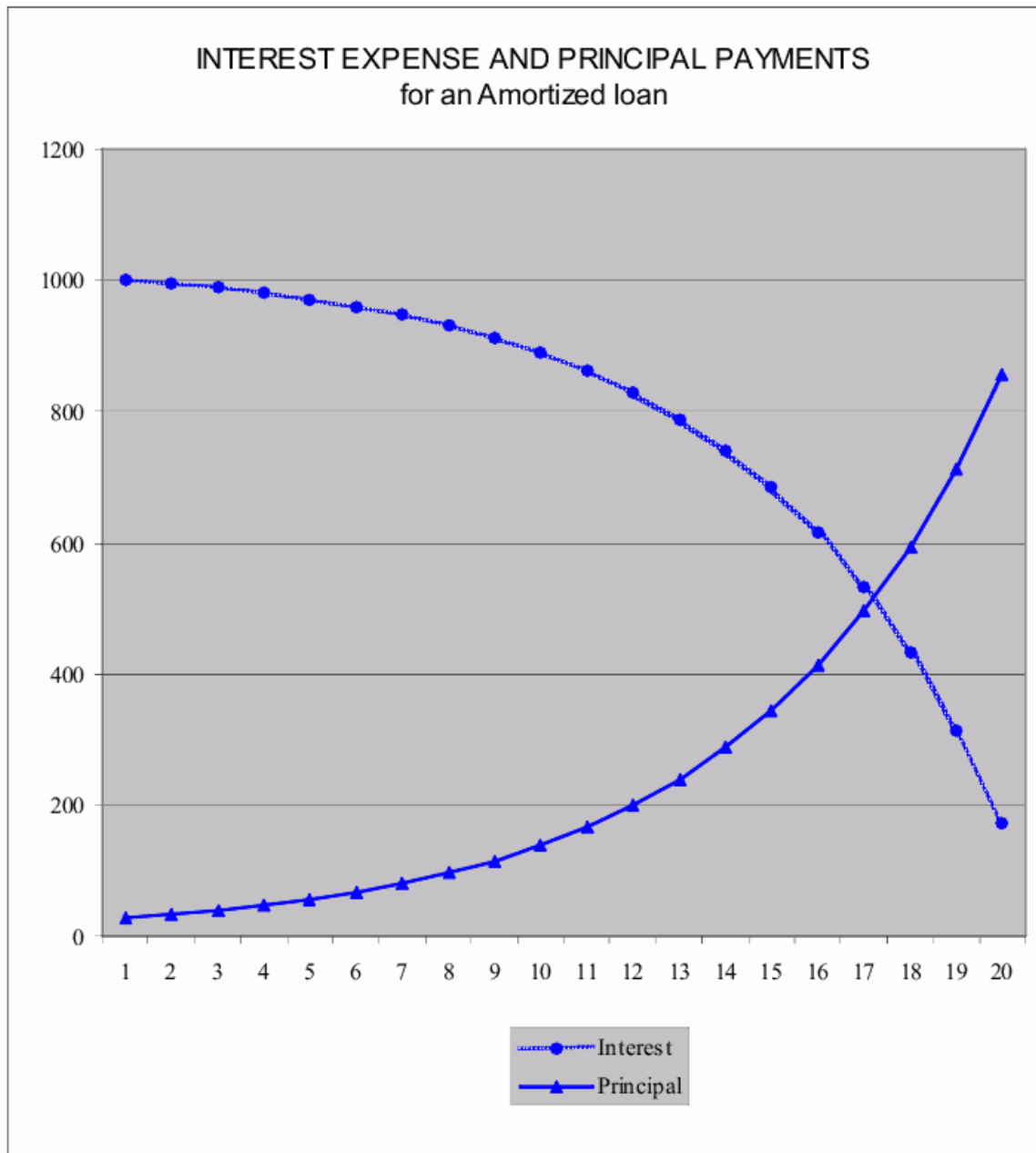


Figure 14 - Interest and Principal for Amortized Loans

**c. For a Simple Interest Loan**

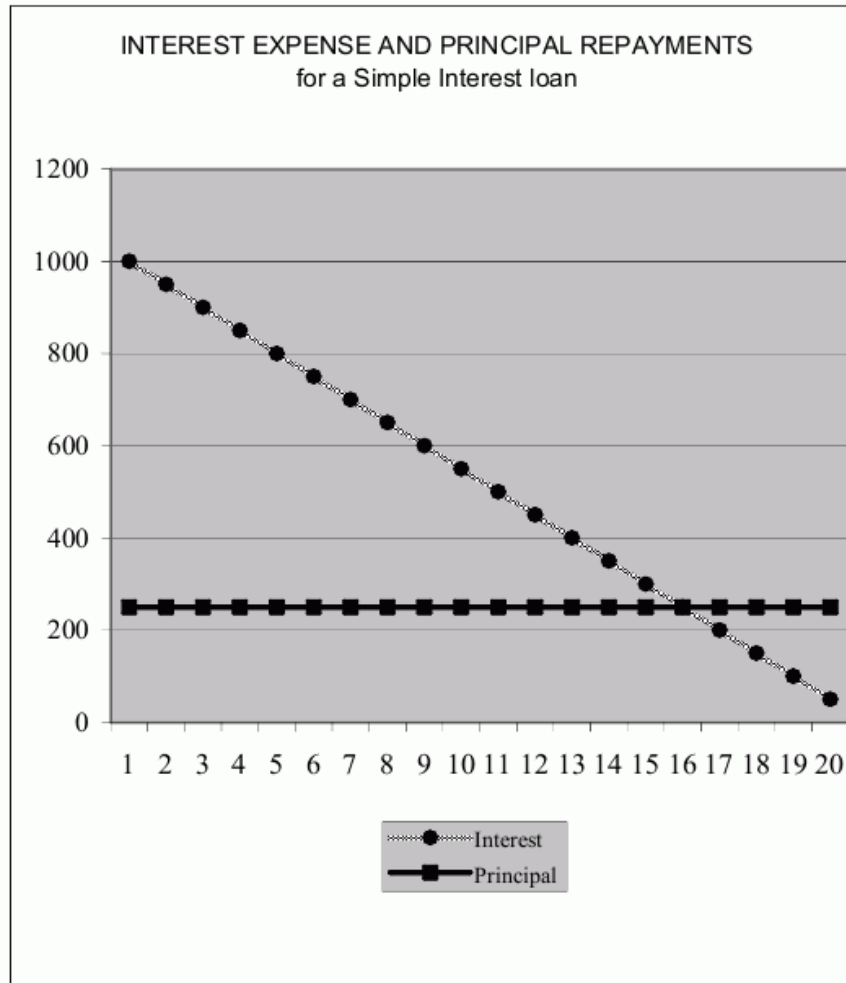


Figure 15 - Financing costs for a Simple Interest Loan

d. The combined costs compare as follows:

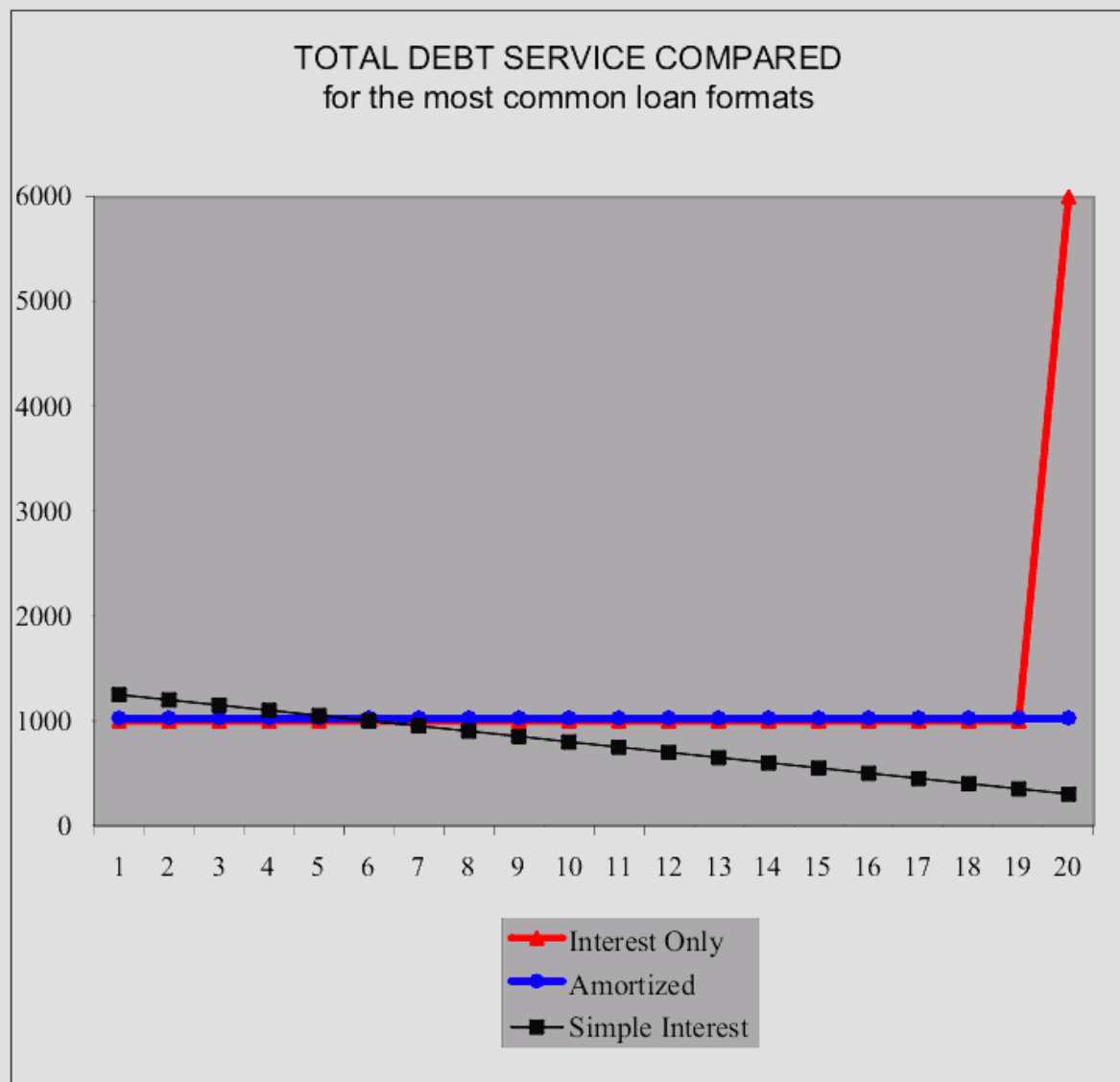


Figure 16 - Total Debt Service compared

During the term that the loan is outstanding, there is little difference between the debt service of an “Interest Only Loan” and that of an “Amortized Loan”. The “Interest Only Loan” provides however a small periodic saving on the debt service. The borrower is penalized for that small savings when the “balloon payment” comes due at the end of the term. The lender, on the other hand, has enjoyed constant full interest payments during the loan term.

**Total Debt Service for the most common Loan Structures**

<b>Year</b>	<b>Interest Only loan</b>	<b>Amortized loan</b>	<b>Simple Interest loan</b>
<b>1</b>	1,000	1,027	1,250
<b>2</b>	1,000	1,027	1,200
<b>3</b>	1,000	1,027	1,150
<b>4</b>	1,000	1,027	1,100
<b>5</b>	1,000	1,027	1,050
<b>6</b>	1,000	1,027	1,000
<b>7</b>	1,000	1,027	950
<b>8</b>	1,000	1,027	900
<b>9</b>	1,000	1,027	850
<b>10</b>	1,000	1,027	800
<b>11</b>	1,000	1,027	750
<b>12</b>	1,000	1,027	700
<b>13</b>	1,000	1,027	650
<b>14</b>	1,000	1,027	600
<b>15</b>	1,000	1,027	550
<b>16</b>	1,000	1,027	500
<b>17</b>	1,000	1,027	450
<b>18</b>	1,000	1,027	400
<b>19</b>	1,000	1,027	350
<b>20</b>	<u>6,000</u>	<u>1,027</u>	<u>300</u>
<b>Total</b>	25,000	20,540	15,500

**Interest and Principal for most common Loan Structures**

	<b>Interest</b>	<b>Principal</b>	<b>Total</b>
Interest Only Loan	20,000	5,000	25,000
Amortized Loan	15,536	5,000	20,540
Simple Interest Loan	10,500	5,000	15,500

Although the total interest cost is an important consideration, the timing of the principal repayments plays a leading role when fitting a loan into the available cash.

To demonstrate the difference between the total cash flow associated with the debt service of different loan formats, the following figure compares three formats.

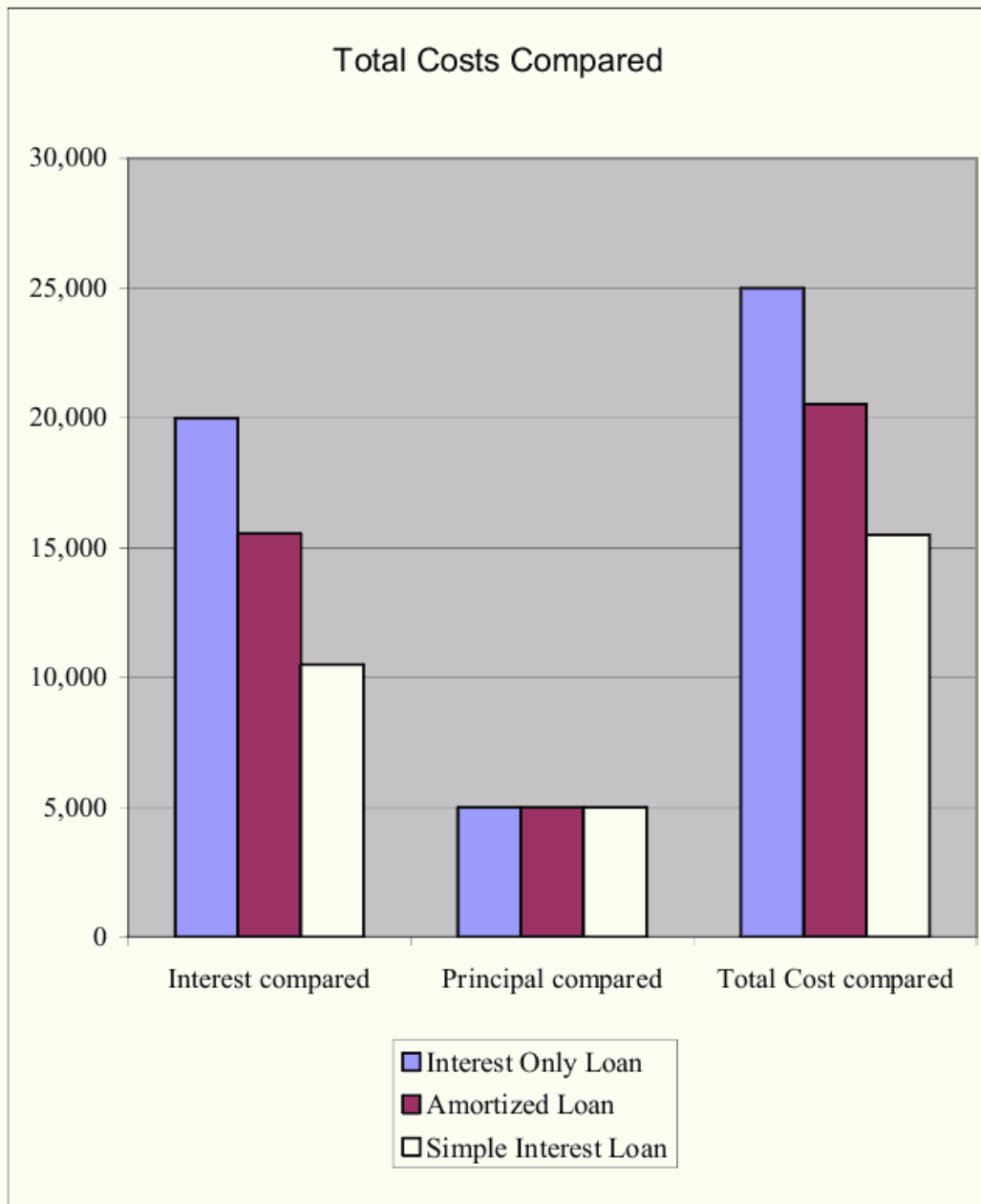


Figure 17 - Costs of the debt structures compared



## 5. Impact of the Loan Format on the ROE

As demonstrated above, the total interest expense over the life of a loan depends not only on the size of the loan and the interest rate charged but also on the loan repayment “structure”. The interest calculations for an identical 20 year loan in the amount of 5,000 with the same interest rate of 20% can result in a total interest expense as high as 20,000 or as low as 10,500 depending on the loan repayment structure alone. (See FIGURE 12)

Fitting the debt service into the available cash flow is only a first step to strategic loan structuring. The structure of the debt service impacts the Return on Equity measure. The ROE is a basic measure to attract equity.

- The total cost of interest.

As the total cost of interest, during the time the loan is outstanding, decreases, the ROE should increase. An “Interest Only Loan” is the most expensive because the total loan remains outstanding until the end. The “Simple Interest Loan” is least expensive because the loan is repaid in a straight line. The “Amortized Loan” costs more than the Simple Interest loan, because the repayments of principal are increasing toward the end of the term.

- The repayment schedule.

The cost of interest is only one important component of the cash flow used to calculate the ROE. It is not the only one. The other important component of the cash flow is the repayment of principal. The more we can delay the repayment of the loan, the deeper that part of the cash flow is discounted for futurity and will therefore benefit the resulting ROE measure.

Conversely, the sooner the loan is repaid, the less it is discounted for futurity and the poorer the ROE measure becomes.

- Structuring the combination of interest and loan repayments.

The only way the total interest cost can be decreased is by speeding up the loan repayment schedule. Decreased interest cost increases the ROE, however, speeding up the loan repayment schedule (which decreases the interest expense) decreases the ROE. These two opposing effects do not always cancel each other out. One will have more influence on the ROE than the other, depending on the interest rate and the amounts of repayments involved.

However important it may be to fit a loan into the available cash flow for reasons of viability, one cannot forget that the loan format can influence the Return on Equity, a major motivator to attract equity capital.

#### **a. Influence of the Interest Rate on the ROE**

A loan influences the Return on Equity. The more an investment is financed with borrowed funds, the better the return on the Equity. This phenomenon is called “Leveraging”.

One should be aware of the fact that increasing borrowing does not continue to result in an improved outcome. As the debt portion of the balance sheet increases, the cost of borrowed money escalates. At one point, the cost of borrowing can eradicate the advantage of leverage completely. Once the ROI is higher than the ROE the leverage effect becomes negative.

The example below shows that a loan with a 10% interest cost improves the ROE as more money is borrowed. However, when the interest is 20%, increased borrowing decreases the ROE. If the interest rate on the loan is too high, the benefits of leverage decrease as borrowing increases until it disappears and becomes negative leverage.

#### **EXAMPLE 20**

This Example uses the following assumptions:

Investment	1,000
Yearly net income	300
The loan is	0%, 25% or 50%
Life of the project	5 years
The loan is repaid as soon as possible	

#### **Return On Equity before Taxes**

Borrow	0%	25%	50%
At 10% Interest	ROE 15.24%	ROE 15.78%	ROE 17.16%
At 20% Interest	ROE 15.24%	ROE 14.76%	ROE 13.28%

## b. Influence of the Loan Repayment Schedule on the ROE

An Amortized loan structure causes delayed repayments, as compared to a Simple Interest loan. The delay causes the total interest expense to be higher than for the Simple Interest loan structure. The amortized loan structure should therefore be worse than the Simple Interest format. On the other hand, the delayed repayments must be good for the ROE. These two characteristics dim the effect of each other.

A lesser interest rate may increase the ROE as shown above. But this lesser interest expense may require an earlier debt repayment schedule. These early payments are not discounted as much for futurity and may penalize the ROE to a point where the timing of loan repayment becomes dominant and reverses the beneficial effects of lower total interest expense.

### EXAMPLE 21

This Example uses the following assumptions:

Investment	1,000
Yearly net income	300
The loan is 50%	500
Interest is	10% and 20%
The loan term is	5 years
Life of the project	5 years

### Return On Equity before Taxes – ROE

	<u>Interest Only</u> <u>loan</u>	<u>Amortized</u> <u>loan</u>	<u>Simple Interest</u> <u>loan</u>
10% Interest	ROE 26.19%	ROE 20.25%	ROE 19.80%
20% Interest	ROE -22.67%	ROE 10.28%	ROE 11.15%

The loan repayment structure and the total interest expense have a joint influence on the leverage effect. When, during the start-up period, the cash flow is not sufficient to accommodate conventional debt service, one may consider a graduated loan repayment structure. This choice has a two-pronged effect. A string of smaller payments are made at the early stages and a string of larger payments at later stages. The later larger payments are discounted deeper for futurity which is beneficial for the ROE measure but interest expenses increase, which have a negative effect on the ROE.

If the loan repayment schedule is graduated with the intent to speed up the repayment as much as possible, instead of delaying the repayments as much as possible, the ROE may increase because of the reduced interest expenses and it may decrease because the earlier principal payments are less discounted. Note that decreasing the total interest cost, by shortening the repayment schedule, may decrease the ROE further.

#### **Interest Only loan**

For the project studied in the above example, the Interest Only format gives the best result at 10% interest and the worst result at 20% interest. The yearly loan repayments were zero until the last year. This benefited the net cash flow compared to the cash flow of the other two loan formats. When the interest rate was increased from 10% to 20%, the benefit of delaying the repayments disappeared because the cash flow reduced to pay more interest and repayment of the loan at the end of the term left a negative ROE of -22.67%.

#### **Amortized loan**

An amortized loan format repays the principal earlier than the Interest Only Loan which should decrease the ROE. The lesser total cost of interest on the other hand, improves the ROE. Assuming a 10% interest rate, the combination of these two aspects makes the early loan repayment dominant over the lesser interest and thereby making the ROE smaller than the ROE of the Interest Only Loan.

At 20% interest the ROE decreased from 20.25% to 10.28%. The 20% interest rate, however, was not as bad as it was for the Interest Only format.

#### **Simple Interest loan**

The Simple Interest format pays less total interest than the Amortized Loan format because it repays the loan faster than the Amortized loan. The earlier repayments dampen the impact of the reduced interest cost on the ROE. With an interest rate of 10%, the combination of these two aspects reduces the ROE from 20.25% for the Amortized Loan to 19.80% for the Simple Interest Loan. The impact of the earlier loan repayment dominated and made the Simple Interest format inferior to the Amortized Loan format.

At 20% interest, the disadvantage of the early loan repayment was more than recovered by the lesser associated interest expenses, thereby increasing the 10.28% ROE for the Amortized Loan to 11.15% for the Simple interest Loan format.

## 6. Conclusion

The ROE attracts equity capital and must be maximized. However, one cannot predetermine the zenith, the nadir or the culmination point from positive to negative leverage effect, until the complete loan package is studied.

If the ROE is ~~worse than~~ the ROI, then you ~~may have to~~ decrease the equity investment or negotiate a lower interest rate and other financing costs. In addition, the loan repayment schedule may be too heavy in the early periods. Delaying the principal repayments seems beneficial, but it increases the interest cost, which is detrimental. A combination of two or all of the above factors may change the leverage effect.

Each format gives a different result:

The nuts and bolts available to structure a financing plan are:

- The available cash flow
- The timing of the loan repayment schedule
- The associated interest cost
- The resulting ROE to attract equity capital
- The lender's comfort with your loan

One should remember that the exposure to risk is a primary financier's concern for both equity and borrowed funds. It is up to the borrower to produce a financing package that attracts the necessary debt and equity funding.



# CHAPTER 7 - FUNDING YOUR PROJECT

## 1. Anatomy of a Financing Document

Now we have a plan. We took inflation into account, staggered the replacement costs to minimize the average lifetime of our investment. We balanced the borrowed amount with the average life of our investment. We fitted the loan repayment schedules into our available cash flow and optimized the repayment structures so that the ROE benefits from a maximized positive leverage.

With the financial plan being optimized one must prepare to obtain funding. The assumption used in the business plan must be substantiated by verifiable permits, licenses and contracts, rather than by literature and graphics based on statistics and predictions based on the opinions of consultants and specialists. Such well written documents may be the best you can do to approach a venture capitalist house and be successful. Those institutions will accept more risk than the conventional financing sources, but they will demand to be well compensated for the risk they take.

Believing that financing is “getting money from someone who has plenty of it” may be a misleading over-simplification. Borrowing needs some preparation. Your plan has to be dressed up so that an outsider can understand it, believe it, trust you and be motivated to participate.

Experience has made lenders distrusting. They feel that a borrower takes over control of the borrowed money. Borrowers may be tempted to risk more with other people’s money than with their own. Simpler yet, the borrower may disappear with that money. Lenders know that and do not want to be in that situation. In many cases the lender taps into money that is entrusted to the institution by third parties. The fiduciary duty to protect the depositors’ money makes the lender even more careful. That is why lenders will ask for your house, your boat, your watch, your rings and everything you can pledge as collateral. The more collateral the lender can secure, the less risk the lender takes.

The better the lender knows you, the less demanding your source of money may become and the more the door is left open to risk. To avoid this danger lenders and their staff follow a protocol that the borrower must follow.

Have you heard would-be borrowers say: *“That bank is so stupid! They lend their money only to those that don’t need it. They want more collateral than the money I was asking for. If I were that rich I would not need to borrow.”*

Think of Borrowing as “Obtaining partial and temporary liquefaction”.

If there is no asset to pledge, there is nothing to liquefy and you may be wasting your time convincing the lender that you will repay the loan from forecasted earnings, printed on paper.



Following is a conventional list of documents that can be prepared and included in the folder that a corporation presents to the lender.

- a. IDENTITY OF THE BORROWER
- b. PROOF OF THE AUTHORITY TO BORROW
- c. PURPOSE OF THE LOAN - LEGALITY AND LICENSES
- d. THE CAPACITY TO SERVICE DEBT
- e. THE EXISTENCE OF ADEQUATE COLLATERAL
- f. POLITICAL ENVIRONMENT
- g. POLICIES AND BY-LAWS OF THE CORPORATION OR PARTNERSHIP
- h. PRODUCT OR SERVICE VIABILITY
- i. OPERATING DATA
- j. FINANCIAL DATA

**a. IDENTITY**

Prove the identity of the borrower. If the borrower is an association or a corporation, provide copy of a document showing proof of the formation and legality of such organization with date, location and notarized signature.

Description of the Legal structure of the organization

Copy of the by-laws of the organization

Identification of the owners and distribution of equity holdings

Acquisition of Subsidiaries and other ownership participations

Short and long term objectives of the owners

**b. AUTHORITY TO BORROW**

Minutes of the Board meeting electing the Officers

Minutes of the Board Meeting authorizing the amount to be borrowed

**c. PURPOSE OF THE LOAN - LEGALITY AND LICENSES**

Description of the purpose of the loan

Land use and Building Permits

Environmental Impact on noise, fauna, flora, water pollution and compliance with Air Quality Board

Historic Site Preservation

**d. CAPACITY TO SERVICE DEBT**

Description of the history of Capital Structure Changes of the Corporation  
Purpose and Activities of the Corporation  
Description of the background and moral character of the Elected Officers  
Financial data on the owners  
Description of the bonus contracts and incentives for elected officers

**e. EXISTENCE OF ADEQUATE COLLATERAL**

Market Value appraisal of your assets by licensed estimator  
Debt to Worth Ratio  
Seniority of the new Loan  
Disclosure of Contingent Liabilities  
Disclosure of all Insurance Coverage  
Patent - Trademark contracts, Copyrights  
Outside Loan Guarantors -  
Long term Sales guarantors

**f. POLITICAL ENVIRONMENT**

Political Stability of the area  
Social Acceptance of the Project  
Availability of skilled and unskilled labor  
Union Activities

**g. POLICIES**

Inventory Costing  
Sales and Credit Policies  
Accounts Payable Policies  
Operations Control Systems  
Depreciation Method  
Operating Cost and Overhead Costs  
Pay scales and Incentive Programs  
Selling Prices and Volume of Sales

Dues and Taxes  
Financing Costs and Financing Structure  
Dividend Policies

#### **h. PRODUCT VIABILITY**

The Product and Projected Volume in the Industry  
    Position of the Product's Life Cycle  
    Seasonality and other Cycles  
    Life Expectancy of the Product  
Description of the Industry  
Related Social Trends  
Market and Size of Product Share  
    Existing and expected Competition  
    Provide a detailed and realistic marketing plan  
Advantages of the Venture  
    Location, Transport, Raw Materials, Market Proximity  
    Investment / Economies of Scale / Replacements and repairs  
    Planned Expansion phases  
    Production Costs

#### **i. OPERATING DATA**

Functional Organization Chart  
    Job Descriptions  
    Budget Allocations for each job  
    Time Allocation for each job  
Manning Schedule  
Supply contracts  
    For Power  
    Raw Material  
    Leases of important equipment

## **j. FINANCIAL DATA**

Projected Financial Statements and for an existing operation the latest audited statements

A copy of your tax returns if the business is a going concern

Profitability trends of the Corporation

A Ratio Analysis based on audited Financial Reports(delivered to the SEC if a publicly held Corporation)

Classic ratios include:

- Cost / Sales
- Gross profit / Sales
- Operating profit / Sales
- Net profit / Sale

Liquidity trends can be shown by ratios between

- Inventories / Sales
- Accounts Receivable / Sales
- Payables / Sales

## 2. Conventional Sources of Money

Now that you have a business plan and a financing folder, where can you turn to get funded?

External Sources of Funds come from Grants, Equity or Loans.

A **GRANT** is the best way to fund a project. You do not have to worry about giving the money back to the source. All that may be required is that you perform a service or a function that is beneficial to others as well as to yourself. But GRANTS are not the most common way to finance a business.

**EQUITY** is money that belongs to an owner or owners of the business. Before the owners can take their investment back, they will have to pay their taxes and their obligations, including all loans. Obviously then, EQUITY carries the most risk and it can therefore be expected to be the most costly form of financing. "Most costly" meaning "it needs the highest ROE".

Equity investors in a corporation will normally elect the Board of Directors and the Board of Directors appoints the Officers of the Corporation. A minority owner, may very well not control what the Management does with his EQUITY money and this additional risk carries no rights to higher returns. This is why Venture Capitalists often want controlling interest, until they can recover or sell their investment.

**LOANS** must be repaid according to a predetermined schedule and interest rates are agreed upon in advance. Interest can be fixed or variable, with or without a ceiling. The agreed upon terms are not influenced by the degree of success of the venture. Although lenders can impose restrictive covenants, they have normally no participation in the decision making process but they can recover their money before the owners can recover any of their investment... if there is anything left to recover at all.

All sources can be approached for equity participation as well as for loans.

## 3. Additional Sources

Following is a partial list of additional sources to consider:

- Venture capitalists are an excellent source of funds for an unproven business. They take an enormous risk and expect to be compensated for it by owning a controlling share of the issued stock at a low par value. It has been said that approaching a venture capitalist for help is like asking a crocodile for mouth to mouth resuscitation. As soon as your business has taken roots and flourishes, they sell their stock at market prices and hopefully find their risk properly compensated for.
- Private parties who feel your business has excellent merit may be persuaded to participate in your new venture. They may be less demanding than the venture capitalist.
- Some mutual funds specialize in specific levels of risk and growth and can be an excellent source of equity capital.

- The Government may fund a project of public, economic or political interest. The lobbying effort is then of equal or higher importance than the thoroughness of your business plan.
- For an international project of public interest the World Bank, the United States Agency for International Development (USAID), or the European Bank for Reconstruction and Development (EBRD) may be of enormous assistance.
- Insurance companies are often attracted to investments with a secure and steady income, rather than to high risk and high profit ventures.
- Pension funds seek out investments that secure long term income, with little or no foreseeable obsolescence. High returns are not necessarily a prerequisite here.
- The managers of Union Funds will listen to any venture that enhances their purposes.
- Suppliers' credit can be a major part of a construction loan with excellent terms because of the supplier's government support to promote their country's exports. EXIM Bank, HERMES and other such government institutions provide export assistance.
- Sometimes your clients have an interest in securing their source of supply at favorable prices and may assist you in your financing efforts.
- Common Stock such as in the USA, Canada, Europe, and Asian-Pacific markets. New York, Toronto, Paris, Frankfurt, London, Tokyo, Hong Kong and so many others have their own rules, regulations and conditions for admission. One market may be more suitable for you than another. Stock brokerage houses and investment bankers or the syndication of underwriters should be considered to find the best way to float your issue.
- Stock markets provide not only "common shares of stock", they can issue preferred stock that pays interest on the investment before dividends can be paid to common share holders. However, preferred stock can delay payments of such interest to avoid financial difficulties. Preferred stock holders will also be compensated before the common share holders, should the company be liquidated.
- Preferred stock can be convertible. It can be converted into common stock. Preferred stock pays interest if the money is available and pays such interest before it can distribute dividends to common stock holders. Conversions are made when dividends on common stock seem to be a more fitting solution than interest payments on preferred stock.
- Bond issues can be floated by the same organizations that float stocks. If the Government issues them, the bonds may have important tax advantages associated with it. Also, convertible bonds can be converted into stock.
- The face value of the bond is to be returned to the bond holder at the end of its life. If it is a callable bond, the issuer can call the bond at any time, usually as a means to take advantage of lower interest rates. Think of a bond issue as an Interest Only loan.



- Bank loans are perhaps the most common source of money. Banks can form a consortium to spread the risk if the deal appears too big for a single bank. Some larger banks even have their own venture capital division, where they can take more risks with a part of their own retained earnings. They use this to provide seed money and attract larger deals.
- Some trustworthy banks operate offshore branches in a tax free haven that can provide interesting conditions. Borrowing money in a perceived weaker currency can make a loan appear more alluring while that currency declines during the loan repayment period. These perceived advantages can quickly turn sour and the borrower must be fully aware of the associated risks.
- Finally one can include leasing an asset as off balance sheet financing. Leasing contracts can take many interesting formats and these options should be carefully considered in your financing plan. Leasing can take many formats such as lease purchase agreements or leveraged lease agreements.

## 4. Sources of Collateral

To reduce the risk associated with entrusting someone with a loan the lender will ask for collateral that can be used to recover or replace the money lost due to a loan turned sour.

Borrowing in weaker currencies would make the loan cheaper if that currency devalues. But it may not devalue and hedging costs can erode the perceived advantage.

A loan guarantee can do wonders. Sometimes it is possible to shift the requirement for collateral to someone else. If a well established entity with sufficient collateral can provide a guarantee for your loan, you do not need additional security.

A strong purchase agreement can replace collateral as well. In this case a respected entity would commit to take or pay your goods or services. Such contract can mention that it will be a “take or pay contract”, which means that the buyer will pay you even if you did not perform as expected or if the buyer does not need your goods. Sometimes such provision is referred to as “a hell or high water clause”. To obtain this you may have to proceed carefully on a step by step basis.

Rather than ask for such “contract” it may be easier to obtain a “letter of comfort”. Such document would show the lender that your plan is found to be interesting by a recognized party. This may not replace collateral or secure your loan, but it may open doors that may otherwise be slammed shut.

A “letter of intent” is already a sounder support and shows that a stronger entity than yourself has the intention to help you. Because no one is bound to perform when signing such letter, it is easier to obtain than a final contract.

A “letter of conditional commitment” could become a big step forward. If the conditions, defined in such letter, are fulfilled, the commitment materializes.

A firm “letter of commitment” from a sturdy firm resembles a contract and may be all that is required to replace the collateral you were missing.

Some banks work with government organizations to guarantee the loans they issue to weaker borrowers. One such organization is the Small Business Administration.

For a larger warranty OPIC can provide insurance against confiscation or political actions of a foreign government. This insurance is expensive and it takes an act of Congress to make such protection effective.



# **CHAPTER 8 - THE SENSITIVITY ANALYSIS**

## **1. The importance of documentation format**

Now you know how to make a financial plan and what to do about financing your project. You still need a sensitivity study:

- to check the strength of your plan
- to make possible improvements to your plan
- to answer “What if..?” questions during your presentations

Financial Planning is conventionally based on clearly defined assumptions. Unfortunately, the real world is cloudy and framed by a constantly changing contour.

No one can be certain of what the future holds except that things will change. A forecast that shows only a single set of assumptions is therefore most probably wrong.

## **2. Maximizing Project visibility by means of format**

Better information can only come from clarity, and clarity is a product of simplicity.

A Business Plan targets the long term effect on the bottom line of the business. You can normally expect to find that bottom line under a repulsive abundance of figures and calculations. It need not be so, as we will demonstrate.

The application of new techniques explained in this chapter will prove to be of great help for today's leaders. Progress in planning techniques has become available thanks to the computer. Modern planning requires therefore access to a computer and to software.

## **3. Conventional and New formats of Classic Financial Reports**

If one can only see a small part of an elephant, the depiction of the entire elephant will be influenced by the part one saw.

We will first introduce a format that facilitates the presentation of a forecast covering a complete project life. Then we will extract what is needed to measure and manipulate the financial outcome of the plan.

Business plans are most often made by trained accountants for the purpose of project funding. They follow a pattern that is practical and satisfies the targeted source of money.

Many good accountants are trained to concentrate on details that involve short term optimization of tax payments.

Bankers concentrate on the time span between loan draw out and the beginning of debt repayment.

Planners, however, need to see what happens between the time that an investment is made and the time that marks the end of the dividend stream expected from that investment during its life.

To make a business plan, a lot of calculations need to be made, everything needs to be quantified and counted in money, and the results are to be presented in a format that allows the plan's financial results to be readily understood. Who could be better qualified to do that work than the accountant? He counts everything in money all the time.

Although it is true that accountants are specialists in composing Financial Reports, one possible stumbling block is that they are used to take pictures of the past. Accountants are not really trained to look into the future.

One more difficulty is that the best accountants are retained because they can execute specific marching orders, such as minimizing or delaying tax payments or presenting this year's profitability picture so that it fits the shareholders' expectations. They can accomplish that with off-balance sheet financing and footnotes, with cunning allocations or capitalization of expenses, with methods of depreciation or write-offs and with special ways to account for the value of inventories. Their work requires a specific format for financial reporting which they must adhere to for the sake of practical uniformity and continuity. Their "art" is limited by Generally Accepted Accounting Principles and limitations imposed by the Securities and Exchange Commission. Unfortunately such format often obscures essentials that are important for planning purposes. It may even obscure pitfalls.

Two major differences between the conventional accountants' format and the format required for efficient planning are:

1. the time span covered and
2. the detail displayed.

Planners need more periods and less detail than accountants do. Instead of working with all the details that make up an accounting report, the planner needs a performance measure over the useful life of the asset or over the life of a debt obligation.

Because accountants portray the past, their format needs to go back in time for only a few periods to be adequate. As one goes farther and farther back in time, the past becomes less and less relevant. After all, the accountant's main purpose is to demonstrate the recent performance of the management team, of the people appointed to handle the investors' money. The conventional layout will therefore be adequate if it accommodates only a few periods of the past, providing a means to compare the past with the present and show evidence that things have improved.



When the same accounting format is used to forecast the future for planning purposes, the number of periods covered is inadequate because the available space on ordinary paper sizes is not available.

For planning purposes, one needs to cover all the periods affecting a decision. If an investment is involved, one may have to cover the useful life of that asset, which means: until its replacement must be financed. If a loan is considered, one needs to cover at least the full repayment term of that loan.

Some old accountants say that the future is never what it used to be. Asking for a five year forecast is already reaching for the limits of the impossible. And if the impossible is done, a twenty year forecast takes up so much paper that management does not even want to see it anyway. Everybody agrees quickly that four periods are sufficient. How many times have you heard: *"How can anyone know what fixed costs will be five years from now, when no one knows with certainty what one's next meal will cost?"*

But, the uncertainty about the future should never be used as an excuse for not forecasting sufficiently far. One must know what happens when an asset is to be replaced at an inflated cost; one must know what happens when the advantages of accelerated depreciation stop and reverse; one must know how a loan repayment schedule fits in the available cash flow throughout the loan term and around possible asset replacement cost.

Bankers, and for that matter all lenders, pursue their own purposes. They want mainly to feel confident that their money will come back with interest. They do not participate in the spoils of the borrower's success, they do not plan for his success because that is not their job. Lenders want safety. They will understandably distrust any forecast. One way bankers protect themselves from being led astray is to ask their clients for financial statements of the last three years, preferably audited by a respected accounting firm. The fall back position is to ask for copies of tax returns because they may be audited by austere authorities and should therefore be more reliable than the "magic" forecasts cooked up to obtain financing. With those more reliable documents, bankers can see if the client's three year forecast is in line with his factual past performance.

However, any size business plan is by itself rarely sufficient to obtain a loan, even when wrapped in an expensive cover.

Borrowed money is mostly obtained based on the availability of someone's collateral. In rare cases is credit extended because the borrower is known to be so reliable that "he makes only trustworthy forecasts".

Obviously then, the business forecast that is made by planners, who need to optimize the owner's interest, will be quite different from the conventional accountant's format, made for a banker who just wants his money back.

A special format had to be devised for a planner to depict the financial reports. It must be special in its format because not only does it have to show all the periods necessary for a business plan, ideally, it has to show all those periods on a single page or on as few pages as possible.. If too many pages are necessary to cover the complete time span under review, the picture becomes soon too difficult to grasp.

The practicality of the new format is unusual but you will quickly grow used to it.

#### **a. Description of the SMELTER PROJECT'S INPUT DATA**

We will study a sample project and we will be able to see a complete forecast for 50 consecutive years.

Following is a description of the data for this project, which we will call SMELTER PROJECT. The data are mainly a summarizing of the investments, the operating data, the revenues, and the financing plan.

##### **Duration:**

The project will cover 50 years. This lifespan is chosen to demonstrate the improved visibility of the project when the special format, devised for the planner, is used to depict the financial reports.

##### **Investment:**

The venture will require an investment in fixed assets of 141,698,000 spent over 4 year as follows.

In Year 1 25,401,000

In Year 2 58,295,000

In Year 3 52,301,000

In Year 4 5,701,000

##### **Replacements:**

A portion of these fixed assets will have to be replaced during the life of our project. The cash to be used for such replacements is to be earned by the project and will therefore not be available to service debt. Cash outlays for replacements must therefore be taken into account when we make a cash flow forecast. Assume the replacements will take place as follows:

In Year 15: 5,600,000

In Year 30: 5,600,000

In Year 37: 4,000,000

##### **Working capital:**

We plan to start operations in the third year, the first two years being strictly construction years. We will need 5,522,000 for working capital starting in the third period, when the facility starts its testing, loads the "supply inventories", fills up the production pipeline with "inventory in process" and stocks the "finished goods inventories". To prepare for operations at capacity in year 6, year 5 will already require an additional 11,223,000 in working capital to cover added inventories.

##### **Minimum cash:**

We plan on keeping 100,000 available in the bank at all times, as a cushion against contingencies. We must take this into account when we make our plan since this amount cannot be used to service debt or pay for the replacements.



Interest rate:

Fixed at 10% for the duration of the loan.

Commitment Fee:

1% per annum for money that the bank keeps available for us. The bank charges us 1% per annum on such committed funds until we draw them to make progress payments for our investment.

Loan Initiation Fee:

Assume we must pay 2 points.

Debt/Equity:

We plan to structure our initial funding in such a way that we will at worst show 75% debt.

The volume we plan to sell will be:

Because of construction in years 1, 2, and 3 -	0 units
Production in year 4 -	100,000 units
in year 5 -	200,000 units
in year 6 etc.	360,000 units

The unit price:

Unit price will be 160.

The direct or variable cost:

Variable production cost per unit is 83 per unit.

Fixed Costs:

Will yearly be 1,091,000 starting in year 3 and increasing to \$3,935,000 in year 4 and beyond.

Income Taxes:

Will be 30% of profit. There is a 4 year pre-operating period followed by a 5 year tax-loss carry-forward.

Depreciation:

Will be the straight-line method over 20 years.

Amortization of capitalized finance expenses:

Will also be straight-line over 20 years.

The following pages show an example of how data would be presented in a conventional accountant's manner, followed by an example of how a single page in the new format could show a complete set of data. To demonstrate the improved visibility, the report covers a 50 year period.

### b. Conventional Format for Financial Reporting

A conventional format for the presentation of forecasted income would probably look as follows:

#### INCOME REPORT IN THOUSANDTHS

	Year 3	Year 4	Year 5	Year 6
REVENUE	0	16,000	32,000	57,600
VARIABLE COSTS	<u>0</u>	<u>8,300</u>	<u>16,600</u>	<u>29,880</u>
GROSS PROFIT	0	7,700	15,400	27,720
FIXED COSTS	1,091	3,935	3,935	3,935
INTEREST	0	0	15,260	15,260
DEPRECIATION	0	0	7,085	7,085
AMORT. FIN.COSTS	<u>0</u>	<u>0</u>	<u>2,150</u>	<u>2,150</u>
<b>INCOME BEF. TAX</b>	<b>-1,091</b>	<b>3,765</b>	<b>-13,030</b>	<b>-710</b>
TAXES	<u>0</u>	<u>802</u>	<u>0</u>	<u>0</u>
<b>INCOME AFTER TAXES</b>	<b>-1,091</b>	<b>2,963</b>	<b>-13,030</b>	<b>-710</b>

Obviously, it would be difficult to show 50 periods on the same page. One would have to cover several pages, and it would be clumsy to study the evolution of the project over the complete project life.

The titles (REVENUE, VARIABLE COSTS etc.) appear conventionally in a column on the left side of the page. The new format places these titles in a row on top of the page. This new format allows the results for many more periods to be shown one below the other, instead of one next to the other.

### c. Revised Format for Financial Reporting

It would take many pages to show the same amount of information in the traditional format, where the periods are shown in rows instead of in columns. The SMELTER project covers 50 periods. Most projects cover less than 50 years and would be easily presented on a page the size of this book. This time span was chosen to dramatize the advantages of this format, designed to facilitate a comprehensive view and make the digestion of a project's forecast much easier.

## INCOME REPORT

period	Volume	Revenue	Variable Costs	Fixed Costs	Interest and Fin. Expenses	Depreciation of Fixed Assets	Amortization of Capitalized Int.	and Financing Fees	Income before taxes	Taxes	Income after Taxes
1	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	1,091	-	-	-	-	-1,091	-	-1,091
4	100	16,000	8,300	3,935	-	-	-	-	3,765	802	2,963
6	360	57,600	29,880	3,935	15,260	7,085	1,880	270	-710	-	-710
7	360	57,600	29,880	3,935	14,751	7,085	1,880	270	-201	-	-201
8	360	57,600	29,880	3,935	14,243	7,085	1,880	270	308	-	308
9	360	57,600	29,880	3,935	13,734	7,085	1,880	270	816	-	816
10	360	57,600	29,880	3,935	13,225	7,085	1,880	270	1,325	-	1,325
11	360	57,600	29,880	3,935	12,717	7,085	1,880	270	1,834	277	1,557
12	360	57,600	29,880	3,935	12,208	7,085	1,880	270	2,342	703	1,640
13	360	57,600	29,880	3,935	11,699	7,085	1,880	270	2,851	855	1,996
14	360	57,600	29,880	3,935	11,191	7,085	1,880	270	3,360	1,008	2,352
15	360	57,600	29,880	3,935	10,682	7,365	1,880	270	3,588	1,077	2,512
16	360	57,600	29,880	3,935	10,173	7,365	1,880	270	4,097	1,229	2,868
17	360	57,600	29,880	3,935	9,665	7,365	1,880	270	4,606	1,382	3,224
18	360	57,600	29,880	3,935	9,156	7,365	1,880	270	5,114	1,534	3,580
19	360	57,600	29,880	3,935	8,647	7,365	1,880	270	5,623	1,687	3,936
20	360	57,600	29,880	3,935	8,139	7,365	1,880	270	6,132	1,840	4,292
21	360	57,600	29,880	3,935	7,630	7,365	1,880	270	6,640	1,992	4,648
22	360	57,600	29,880	3,935	7,121	7,365	1,880	270	7,149	2,145	5,004
23	360	57,600	29,880	3,935	6,613	7,365	1,880	270	7,658	2,297	5,360
24	360	57,600	29,880	3,935	6,104	7,365	1,880	270	8,166	2,450	5,716
25	360	57,600	29,880	3,935	5,595	280	-	-	17,910	5,373	12,537
26	360	57,600	29,880	3,935	5,087	280	-	-	18,418	5,526	12,893
27	360	57,600	29,880	3,935	4,578	280	-	-	18,927	5,678	13,249
28	360	57,600	29,880	3,935	4,069	280	-	-	19,436	5,831	13,605
29	360	57,600	29,880	3,935	3,561	280	-	-	19,944	5,983	13,961
30	360	57,600	29,880	3,935	3,052	560	-	-	20,173	6,052	14,121
31	360	57,600	29,880	3,935	2,543	560	-	-	20,682	6,205	14,477
32	360	57,600	29,880	3,935	2,035	560	-	-	21,190	6,357	14,833
33	360	57,600	29,880	3,935	1,526	560	-	-	21,699	6,510	15,189
34	360	57,600	29,880	3,935	1,017	560	-	-	22,208	6,662	15,545
35	360	57,600	29,880	3,935	509	280	-	-	22,996	6,899	16,097
36	360	57,600	29,880	3,935	-	280	-	-	23,505	7,052	16,454
37	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
38	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
39	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
40	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
41	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
42	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
43	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
44	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
45	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
46	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
47	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
48	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
49	360	57,600	29,880	3,935	-	480	-	-	23,305	6,992	16,314
50	360	57,600	29,880	3,935	-	200	-	-	23,585	7,076	16,510
	<b>16,500</b>	<b>2,640,000</b>	<b>1,369,500</b>	<b>186,036</b>	<b>251,787</b>	<b>155,698</b>	<b>37,603</b>	<b>8,396</b>	<b>633,984</b>	<b>193,369</b>	<b>440,615</b>

## FUNDS FLOW REPORT

Period	APPLICATION OF FUNDS					SOURCES OF FUNDS				Cash Balance	Cumulative Cash Balance
	Investment	Capitalized Financing Costs	Loan Repayments	Operating Losses	TOTAL USES	Cash from Operations	Equity Investments	Loans	TOTAL SOURCES		
1	25,401	6,755	-	-	32,156	-	8,064	24,192	32,256	100	100
2	58,295	8,191	-	-	66,486	-	16,622	49,865	66,486	-	100
3	57,823	13,049	-	1,091	71,963	-	17,991	53,972	71,963	-	100
4	16,924	15,004	-	-	31,928	2,963	7,241	21,724	31,928	-	100
5	-	-	-	3,795	3,795	-	949	2,846	3,795	-	100
6	-	-	5,087	-	5,087	8,525	-	-	8,525	3,439	3,539
7	-	-	5,087	-	5,087	9,034	-	-	9,034	3,947	7,486
8	-	-	5,087	-	5,087	9,543	-	-	9,543	4,456	11,942
9	-	-	5,087	-	5,087	10,051	-	-	10,051	4,965	16,906
10	-	-	5,087	-	5,087	10,560	-	-	10,560	5,473	22,380
11	-	-	5,087	-	5,087	10,792	-	-	10,792	5,705	28,085
12	-	-	5,087	-	5,087	10,875	-	-	10,875	5,788	33,873
13	-	-	5,087	-	5,087	11,231	-	-	11,231	6,144	40,017
14	-	-	5,087	-	5,087	11,587	-	-	11,587	6,500	46,517
15	5,600	-	5,087	-	10,687	12,027	-	-	12,027	1,340	47,857
16	-	-	5,087	-	5,087	12,383	-	-	12,383	7,296	55,153
17	-	-	5,087	-	5,087	12,739	-	-	12,739	7,652	62,805
18	-	-	5,087	-	5,087	13,095	-	-	13,095	8,008	70,813
19	-	-	5,087	-	5,087	13,451	-	-	13,451	8,364	79,178
20	-	-	5,087	-	5,087	13,807	-	-	13,807	8,720	87,898
21	-	-	5,087	-	5,087	14,163	-	-	14,163	9,076	96,974
22	-	-	5,087	-	5,087	14,519	-	-	14,519	9,433	106,407
23	-	-	5,087	-	5,087	14,875	-	-	14,875	9,789	116,196
24	-	-	5,087	-	5,087	15,231	-	-	15,231	10,145	126,340
25	-	-	5,087	-	5,087	12,817	-	-	12,817	7,730	134,070
26	-	-	5,087	-	5,087	13,173	-	-	13,173	8,086	142,157
27	-	-	5,087	-	5,087	13,529	-	-	13,529	8,442	150,599
28	-	-	5,087	-	5,087	13,885	-	-	13,885	8,798	159,398
29	-	-	5,087	-	5,087	14,241	-	-	14,241	9,155	168,552
30	5,600	-	5,087	-	10,687	14,681	-	-	14,681	3,995	172,547
31	-	-	5,087	-	5,087	15,037	-	-	15,037	9,951	182,497
32	-	-	5,087	-	5,087	15,393	-	-	15,393	10,307	192,804
33	-	-	5,087	-	5,087	15,749	-	-	15,749	10,663	203,467
34	-	-	5,087	-	5,087	16,105	-	-	16,105	11,019	214,486
35	-	-	5,087	-	5,087	16,377	-	-	16,377	11,291	225,776
36	-	-	-	-	-	16,734	-	-	16,734	16,734	242,510
37	4,000	-	-	-	4,000	16,794	-	-	16,794	12,794	255,304
38	-	-	-	-	-	16,794	-	-	16,794	16,794	272,097
39	-	-	-	-	-	16,794	-	-	16,794	16,794	288,891
40	-	-	-	-	-	16,794	-	-	16,794	16,794	305,684
41	-	-	-	-	-	16,794	-	-	16,794	16,794	322,478
42	-	-	-	-	-	16,794	-	-	16,794	16,794	339,271
43	-	-	-	-	-	16,794	-	-	16,794	16,794	356,065
44	-	-	-	-	-	16,794	-	-	16,794	16,794	372,858
45	-	-	-	-	-	16,794	-	-	16,794	16,794	389,652
46	-	-	-	-	-	16,794	-	-	16,794	16,794	406,446
47	-	-	-	-	-	16,794	-	-	16,794	16,794	423,239
48	-	-	-	-	-	16,794	-	-	16,794	16,794	440,033
49	-	-	-	-	-	16,794	-	-	16,794	16,794	456,826
50	-17,945	-	-	-	-17,945	16,710	-	-	16,710	34,655	491,481
	155,698	42,999	152,598	4,886	356,180	644,197	50,866	152,598	847,662	491,481	



# BALANCE SHEET

Period	ASSETS									LIABILITIES			
	Cash from Operations	Working Capital	Fixed Assets	Less Accumulated Depreciation	Net Fixed Assets	Capitalized Financing Costs	Less Accumulated Amortization	Net Capitalized Financing Costs	TOTAL ASSETS	Loans	Equity	Retained Earnings	TOTAL LIAB
1	100	-	25,401	-	25,401	6,755	-	6,755	32,256	24,192	8,064	-	32,256
2	100	-	83,696	-	83,696	14,946	-	14,946	98,742	74,057	24,686	-	98,742
3	100	5,522	135,997	-	135,997	27,995	-	27,995	169,614	128,029	42,676	(1,091)	169,614
4	100	16,745	141,698	-	141,698	42,999	-	42,999	201,541	149,752	49,917	1,872	201,541
5	100	16,745	141,698	7,085	134,613	42,999	2,150	40,849	192,307	152,598	50,866	(11,158)	192,307
6	3,539	16,745	141,698	14,170	127,528	42,999	4,300	38,699	186,510	147,512	50,866	(11,867)	186,510
7	7,486	16,745	141,698	21,255	120,443	42,999	6,450	36,549	181,223	142,425	50,866	(12,068)	181,223
8	11,942	16,745	141,698	28,340	113,358	42,999	8,600	34,399	176,444	137,338	50,866	(11,761)	176,444
9	16,906	16,745	141,698	35,424	106,274	42,999	10,750	32,249	172,174	132,252	50,866	(10,944)	172,174
10	22,380	16,745	141,698	42,509	99,189	42,999	12,900	30,099	168,412	127,165	50,866	(9,619)	168,412
11	28,085	16,745	141,698	49,594	92,104	42,999	15,049	27,949	164,882	122,079	50,866	(8,062)	164,882
12	33,873	16,745	141,698	56,679	85,019	42,999	17,199	25,799	161,436	116,992	50,866	(6,423)	161,436
13	40,017	16,745	141,698	63,764	77,934	42,999	19,349	23,649	158,345	111,905	50,866	(4,427)	158,345
14	46,517	16,745	141,698	70,849	70,849	42,999	21,499	21,499	155,610	106,819	50,866	(2,1075)	155,610
15	47,857	16,745	147,298	78,214	69,084	42,999	23,649	19,349	153,035	101,732	50,866	437	153,035
16	55,153	16,745	147,298	85,579	61,719	42,999	25,799	17,199	150,816	96,646	50,866	3,305	150,816
17	62,805	16,745	147,298	92,944	54,354	42,999	27,949	15,049	148,954	91,559	50,866	6,529	148,954
18	70,813	16,745	147,298	100,309	46,989	42,999	30,099	12,900	147,447	86,472	50,866	10,109	147,447
19	79,178	16,745	147,298	107,673	39,625	42,999	32,249	10,750	146,297	81,386	50,866	14,045	146,297
20	87,898	16,745	147,298	115,038	32,260	42,999	34,399	8,600	145,502	76,299	50,866	18,337	145,502
21	96,974	16,745	147,298	122,403	24,895	42,999	36,549	6,450	145,064	71,213	50,866	22,985	145,064
22	106,407	16,745	147,298	129,768	17,530	42,999	38,699	4,300	144,982	66,126	50,866	27,990	144,982
23	116,196	16,745	147,298	137,133	10,165	42,999	40,849	2,150	145,255	61,039	50,866	33,350	145,255
24	126,340	16,745	147,298	144,498	2,800	42,999	42,999	-	145,885	55,953	50,866	39,066	145,885
25	134,070	16,745	147,298	144,778	2,520	42,999	42,999	-	153,335	50,866	50,866	51,603	153,335
26	142,157	16,745	147,298	145,058	2,240	42,999	42,999	-	161,142	45,779	50,866	64,496	161,142
27	150,599	16,745	147,298	145,338	1,960	42,999	42,999	-	169,304	40,693	50,866	77,745	169,304
28	159,398	16,745	147,298	145,618	1,680	42,999	42,999	-	177,823	35,606	50,866	91,350	177,823
29	168,552	16,745	147,298	145,898	1,400	42,999	42,999	-	186,697	30,520	50,866	105,311	186,697
30	172,547	16,745	152,898	146,458	6,440	42,999	42,999	-	195,732	25,433	50,866	119,433	195,732
31	182,497	16,745	152,898	147,018	5,880	42,999	42,999	-	205,122	20,346	50,866	133,910	205,122
32	192,804	16,745	152,898	147,578	5,320	42,999	42,999	-	214,869	15,260	50,866	148,743	214,869
33	203,467	16,745	152,898	148,138	4,760	42,999	42,999	-	224,972	10,173	50,866	163,932	224,972
34	214,486	16,745	152,898	148,698	4,200	42,999	42,999	-	235,431	5,087	50,866	179,478	235,431
35	225,776	16,745	152,898	148,978	3,920	42,999	42,999	-	246,441	-	50,866	195,575	246,441
36	242,510	16,745	152,898	149,258	3,640	42,999	42,999	-	262,895	-	50,866	212,029	262,895
37	255,304	16,745	156,898	149,738	7,160	42,999	42,999	-	279,209	-	50,866	228,342	279,209
38	272,097	16,745	156,898	150,218	6,680	42,999	42,999	-	295,522	-	50,866	244,656	295,522
39	288,891	16,745	156,898	150,698	6,200	42,999	42,999	-	311,836	-	50,866	260,970	311,836
40	305,684	16,745	156,898	151,178	5,720	42,999	42,999	-	328,149	-	50,866	277,283	328,149
41	322,478	16,745	156,898	151,658	5,240	42,999	42,999	-	344,463	-	50,866	293,597	344,463
42	339,271	16,745	156,898	152,138	4,760	42,999	42,999	-	360,776	-	50,866	309,910	360,776
43	356,065	16,745	156,898	152,618	4,280	42,999	42,999	-	377,090	-	50,866	326,224	377,090
44	372,858	16,745	156,898	153,098	3,800	42,999	42,999	-	393,403	-	50,866	342,537	393,403
45	389,652	16,745	156,898	153,578	3,320	42,999	42,999	-	409,717	-	50,866	358,851	409,717
46	406,446	16,745	156,898	154,058	2,840	42,999	42,999	-	426,031	-	50,866	375,164	426,031
47	423,239	16,745	156,898	154,538	2,360	42,999	42,999	-	442,344	-	50,866	391,478	442,344
48	440,033	16,745	156,898	155,018	1,880	42,999	42,999	-	458,658	-	50,866	407,792	458,658
49	456,826	16,745	156,898	155,498	1,400	42,999	42,999	-	474,971	-	50,866	424,105	474,971
50	491,481	-	155,698	155,698	-	42,999	42,999	-	491,481	-	50,866	440,615	491,481

## 4. The Financial Synopsis Report

Computers are routinely used to reduce the repetitive, error-prone and time consuming work that is necessary to process data and to produce all the reports we need to make decisions. The time saved by computers can thus be used better to generate a more complete data base to support our preferred course of action.

This was quickly discovered by the younger generation that grew up with Computers and database software packages. Computer specialists could soon gain recognition and advancement.

As could have been expected, the pendulum swung too far and the use of computers has lead to information overflow, which causes confusion. The human brain has not kept up with computers. Today an average brain cannot digest more information than it could a hundred years ago. It may be less! If the unusual mass of computer generated information is not packaged right, the resistance to change by the established management becomes justified. As a consequence, the computer has still not made it to the top of our big corporate edifice, where the shots are called. It is still stuck in the middle management levels where it is mainly used to find, rank and manipulate more and more data.

There can never be enough information. But there can be more information than we can digest. The answer to control information overflows is FORMAT.

Any forecast, in whatever format, shows how a project evolves. However, no formats show the profitability of the project.

The classic bankers' and accountants' ratios, such as: times interest earned, acid test, asset turnover, and many such others are believed to be useful to bankers to measure their risk. Such measures change every year of the project's projection and are of little use for the planner.

The classic ratio analyses do not help upgrade the strategic planning effort or the decision making process intended to improve the longer term bottom line.

The new proposed format, even if it clearly portrays the evolution of a Project over a 50 year period, does not show classic profitability measures either.

However, following is an ample set of profitability measures, extracted from this new forecast. Such measures are used by the planner to check the desirability of the project. The Financial Synopsis Report tells much more about the strength of the Smelter Project than the lengthy classic financial reports.

## FINANCIAL SYNOPSIS REPORT

### SMELTER PROJECT

#### Base Case

Pay Back Period 12 + 10/12 (12.80) PERIODS

Assumes 25% equity financing

IRROI Before Tax 10.80%

IRROI After Tax 8.76%

IRROE After Tax 9.87%

Minimum Equity 50,866,000

Minimum Debt 152,598,000

Using all cash from operations after taxes the shortest possible number of periods with equal loan repayments required to retire all debt could be 19.16 years.

NOTE: REPLACEMENTS MIGHT BE FINANCED SEPARATELY

## 5. The Sensitivity Reports

A complete Financial Forecast is based on a single set of data. The revised format is an important improvement in conveying information about a project's forecast. A Synopsis Report brings to light pertinent information about the viability and profitability of the project which was enclosed in the Financial Reports.

However, the data used to make our forecast are assumptions about the future. Our data are not auditable facts, as is the case when reporting past performance. Some of the data we used, such as the location of the facility, the tax laws, proximity of transportation, etc., are clear and unchangeable. But other data are not so certain. Perhaps the latter inputs turn out to be lower or higher than the ones used. Those uncertain inputs are called VARIABLES. Their values have a possible high and a possible low and within that range we therefore chose the most probable value. Our choice is only an assumption, it is not an auditable fact. What will the Financial Synopsis Report show when one of these assumptions changes to a higher or a lower value? We must make a complete financial forecast each time we make a change in a single input and then extract from that forecast a new Financial Synopsis Report.

Changes in assumptions, used in our forecast, may be imposed by uncontrollable exterior forces or be generated by choice. We need to know how these changes affect the viability and the profitability of our project.



“We do not forecast to show or predict the future. We forecast to portray our choices when we are faced with good opportunities or adverse possibilities or other choices in the road.”

To provide the planner with a complete view of the consequences of altered inputs, each varied assumption must be revisited and changed to its highest possible value, its lowest possible value and to some intermediate values. The values used in our original forecast were the most probable assumptions in the range of their possibilities and as you step away from that most probable value, the more you move to a lesser probability. This is the reason why gradual steps are necessary in addition to the extreme high and low possibilities.

If a new forecast is made for every step of the range, each one of those steps will produce its own Financial Synopsis Report. A set of Synopsis Reports must be configured in a format that fits a single page for each variable studied in that manner. Let's call that format A SENSITIVITY REPORT.

On the left of a SENSITIVITY REPORT is shown the value of each step of the range studied, with their extremes at the top and at the bottom. In the center is the most probable assumption, the one used as input to the original forecast. The original forecast is called the BASE CASE and is presented in the middle row and in bold letters to be easily recognized. The juxtaposed columns show the associated profitability measures and the influence on their financial requirements and limitations.

Profitability Measures should be calculated based on present day values only. If inflation is included these measures are inflated as well and become meaningless. However, inflation is a reality which must be accounted for in some aspects of the financing plan.

The SENSITIVITY REPORT presents all information extracted from the Financial Synopsis Report. It shows the financing requirements and restrictions for zero inflation, but in addition it reports such information for two inflation rates. That provides results for three possible situations, the minimum required to show direction and trend.

Each variable assumption must thus be studied and packaged into a special report.

The following pages show an example of 5 such SENSITIVITY REPORTS:

1. TOTAL INVESTMENT
2. VOLUME sold per year
3. UNIT PRICE
4. UNIT DIRECT PRODUCTION COST
5. FIXED COSTS

Each one of these SENSITIVITY REPORTS shows 7 alterations of one single assumption. The range should cover perceived possibilities of deviation from the most probable assumption, being used for the Base Case, to the least probable in both directions. For the sake of simplicity, it was elected to study the results of forecasting 70%, 80%, 90%, 100%, 110%, 120% and 130% of the original values. The Base Case, the 100% case, is printed in the middle row and in bold letters for easy identification.

For each variation, basic profitability computations and the financing limits for zero percent inflation, are copied from the Financial Synopsis Report. In addition 2 inflation rates are added to provide direction and trend.

Many studies, each consisting of three Financial Reports, (Income Statement, Fund Flow Statement and Balance Sheet) would be required to find the information contained on one such Sensitivity Report. Even if only a few years are covered, as is the custom for conventional accounting, one would need to digest more than 20 pages and, in spite of it, obtain much less information than one can find on a single one-page SENSITIVITY REPORT.

NOTES:

1. To create the Sensitivity Reports it was assumed that no dividends are being paid. Dividends are based on availability of retained earnings which change as one changes assumptions. Dividends become available after all debt service and can only be decided upon when a final plan is executed. The profitability measures do not change when dividend payments are altered or deleted. Yet the available cash flow, destined to service debt, could be impeded by the payment of excessive dividends.

2. Inflation is left out when calculating the profitability measures. However, inflation is included to measure the capability of loan repayment schedules.

3. Values are in thousandths.

SMELTER PROJECT													
SENSITIVITY RESULTS OF INVESTMENT													
BASIC PROFITABILITY MEASURES				% ASSUMED INFLATION									
INVESTMENT	Based on lowest assumed inflation rate				0%			5%			10%		
	Pay Back Period	%IRR on Investment Before Tax	%IRR on Investment After Tax	%IRR on Equity after Tax	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan	Minimum Loan repayment Term
99,189	10.76	13.80	11.14	16.27	36,221	108,663	14.28	41,087	123,262	11.42	46,482	139,445	10.19
113,358	11.46	12.63	10.21	13.84	40,988	122,964	15.79	46,236	138,707	12.29	52,119	156,357	10.72
127,528	12.14	11.65	9.43	11.80	45,927	137,781	17.35	51,730	155,191	13.15	58,175	174,524	11.34
<b>141,698</b>	<b>12.80</b>	<b>10.80</b>	<b>8.76</b>	<b>9.87</b>	<b>50,866</b>	<b>152,598</b>	<b>19.16</b>	<b>57,240</b>	<b>171,720</b>	<b>14.40</b>	<b>64,277</b>	<b>192,830</b>	<b>11.84</b>
155,868	13.45	10.07	8.17	8.26	55,805	167,415	20.99	62,750	188,250	15.21	70,401	211,202	12.43
170,038	14.37	9.43	7.66	6.75	60,744	182,233	23.58	68,260	204,779	16.00	76,525	229,574	13.02
184,207	14.98	8.86	7.21	5.34	65,683	197,050	27.08	73,770	221,309	16.80	82,649	247,946	13.45

SMELTER PROJECT												
SENSITIVITY RESULTS OF VOLUME												
VOLUME		BASIC PROFITABILITY MEASURES					% ASSUMED INFLATION					
		Based on lowest assumed Inflation Rate					0%		5%		10%	
	Pay Back Period	% IRR on Investment Before Tax	% IRR on Investment After Tax	% IRR on Equity after Tax	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan repayment Term
468	10.76	13.73	11.11	16.19	49,402	148,207	14.22	55,746	167,238	11.32	62,722	188,167
432	11.32	12.80	10.36	14.22	49,648	148,944	15.44	55,932	167,796	12.06	62,946	188,839
396	11.99	11.82	9.58	12.19	50,257	150,771	16.99	56,473	169,418	12.88	63,359	190,076
360	12.80	10.80	8.76	9.87	50,866	152,598	19.16	57,240	171,720	14.40	64,277	192,830
324	13.79	9.73	7.89	7.49	51,475	154,426	22.04	58,007	174,022	15.72	65,233	195,700
288	15.42	8.59	6.98	4.20	52,084	156,253	32.63	58,775	176,324	17.59	66,190	198,570
252	17.09	7.38	5.99	n.a.	n.a.	n.a.	n.a.	59,542	178,626	20.48	67,147	201,440
Note: n.a. means not available because out of range.												

SMELTER PROJECT													
SENSITIVITY RESULTS FOR UNIT PRICE													
BASIC PROFITABILITY MEASURES				%ASSUMED INFLATION									
Based on lowest assumed inflation Rate				0%			5%			10%			
UNIT PRICE	Pay Back Period	%IRR on Investment Before Tax	%IRR on Investment After Tax	%ILKR on Equity after Tax	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan	Minimum Loan repayment Term
208	9.42	16.52	13.36	21.52	48,908	146,723	11.20	55,145	165,434	9.62	61,998	185,993	8.70
192	10.21	14.76	11.94	18.38	49,226	147,677	12.79	55,531	166,593	10.63	62,463	187,390	9.43
176	11.27	12.87	10.42	14.37	49,600	148,801	15.53	55,918	167,753	12.00	62,929	188,786	10.46
<b>160</b>	<b>12.80</b>	<b>10.80</b>	<b>8.76</b>	<b>9.87</b>	<b>50,866</b>	<b>152,598</b>	<b>19.16</b>	<b>57,240</b>	<b>171,720</b>	<b>14.40</b>	<b>64,277</b>	<b>192,830</b>	<b>11.84</b>
144	15.53	8.50	6.90	3.71	52,132	156,395	34.73	58,834	176,503	17.90	66,265	198,794	14.66
128	19.78	5.83	4.74	n.a.	n.a.	n.a.	n.a.	63,640	190,921	27.59	68,781	206,342	19.34
112	33.62	2.44	1.84	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	176,715	530,144	40.34
Note: n.a. means not available because out of range.													

SMELTER PROJECT												
SENSITIVITY RESULTS OF UNIT COST												
UNIT COST	BASIC PROFITABILITY MEASURES				% ASSUMED INFLATION							
	Based on lowest assumed Inflation				0%				5%			
	Pay Back Period	%IRR on Investment Before Tax	%IRR on Investment After Tax	%IRR on Equity after Tax	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan repayment Term
58.10	10.64	13.94	11.28	16.64	49,367	148,100	13.66	55,703	167,108	11.18	62,670	188,010
66.40	11.23	12.94	10.48	14.52	49,553	148,659	15.23	55,903	167,709	11.90	62,911	188,734
74.70	11.93	11.90	9.64	12.36	50,210	150,629	16.85	56,413	169,239	12.81	63,288	189,864
<b>83.00</b>	<b>12.80</b>	<b>10.80</b>	<b>8.76</b>	<b>9.87</b>	<b>50,866</b>	<b>152,598</b>	<b>19.16</b>	<b>57,240</b>	<b>171,720</b>	<b>14.40</b>	<b>64,277</b>	<b>192,830</b>
91.30	13.88	9.64	7.82	7.30	51,523	154,568	22.31	58,067	174,201	15.83	65,308	195,924
99.60	15.65	8.41	6.83	3.14	52,179	156,538	37.78	58,894	176,683	18.13	66,339	199,017
107.90	17.56	7.08	5.75	n.a.	n.a.	n.a.	n.a.	59,721	179,164	21.45	67,370	202,111
Note: n.a. means not available because out of range.												

SMELTER PROJECT													
SENSITIVITY RESULTS OF FIXED COSTS													
BASIC PROFITABILITY MEASURES				% ASSUMED INFLATION									
Based on lowest assumed Inflation Rate				0%			5%			10%			
FIXED COSTS	Pay Back Period	%IRR on Investment Before Tax	%IRR on Investment After Tax	%IRR on Equity after Tax	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan	Minimum Loan repayment Term	Minimum Equity	Minimum Loan	Minimum Loan repayment Term
2,754.50	12.37	11.31	9.16	11.04	50,194	150,581	17.98	56,407	169,220	13.41	63,282	189,845	11.49
3,148.00	12.51	11.14	9.02	10.64	50,418	151,254	18.37	56,685	170,054	14.04	63,610	190,829	11.60
3,541.50	12.65	10.97	8.89	10.25	50,642	151,926	18.76	56,962	170,887	14.22	63,938	191,813	11.72
<b>3,935.00</b>	<b>12.80</b>	<b>10.80</b>	<b>8.76</b>	<b>9.87</b>	<b>50,866</b>	<b>152,598</b>	<b>19.16</b>	<b>57,240</b>	<b>171,720</b>	<b>14.40</b>	<b>64,277</b>	<b>192,830</b>	<b>11.84</b>
4,328.50	12.95	10.63	8.62	9.50	51,090	153,271	19.57	57,518	172,553	14.58	64,618	193,854	12.08
4,722.00	13.10	10.46	8.49	9.12	51,314	153,943	19.99	57,796	173,387	14.78	64,959	194,877	12.21
5,115.50	13.26	10.28	8.35	8.74	51,538	154,615	20.44	58,073	174,220	15.04	65,300	195,901	12.33



# **CHAPTER 9 - CONTROLLING INFORMATION OVERFLOW WITH A STRATEGIC PLANNING GRAPH**

## **1. Information becomes “overflow” when it is hard to digest.**

More than 100 different results are condensed into the five Sensitivity Reports in Chapter 8. Conventional report formats generate an indigestible amount of information. In spite of the improvements offered by a new format of forecasting Financial Reports, and in spite of condensing the analysis of Financial Reports in a concise Synopsis Report and in spite of portraying hundreds of alternates and their analyses into a few Sensitivity Reports, the human brain cannot compile all such information. Planners have been trying to find ways to measure risk, test viability and portray sensitivity to changes in a variety of visual concepts.

The Spider Graph was invented and became popular but it was difficult to work with because the farther away one moved from the center, the larger the error shown by its lines.

The Monte Carlo Simulation method calculates risk in a most complex fashion. Yet it results in a measure that portrays only the bias of the individual or of the group that provides the inputs and the ranges for that method.

What is needed is a method designed for specialists who are not trained in accounting, economics or computer science. A system that can be used during a meeting and without delay.

The Strategic Planning Graph is such a tool. Engineering and Mining Journal called it “A back pocket computer”. Let us look at it.

Suppose that your plan is presented in a staff meeting and the Manager in charge of production is of the opinion that your projected volume does not make full use of some pieces of equipment.

If one single assumption, e.g. the VOLUME SOLD, is manipulated in the forecast, it may cause a change in the assumed PRICE, the DIRECT PRODUCTION COSTS, and the FIXED COSTS and as a consequence will affect GROSS PROFIT, INCOME BEFORE TAXES, TAXES and INCOME AFTER TAXES, CASH AVAILABLE, RETAINED EARNINGS and even TOTAL LIABILITIES. It may also change the LOAN REPAYMENT SCHEDULE, INTEREST PAYMENTS, DIVIDENDS, and the CASH BALANCES used to calculate profitability measures. Revising the assumed production volume could influence the amount of the LOAN and of the EQUITY required. Indeed, each time a simple change is proposed, a complete new study is necessary to check the resulting profitability measures. We can gauge the changes for variables that we can control, and we can measure the changes for variables that we cannot control. But by properly positioning the controllable variables we can move into a better position to face an uncontrollable variable turning bad.

This unique methodology provides a new insight that allows one to make “guided” changes for improvement. The plan’s profitability can be optimized by moving away from conditions one should avoid and by plotting a course of action which includes the most desirable goals.

We have shown how to put the financial measures of a project on a single page called a FINANCIAL SYNOPSIS REPORT. It replaces many pages of conventional financial reports.

The results of many such FINANCIAL SYNOPSIS REPORTS that make up a voluminous sensitivity study can now be seen on a single SENSITIVITY REPORT for each variable. Yet, it

seems that having to use several SENSITIVITY REPORTS at once makes it still impossible to find the result of simultaneous changes in assumptions. That is where the STRATEGIC PLANNING GRAPH comes in. It is a new and better answer that is well worth looking at a little closer.

A Strategic Business Plan is only useful if it is presented so that you can see and understand the whole project from beginning to end, wander around it in your mind, and imagine improvements to its execution.

The STRATEGIC PLANNING GRAPH projects all the SENSITIVITY REPORTS on one page. You can now finally see all the financial results at once. This unique GRAPH provides a way of viewing all the possible "STRATHS" one can use to win the battle.

The Strategic Planning Graph has been used for project financing as well as for turn-around projects, financial restructuring, mergers, acquisitions, valuation of ventures, cost allocations, transfer price negotiations, labor disputes and much more. Although obtaining absolute certainty in the decision making process is, as everyone knows, UTOPIA, one would improve considerably on irresponsible gambling, if one could digest all of the knowledge made available by the computer. An insight is what it takes. The STRATEGIC PLANNING GRAPH will provide you that insight.

The following pages will guide you, step by step, on how to produce this new tool as well as on how to use it.

## **2. What is a Strategic Planning Graph?**

A Strategic Planning Graph is a financial slide rule.

No knowledge of computer programming is required to use a Strategic Planning Graph. Neither does one need knowledge of composing financial statements. One can use that Graph without knowledge of macro-economics as well. However, these disciplines provided the information to create the graph and could provide deeper understanding of a playing field that can be compared to the weather forecast needed by the pilot of an aircraft as he prepares his flight plan.

The classic FINANCIAL REPORTS, (Income Report, Funds Flow Report and Balance Sheet) project the financial strength of a project as key-people conceive it. Together, the Financial Reports portray a BASE CASE. This BASE CASE consists of many assumptions. However, several of those assumptions may be questioned by some and may rapidly become subject to change. We have already seen that the outcome of changes is conveniently presented in a SENSITIVITY REPORT. A Strategic Planning Graph allows viewing multiple SENSITIVITY REPORTS at once, change the assumptions used for your Base Case, and read the financial profitability and viability measures resulting from many simultaneous changes

### 3. How to produce a Strategic Planning Graph

#### GRAPH 1 - Example of a Strategic Planning Graph

The STRATEGIC PLANNING GRAPH looks like a multiple Y-axis Graph, where each of the Y-axes portrays a SENSITIVITY REPORT. The values printed on a specific Y-axis are those depicted in the first column of its SENSITIVITY REPORT.

The CURVE on the right of the Y-axes is labeled to indicate the profitability measure under scrutiny. Obviously, a curve links the results found in the SENSITIVITY REPORT, thereby incorporating all the intermediate values that were not studied. The X-axis on the GRAPH shows the result of changed assumptions.

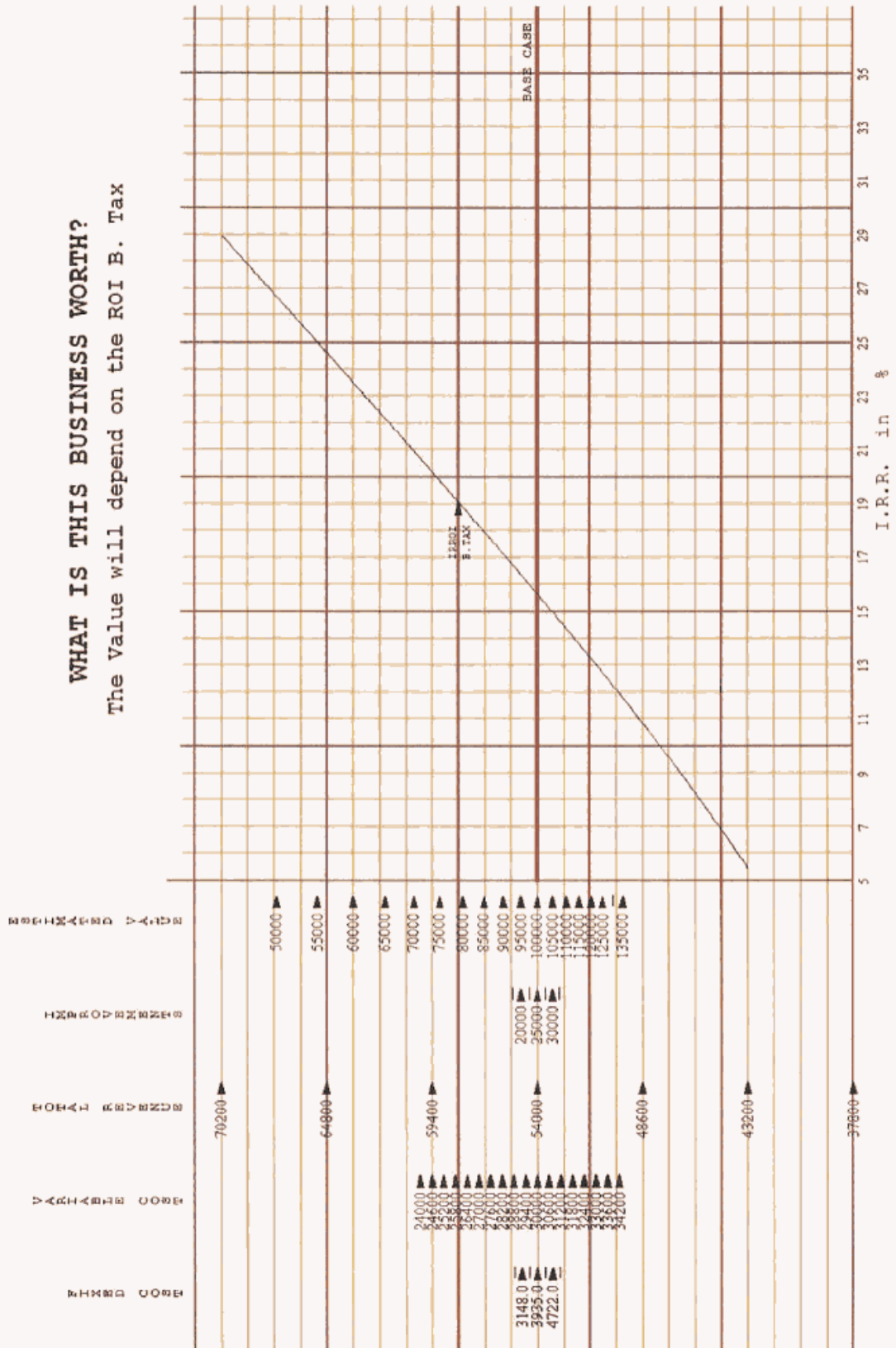
By extending to the left the horizontal line, drawn in bold in the middle of the GRAPH, that line crosses each Y-axis. The values used in the BASE CASE are the Y-values, positioned on this line. It is therefore called the BASE CASE LINE and is labeled as such on the GRAPH. On the right of the Y-axes, the BASE CASE LINE indicates the financial results for the BASE CASE, when it crosses a curve. The financial profitability result for any intermediate value, not listed in the Sensitivity Reports, can also be read by using the CURVE and can be quantified on the X-axis, as one would use any other commonly used graph.

A multi Y-axes GRAPH allows one to clearly visualize the relative sensitivity of each assumption studied. It is true, however, that changing one variable will almost always affect other assumptions as well. The uniqueness of the STRATEGIC PLANNING GRAPH stems from the fact that an infinite number of combinations of changes can be read from the CURVE without recourse to reports, technicians or computers.

Following is an example of a GRAPH showing the value of a Business

# WHAT IS THIS BUSINESS WORTH?

The Value will depend on the ROI B. Tax



GRAPH 1

## **GRAPH 2 - How to produce a single Y-axis Graph**

Find a sheet of squared paper, an Engineer's Computation Pad with squares printed on it.

Select the Profitability Measure that you are interested in. This could be any of the Profitability Measures shown on the SENSITIVITY REPORTS, e.g. ROI before taxes, ROI After Taxes, ROE After Taxes or Pay Back Period or a minimum loan repayment term. The example shows the ROI Before Taxes.

If you are making a multi Y-axes graph, incorporating several SENSITIVITY REPORTS, you Select the SENSITIVITY REPORT with the widest range of results for that chosen Profitability Measure. In the example GRAPH 2 of the SMELTER PROJECT, the Profitability of the SELLING PRICES has the widest range of results. Start making only one Y-axis and indicate the Base Case by drawing a bold line across the graph.

Distribute the range of profitability results in equal steps on the horizontal X-axis at the bottom of the graph.

Distribute the different Prices, shown on the SENSITIVITY REPORT, on the left side of the graph as your vertical Y-axis.

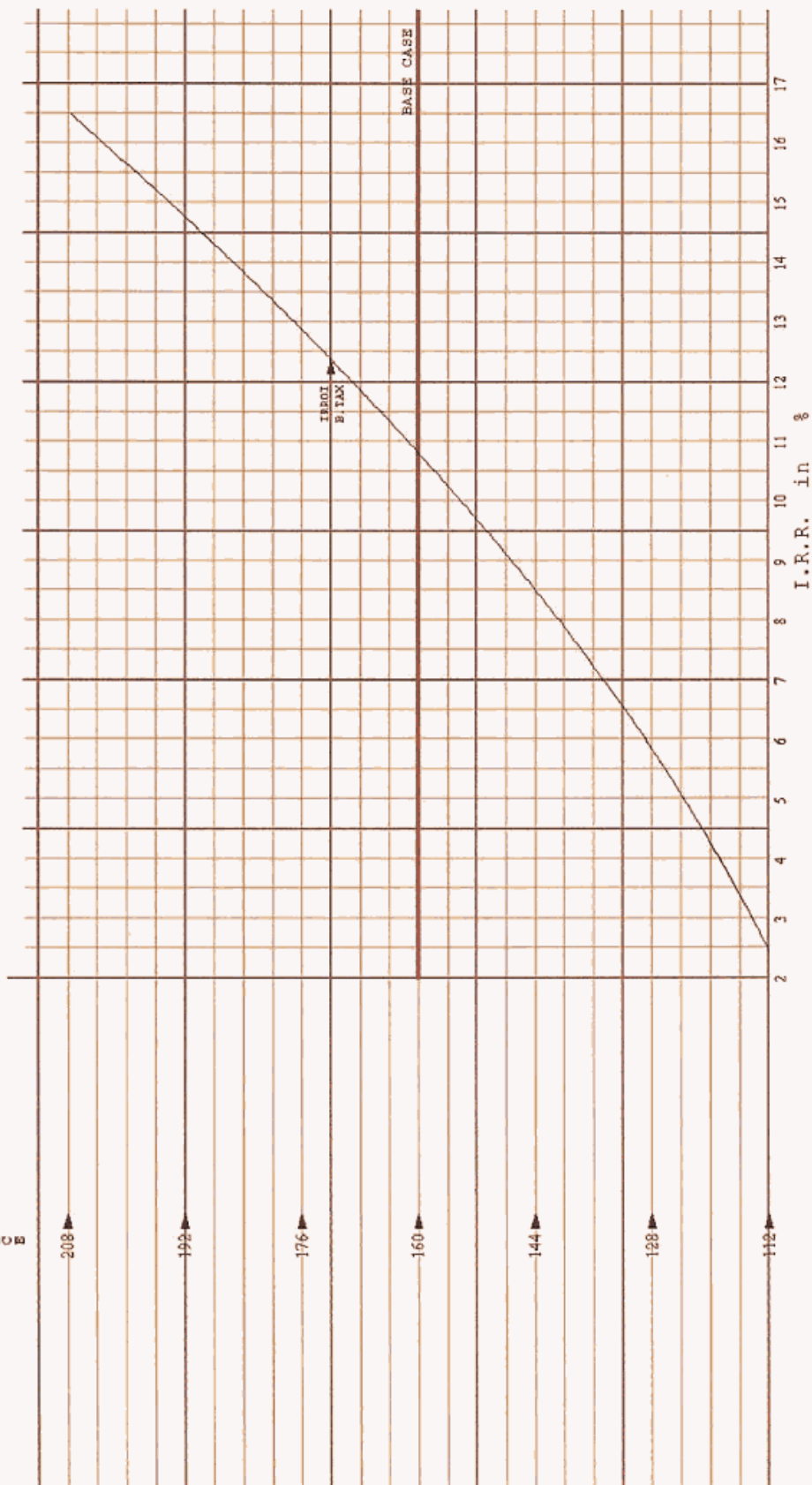
Mark the coordination points between the values on the Y-axis and on the X-axis for each of the prices.

Plot a curve uniting all your coordinates.



# SMELTER PROJECT Reference case

UNHE PCHOM



GRAPH 2



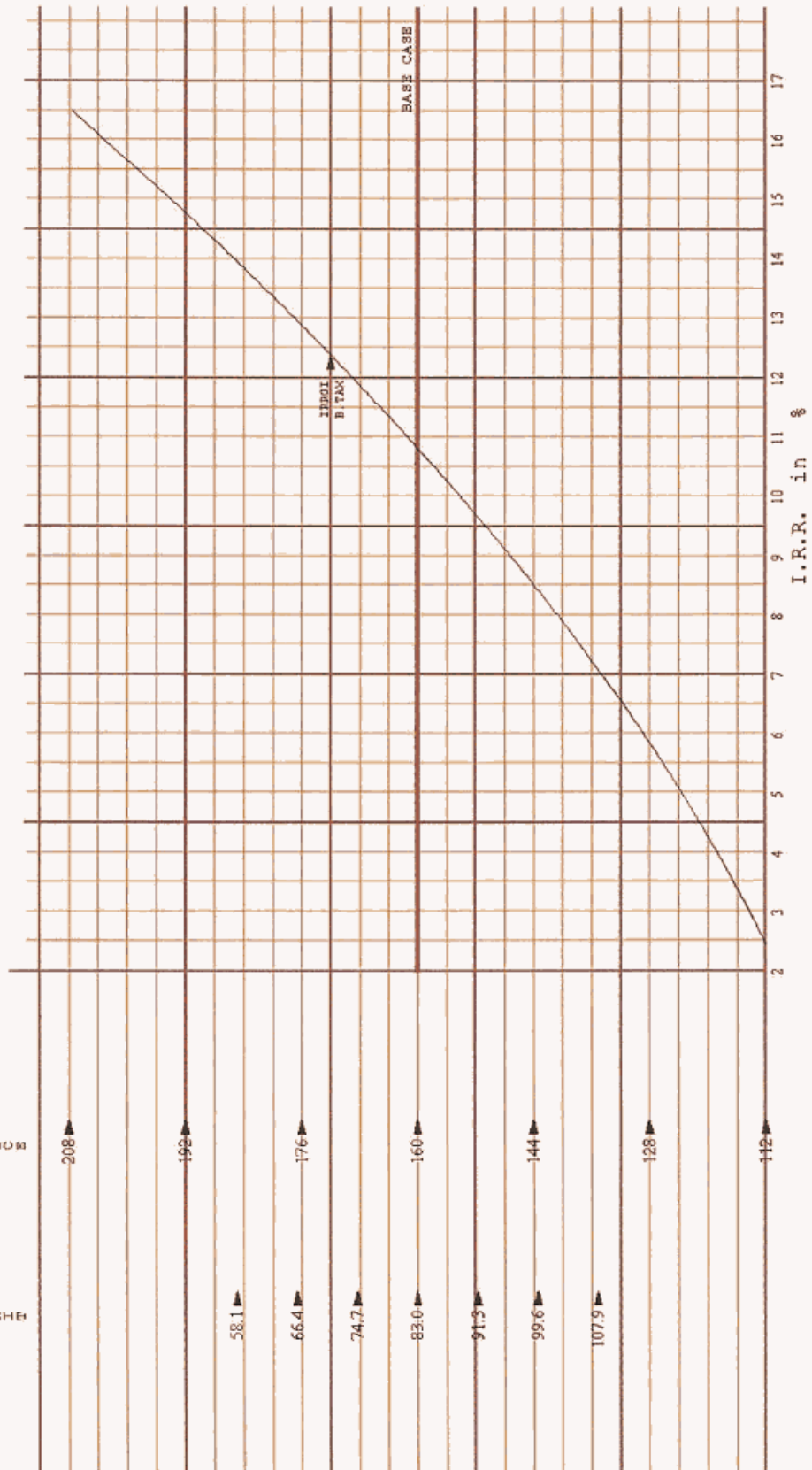
### **GRAPH 3 - Adding a second Y-axis on your Graph**

Suppose the second variable you want to study is “Unit Variable Cost”.

Using the existing curve as the coordinate for the profitability measures and the “Unit Cost”, start reading the IRROI Before Taxes from the X-axis to the curve and position the Y values of the second variable on a second Y-axis.

# SMELTER PROJECT Reference case

CODE PER UNHE  
UNHE PRICE



GRAPH 3

#### **GRAPH 4 - Producing a multiple Y-axes Graph**

GRAPH 3 shows the IRROI Before Taxes

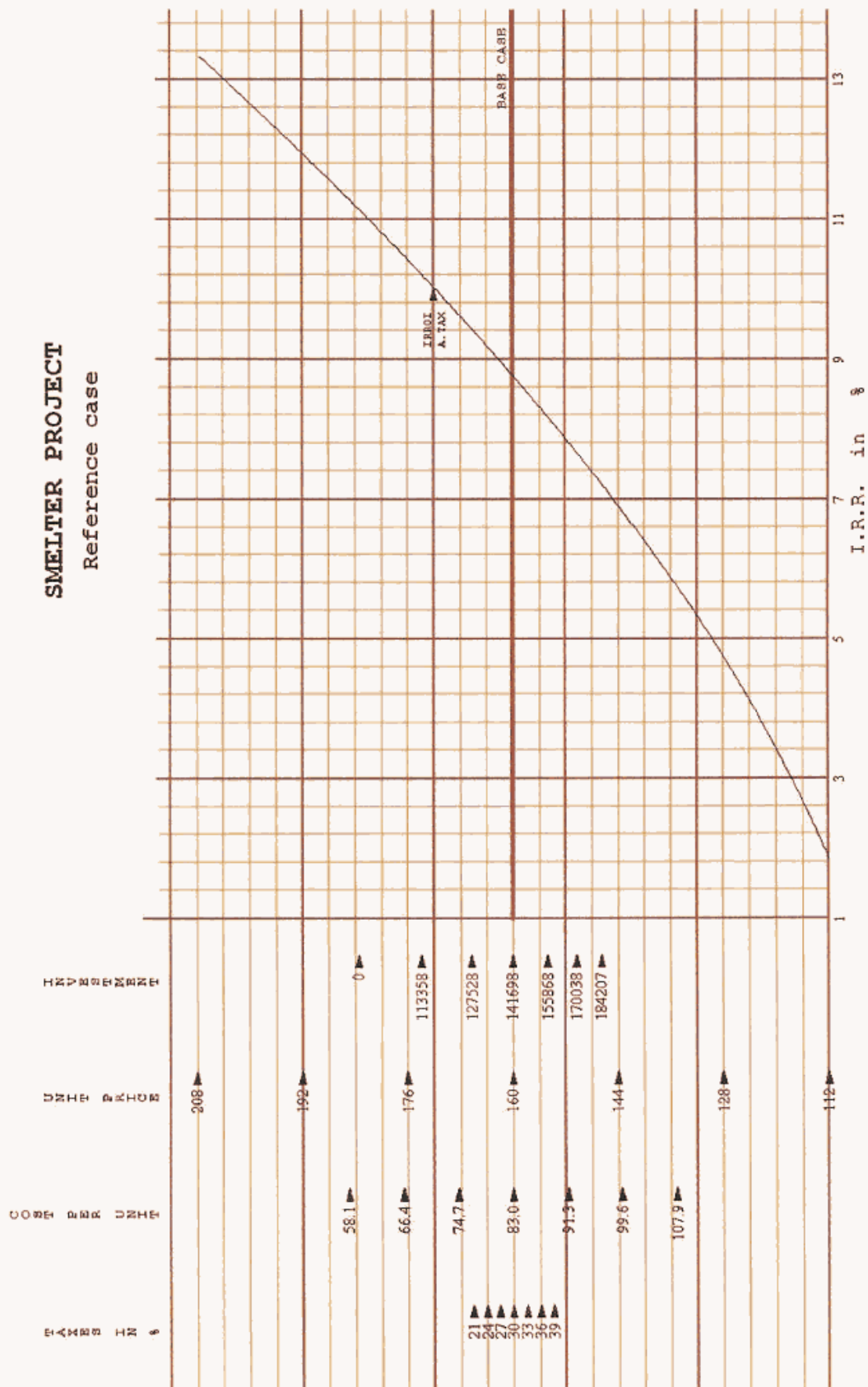
GRAPH 4 shows the IRROI After Taxes

GRAPH 5 shows both at the same time

You can plot in a similar fashion as many SENSITIVITY REPORTS a you desire.

If you want to show more than 11 Y-axes on a single Graph, increase the size of your paper to legal size or larger for easy reading.

# SMELTER PROJECT Reference case



GRAPH 4

## **GRAPH 5 - Producing a multiple curve Graph**

You can draw additional profitability curves on a Mylar transparency using the same values and positions on the lead Y-axis and the same X-axis as indicated on the single Y-axis graph. You can overlay several graphs by lining up the lead Y-axes and the X-axes.

Drawing multiple curves on a single GRAPH should only be done for GRAPHS with a single Y-axis. Drawing multiple curves with multiple Y-axes may not show precisely accurate results.

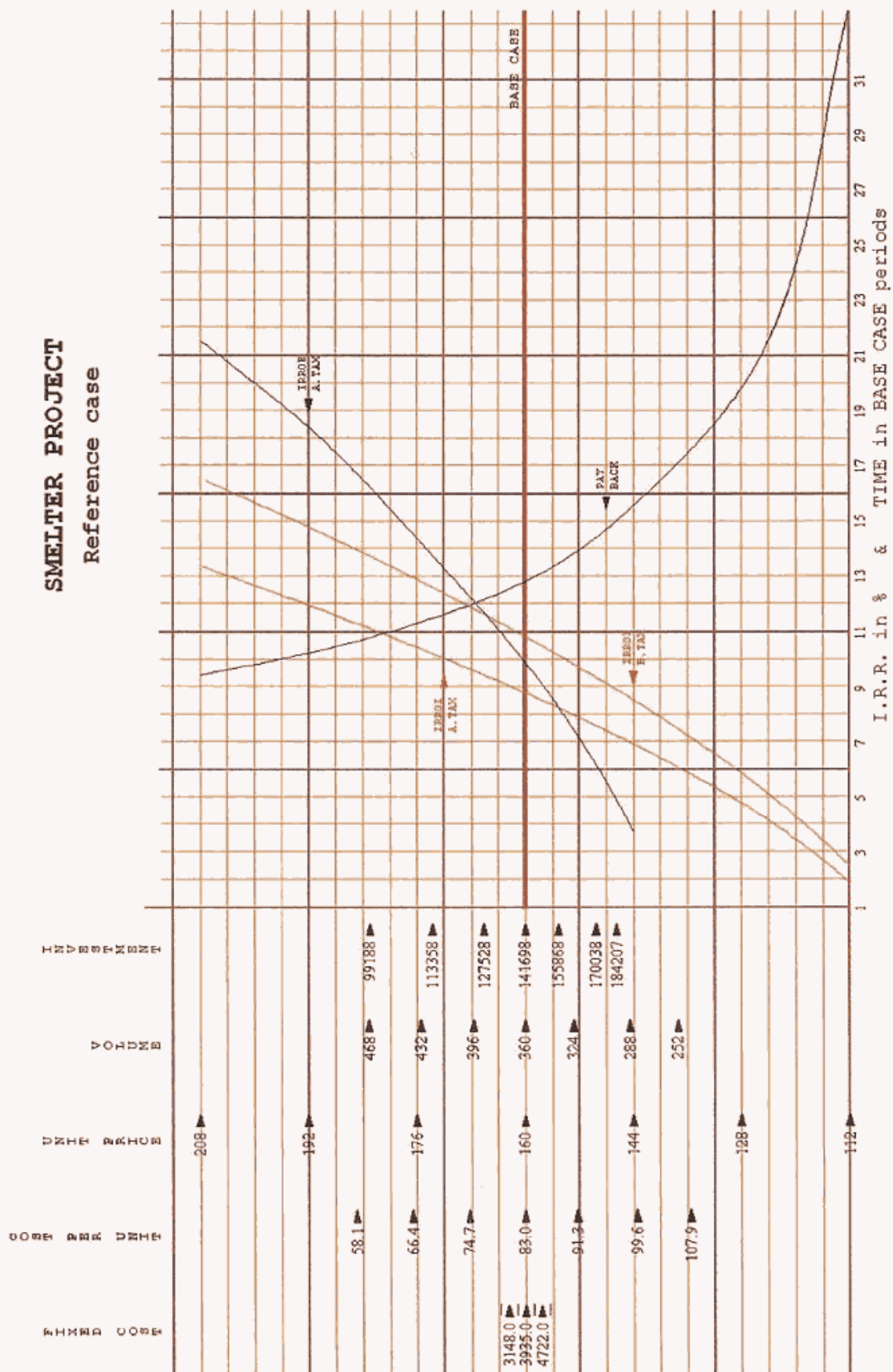
Label each curve.

If more than one Y-axis is drawn on a single multiple curve GRAPH, then flags, indicated by little tick marks, can be drawn near the Y-axes arrows to indicate extremely precise placements of the flags associated with their curve. The position of the flags on the leading Y-axis, chosen to plot the first curve, will be correct for all other curves. The position of the flags on those other Y-axes must be redefined, because the correct position of the flags may be different from the ones indicated on the non-leading Y-axes. You can include tick marks on Graphs like GRAPH 5. If you use the "Wgraph" program such tick marks can be included near the Y-axes arrows at your option and will have the same color as the curve they rate to.

If all curves are drawn on a single graph it is suggested that small tick marks close to the original arrow position indicate the magnitude of any deviations. Although the differences are mostly minimal, they may be important enough to take them into account when using the Graph for precise planning purposes. The lead axis was the "UNIT PRICE" and shows no tick marks because there are no deviations.

It is best to select one profitability curve at a time to optimize your purpose. It is simpler and less error prone.

# **SMELTER PROJECT** Reference case



GRAPH 5





# **CHAPTER 10 - How to use a S. P. G.**

## **1. Reading the Result of simultaneous changes in many assumptions**

Following is a practical method for reading results of simultaneous changes in a set of assumptions.

Using only a ruler or the edge of a transparent Mylar sheet and a pencil, the decision maker can manipulate the information on his GRAPH and find results as correctly as the financial expert with his computer and do it much faster.

The simple calculations discussed in the examples that follow will show the way to use the GRAPH with expertise. You will be able to read from your GRAPH either what financial results can be expected if one or more variables are changed, or conversely, you will be able to decide by how much one or more variables must be modified to achieve a specific financial goal.

The accuracy of the results read from the GRAPH will depend:

1. On the ACCURACY of the graph itself
2. On how well one can USE the graph

The accuracy of the GRAPH depends on how many points are made available to calculate the curve and how much curvature the resulting line requires.

Indeed, a straight-line can be perfectly drawn if only two points are defined. The more curvature, however, the more points are required to near perfection.

The Grid forms the background of the GRAPH. The grid also forms a common measure for all Y-axes on the plot.

Reading the results of an interpolation to  $1/10^{\text{th}}$  of the distance between two Grid lines gives quite a satisfactory approximation for normal business decision making.

In the example we assume that you need to make changes in assumptions. Mark the position of all revised values on each respective Y-axis, found on the left side of the GRAPH. These flags will thus be positioned above or below the BASE CASE LINE.

Next, the GRID VALUE of each flag must be defined. This is why a STRATEGIC PLANNING GRAPH must be drawn on paper with equidistant lines. The GRID VALUE of a FLAG is defined by measuring the vertical distance between the BASE CASE LINE and the FLAG. This measure quantifies your change. This distance must be expressed in GRID LINES.(Not in inches or centimeters.)

Horizontal LINES across the GRAPH facilitate measuring and counting the GRID VALUE of your changes. For FLAGS positioned between two Grid lines, a fraction must be estimated and included in the GRID VALUE. The Y-axis may represent Dollar values, Tons of production volume or Percentages, and the common measure for their GRID VALUE is the distance between horizontal GRID LINES. So, the GRID VALUE of your changes is each time expressed as a number of GRID LINES above or below the BASE CASE LINE. FLAGS above the BASE CASE LINE give positive GRID VALUES. FLAGS below the BASE CASE LINE give negative values.

Make the algebraic sum of all the GRID VALUES for the changes you made.

Example: Suppose the Flag of your first change was placed 3 Grid lines above the BASE CASE LINE and the Flag of a second change, placed on the next Y-axis, is placed 5 Grid lines below the BASE CASE LINE. The algebraic sum would be  $(+3-5 =) -2$ . The result of the algebraic sum of all the GRID VALUES of your changes indicates the position of a Repositioned Base Case line.

This line will most probably fall above or below the original BASE CASE LINE. In the example above, the negative value of the Repositioned Base Case Line (-2) would be drawn as a horizontal line, placed exactly two Grid lines below the original BASE CASE or REFERENCE LINE.

The Repositioned Base Case Line will probably not pass through the Flags that indicate the changes in the Y-axes values. However, the Repositioned Base Case Line will cross the curve at a point that indicates the outcome, resulting from the combination of changes made. The resulting profitability measures are quantified on the X-axis below the crossing point. Vertical Grid lines assist in locating precise values on the X-axis. Using the edge of a transparent Mylar sheet as your ruler facilitates reading with great accuracy.

It is obvious that finding an exact position between two values on the original Y-axis, by interpolation between those two values, is easier when the values on that Y-axis are equidistant. And they will be equidistant if the following conditions are observed:

1. When a SENSITIVITY REPORT is produced, alter the variables in steps of a predetermined percentage, such as 10%, 5% or 1% of the original BASE CASE value.
2. When you start laying out the first Y-axis of a STRATEGIC PLANNING GRAPH, the distance between the different values of your first Y-axis will be equal to each other. It will facilitate drawing the GRAPH if the first Y-axis chosen is the one with the largest spread of the selected profitability measure and uses the complete spread allowable on the graph.

A completed GRAPH may have some additional Y-axes marked with equidistant values and other Y-axes showing values that are not equidistant.

#### **a. How to target results**

It is common that the original BASE CASE does not meet the planners expectations. One or more variables may have to be altered, each having its own influence on the new outcome. The STRATEGIC PLANNING GRAPH can be used, as is explained below, to facilitate Strategic Target-Planning.

Assume a business selling widgets at \$160 a piece.

The volume is 360 per year

The overhead or fixed cost is \$3,935 per year.

A Strategic Planning Graph is made with a curve showing the After Tax Return on Equity. It is labeled (IRROE A. Tax). See Graph 6 below.

The Base Case reveals that the IRROE is 10%

The new management wants an IRROE of 19% That is **9 gridlines** above the present Base Case.

Here is how we get that targeted result:

Find the value of the targeted financial measure (19%) on the X-axis in GRAPH 6. Draw a vertical line from that targeted value (19% you found on the X-axis) until the line crosses the IRROE curve.

At that crossing point draw a new Base Case line, parallel to the original Base Case line.

Define the GRID VALUE of your repositioned Base Case line by measuring the vertical distance between the original BASE CASE LINE and your repositioned Base Case line. The GRID VALUE is again expressed in Grid lines and, if the distance falls between two horizontal Grid lines, read an estimated fraction. Here also the GRID VALUE can be positive or negative.

That resulting GRID VALUE (+9) must now be split into pieces that will be distributed as changes in GRID VALUE of one or more Y-axes. The targeted result will be reached as long as the total of the GRID VALUE of the new changes you make on the Y-axes equal the GRID VALUE (+9) which is the distance between the original and the targeted Base Case lines.

**Splitting up the TARGET GRID VALUE into workable pieces and then distributing those pieces over appropriate Y-axes, remains the prerogative of the Planners.**

## GRAPH 6 - An Example of Strategic Target-Planning

Suppose the owners expect a return on Equity After Taxes of at least 19%.

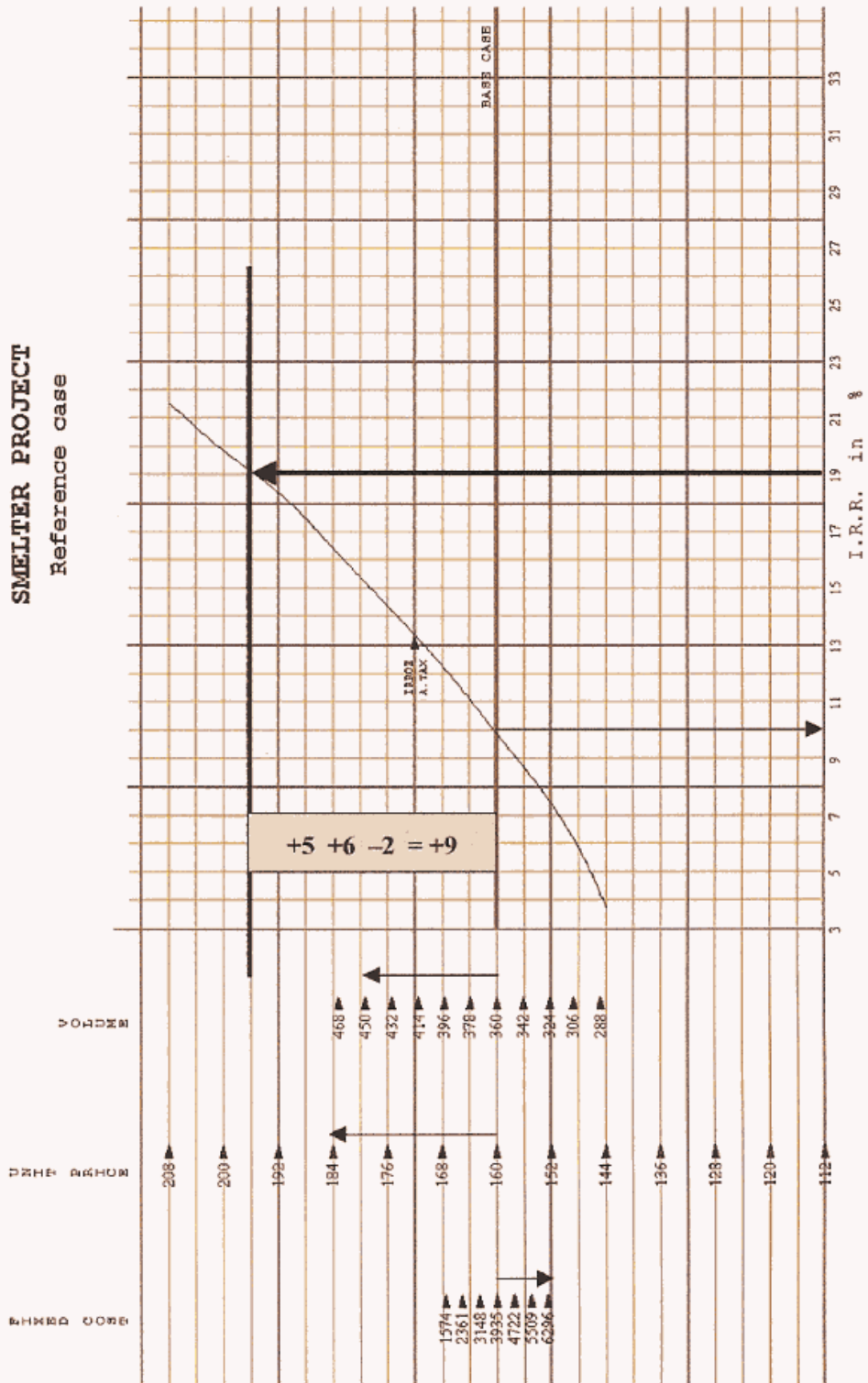
The BASE CASE LINE would have to be moved up by 9 GRID LINES. The following changes to the Y-axes are suggested:

Increase the VOLUME, from 360 to 450.	+5 gridlines
Increase the UNIT PRICE from 160 to 184	+6 gridlines
Increase the FIXED COSTS from 3,935 to 6,296	<u>-2 gridlines</u>
The sum of our changes is $+5 +6 -2 =$	+9 gridlines

This method of using a STRATEGIC PLANNING GRAPH is sufficient for the planner's purposes. If, however, it is important to read precise results of changes in assumptions, the following exhibits guide you to do more complex planning features.

When your accountants run their new IRROE After Taxes to check on your decisions, they will find a result of 19%.

# **SMELTER PROJECT** Reference case



Graph 6

### **Even and Uneven Distribution of Flags**

Even if the Base Case value of every assumption, altered to produce SENSITIVITY REPORTS, is changed in constant steps of a predetermined percentage, and even if, on the first Y-axis you plot, the flags are placed equidistant by design, the possibility still exists that the flags on your next Y-axis will not be equidistant. That is because some assumptions, such as the volume produced or the direct production cost of a unit affect every period of your project. The changes in such assumptions will be equidistant on their Y-axis.

Other assumptions, such as an altered investment or an assumption on inventories or working capital, touch only the very beginning of the project. Their distribution is "uneven" if other changes, marked on the Graph resulted in even distribution of their flags.

It is easy to spot which Y-axes show equidistant positions of the flags and which do not by comparing the distance between the lowest two values to the distance between the highest two values.

For the next examples a Project with the following Base Case assumptions is assumed:

Investment	1,000
Other Investments	750
Working capital	300
Total yearly revenue	1,400
Total yearly production cost	650
Equity	199%
Taxes	30%
Project life	15 years



## **GRAPH 7 - If Flags on the Y-axis are unevenly distributed**

Starting from the left, the two first Y-axes are equidistant, the other 3 are not.

Select the most spread-out Y-axis from among those that are not equidistant and use this axis as your measuring device. In the example the “Investment” axis was chosen.

For demonstration purposes revise the values as follows:

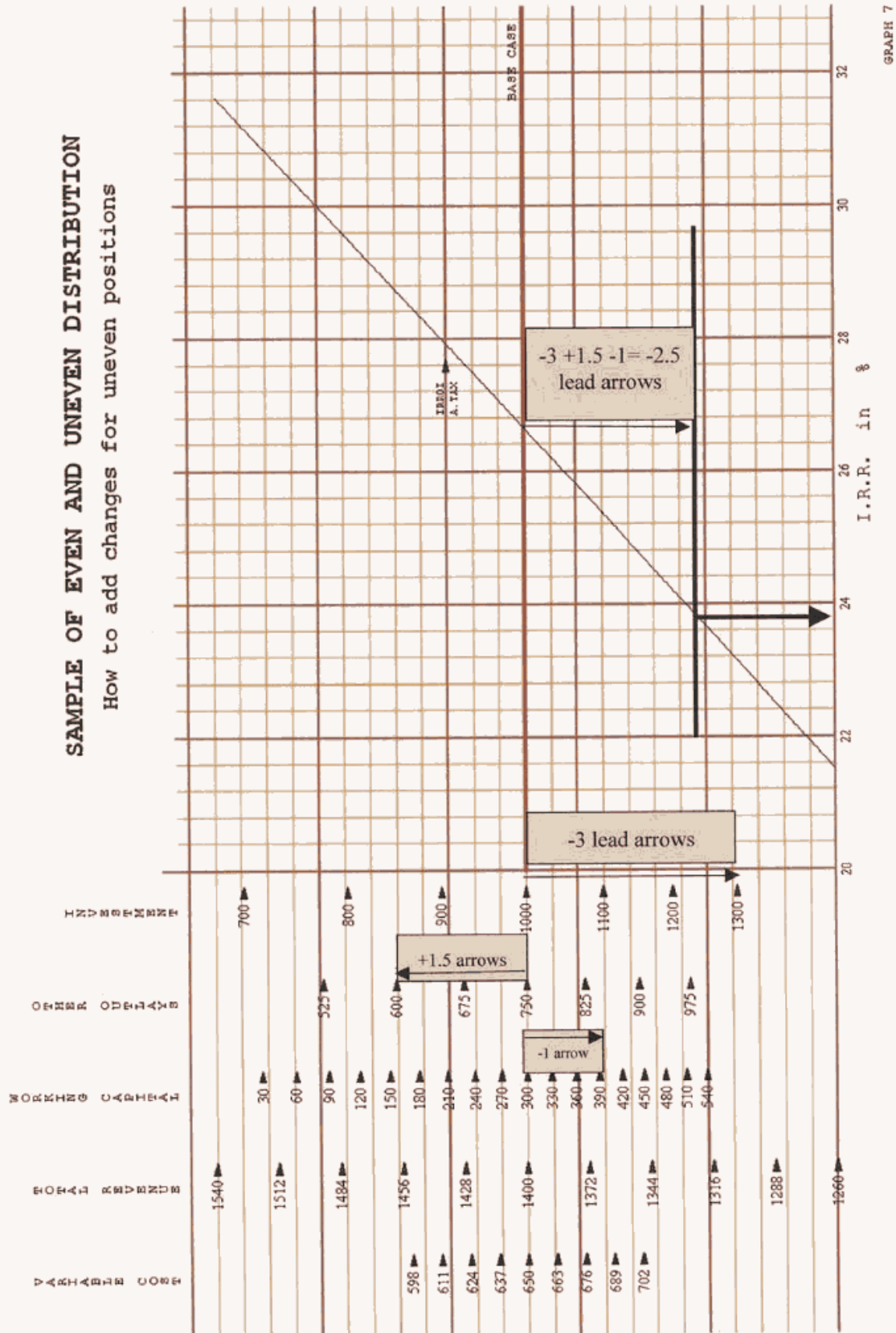
Investment becomes	1,300
Other outlays become	600
Working capital becomes	400

If we want to measure the effect of revised assumptions in more than one non-equidistant Y-axis, we have to count ARROWS or FLAGS up or down from the Base Case Line instead of counting GRID LINES. It may be easier to make a copy of your completed GRAPH and clip out the Y-axis you selected as measuring device. Use it to measure the changes in the other non-equidistant Y-axes.

Notice that the increase by two flags in “Other Outlays” measures only 1.5 flags’ worth when you measure that change with the “Investment” Y-axis, used as your measuring stick. The 3 arrows down on “Working Capital” are only 1 arrow’s worth when measured with the “Investment” axis.

A complete study shows the new ROE decreased from 26.64% to 23.75%

# **SAMPLE OF EVEN AND UNEVEN DISTRIBUTION** How to add changes for uneven positions



## **GRAPH 8 - If equal and unequal Flags are mixed**

### **How to read mixed distribution of flags**

Should the Project need “also” changes in assumptions that are placed on an equidistant Y-axis, then the following procedure is recommended:

We have already calculated the position of the revised Base Case line for the combination of changes in variables that were found on the Y-axes with uneven distribution. (See GRAPH 7.) The changes were expressed in FLAGS of the measuring Y-axis. The selected measuring Y-axis for our example was the “Total Investment” axis.

The result was:

–3.0 FLAGS for the “Investment”

+1.5 FLAGS for “Other Outlays”

–1.0 FLAGS for “Working Capital”

Total change was **–2.5** main Y-axis FLAGS.

We drew the repositioned Base Case line 2.5 Main Y-axis FLAGS below the original Base Case line. Let’s call it the “FLAG line”, represented in gray on Graph 8.

Now we can calculate the position of the revised Base Case line for the combination of changes in variables that were placed on equidistant Y-axes. Express those changes in number of GRID LINES.

Changed assumptions for equidistant flags in GRAPH 8 are as follows:

“Variable cost” from 650 to 702      **–4.5** GRID LINES

“Total Revenue” from 1400 to 1428      **+2.4** GRID LINES

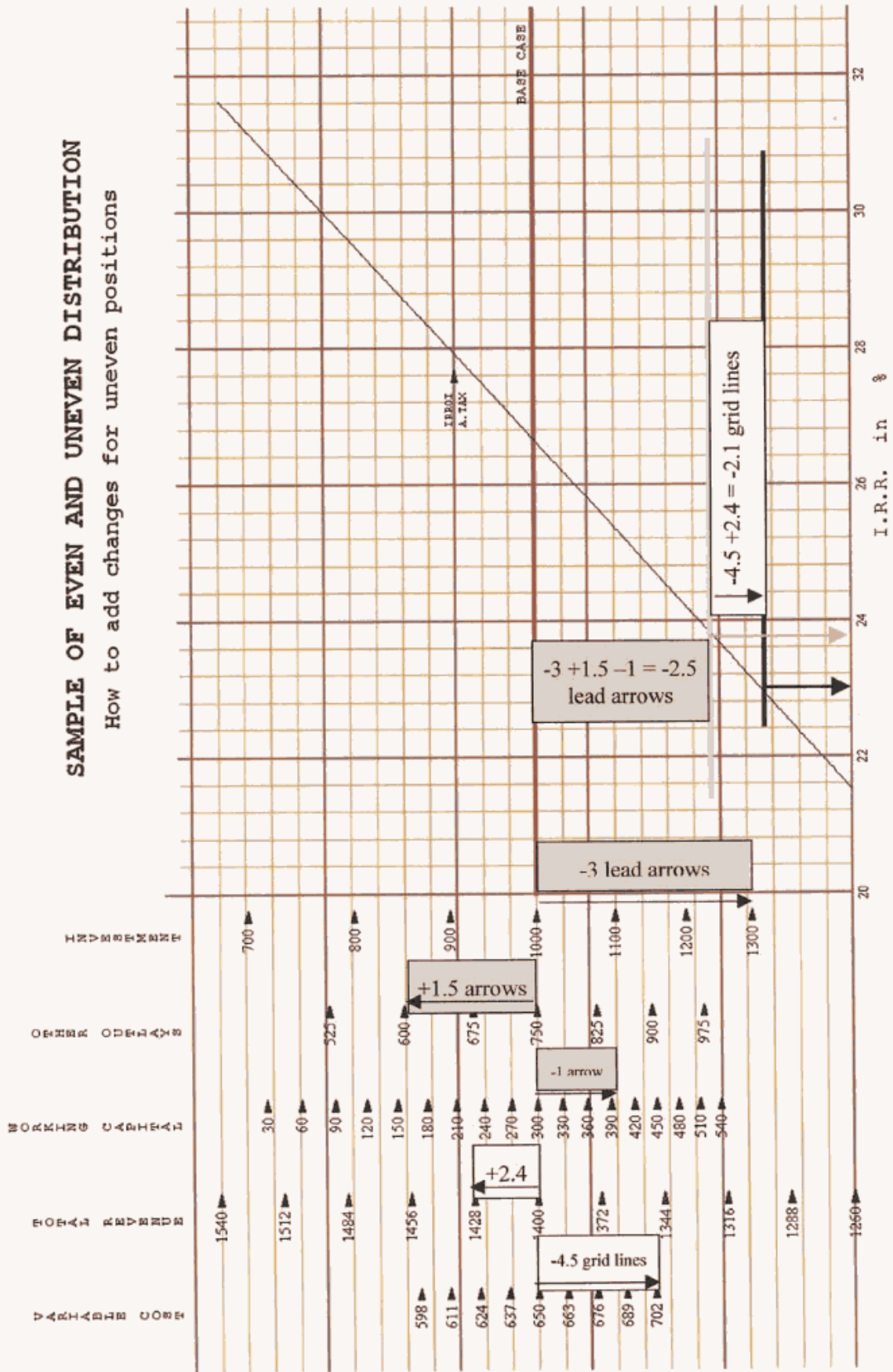
The result for equidistant axes is      **–2.1** GRID LINES.

So far we had a gray Base Case line for the non-equidistant Y-axes by moving down by -2.5 FLAGS. We also know that the result for the equidistant Y-axes is -2.1 Grid lines. To find the position of the Final Base Case line we simply plot it –2.1 Grid lines below the “FLAG line”. A complete study showed the new ROE to be 22.96%

**Notice that the units of measurement are different for the equidistant and the non-equidistant positions on the Y-axes. One is "FLAGS", the other is "GRID LINES".**

# **SAMPLE OF EVEN AND UNEVEN DISTRIBUTION**

How to add changes for uneven positions



GRAPH 8

## 2. Manipulating the variables Volume, Price and Cost per unit

The variable "VOLUME" by itself presents no problem. Should changes in VOLUME be added to changes in other variables we can still use the same methods as described above. However, if UNIT PRICE and VARIABLE COST PER UNIT are to be combined with the variable VOLUME, the addition of changes in GRID LINES for all three variables should not be made, because VOLUME affects both COST and PRICE.

If you change VOLUME, UNIT PRICE and UNIT VARIABLE COST the following formula provides the relation between the Original Base Case line and the resulting Revised Base Case line:

Basic Formula for VOLUME, UNIT PRICE and COST changes

$$\text{ORIGINAL BASE CASE} = V (P - C)$$

$$\text{Revised Base Case} = v (p - c)$$

The symbols used represent values as follows for the ORIGINAL BASE CASE and for the Revised Case.

**Select the best suited Y-axis between**

**VOLUME PER PERIOD**

**UNIT PRICE**

**UNIT VARIABLE COST**

The best Y-axis is the one that will make the most convenient measuring device or is the longest one or extends into a convenient area of the GRAPH.

It follows that you can define the location of a Revised Base Case, such as the dark line in GRAPH 9, by manipulating the general formula:

The general formula for calculating the change is

$$[V (P - C)] / [v (p - c)]$$

By extrapolation we can define each one of the three variables:

If the VOLUME Y-axis is the selected Y-axis

$$V = v(p - c) / (P - C) \text{ which is } 18.72$$

If UNIT PRICE Y-axis is the selected Y-axis

$$P = [v (p - c) / V] + C \text{ which is } 852$$

If UNIT VARIABLE COST Y-axis is the selected Y-axis

$$C = P - [v (p - c)] / V \text{ which is } 48$$

Plug the assumptions for the ORIGINAL BASE CASE and for the Revised Case into the selected formula. The result indicates the position of a flag on the selected Y-axis. That flag indicates also the position of the Revised Base Case line for the combined changes in all three assumptions.

## EXAMPLE 22

The following GRAPH shows how to measure the result of a combined change in the three variables discussed above.

The assumptions for this new Base Case are the following:

INVESTMENT            50,000  
 EQUITY                100%  
 DURATION OF THE PROJECT is 10 years

	<u>BASE CASE DATA</u>	<u>NEW ASSUMPTIONS</u>
VOLUME PER PERIOD	16	14.4
UNIT PRICE	750	975
VARIABLE COST	150	195

**a. How to work with Changes in Volume, Price and Cost simultaneously**

**GRAPH 9 - Reading the Result of such changes**

The Prime Y-axis selected is the UNIT PRICE because it extends farthest on the GRAPH

$$P = [v (p - c) / V] + C$$

$$\text{UNIT PRICE} = [14.4 (975 - 195) / 16] + 150 = 852$$

On the Price Y-axis we notice that there are 12 Grid lines between 750 and 900.

Each Grid line must represent  $(900 - 750) / 12 = 12.50$

To move from 750 to 852 we have to move

$$(852 - 750) / 12.5 = 8.16 \text{ Grid lines up from 750.}$$

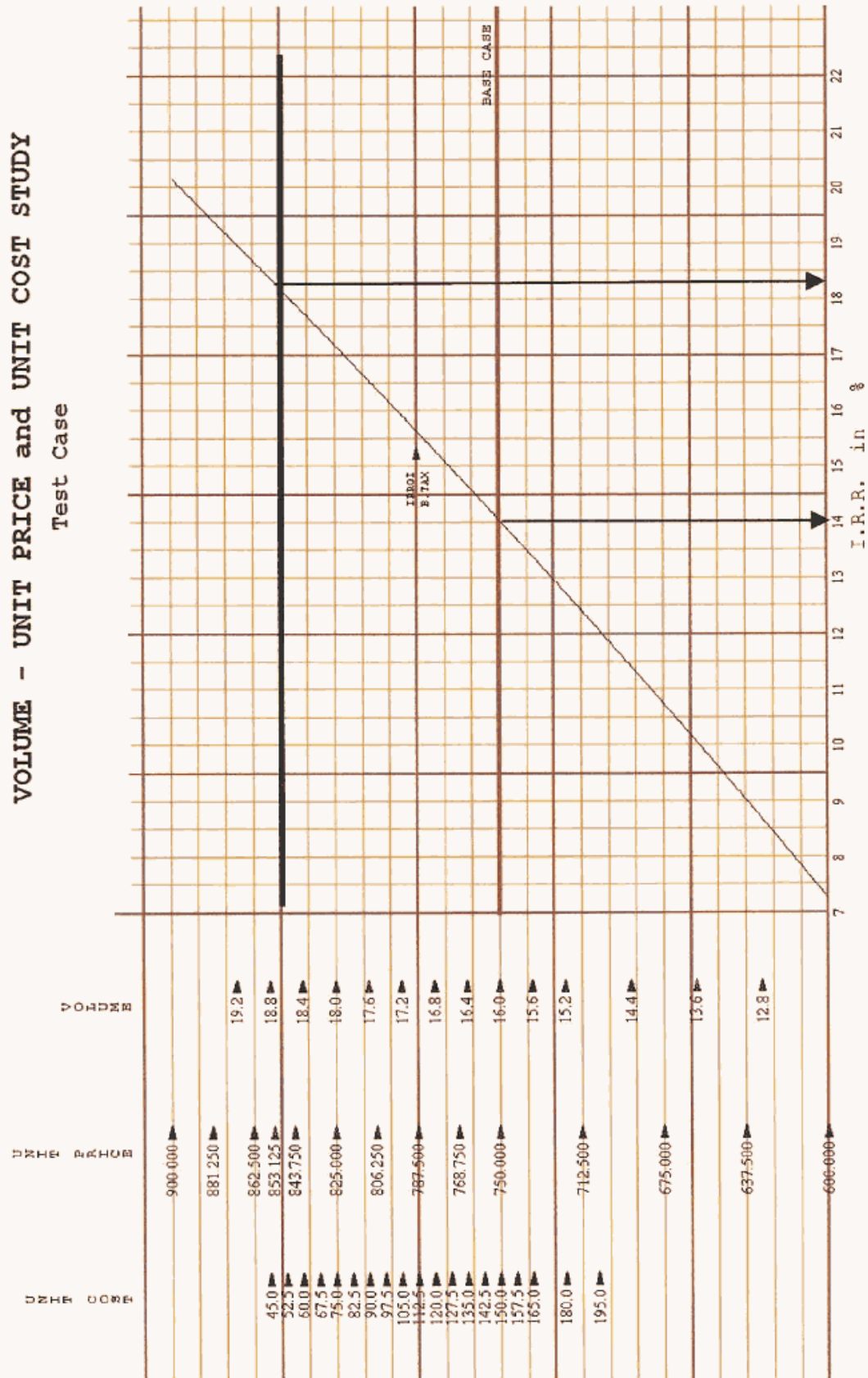
Draw a horizontal line starting from 8.16 Grid lines above 750 on the UNIT PRICE Y-axis and, where that line crosses the ROI curve, draw a line down to the X-axis.

The original return resulted in an ROI of 14.04%

The complete test study shows the IRROI to be 18.2%



# VOLUME - UNIT PRICE and UNIT COST STUDY Test Case



GRAPH 9

## How to target with Volume, Revenue and Cost simultaneously

### GRAPH 10 - Targeting with such changes

To avoid the difficulties when changing the three variables discussed above, it is easier to use the following method:

Graph 10 uses the next assumptions:

VOLUME (V) is	14.4
UNIT PRICE (P) is	975
UNIT DIRECT COST (C) is	195

Instead of plotting three Y-axes, chart only these two:

#### **TOTAL REVENUE and TOTAL DIRECT COST**

The Base Case line shows that

$$V \times P \text{ becomes TOTAL REVENUE } 14.4 \times 975 = 14,040$$

$$V \times C \text{ becomes TOTAL DIRECT COST } 14.4 \times 195 = 2,808$$

The result is an ROI of 18.27%.

To avoid competition, the staff wants an ROI of only 14%.

We must therefore decrease the Base Case line by -7 grid lines

To obtain this result, the following changes are decided:

VOLUME is changed from 14.4 to 16

UNIT PRICE is changed from 975 to 750

But what must the DIRECT COST per unit be?

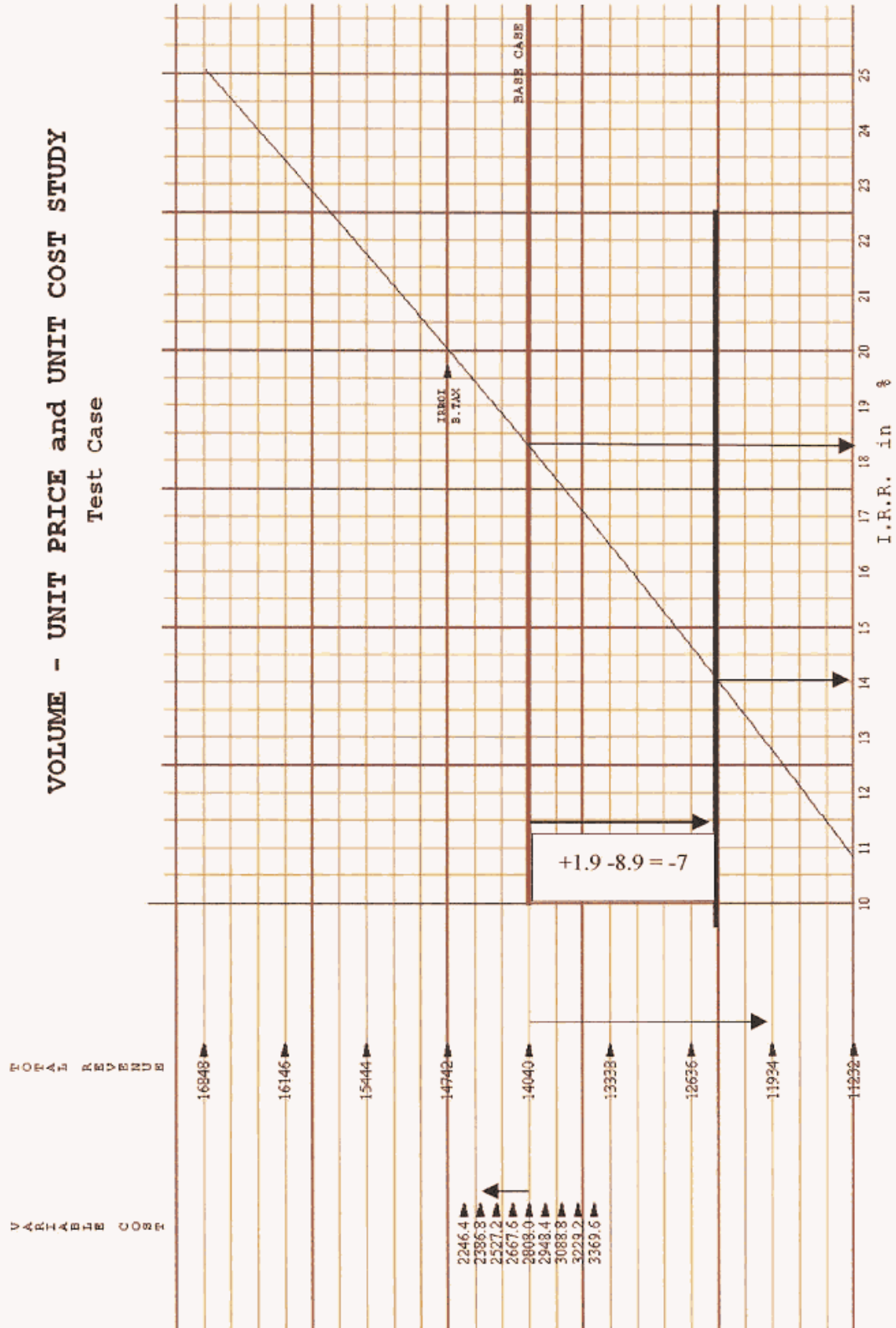
Indicate on the TOTAL REVENUE Y-axis as follows

**NEW VOLUME X NEW PRICE, which is  $16 \times 750 = 12,000$**

However, this change accounts already for -8.9 grid lines

To obtain the needed target of -7 gridlines, we need to find a change of +1.9 grid lines on an other Y-axis.

A flag of +1.9 grid lines on the TOTAL DIRECT COST Y-axis indicates 2,400 The DIRECT COST per unit must be  $2,400 / 16 = 150$ . A complete study shows that the result is an ROI of 14.02%



GRAPH 10

### 3. Debt and Equity valuation

#### GRAPH 11 - The limit for a Loan repayment term

You can also plot the shortest possible loan term allowed by the funds flow of your project. A curve assuming 0% inflation is probably the one looked at by the banker.

The curve shows the shortest possible repayment period the project can support. No finance institution will accept such term because they would have no contingency protection, but it is important to know those limits. The bank must either agree to a longer term, so that the ratio between cash flow and debt service becomes acceptable to the lender, or the project has to be altered to meet the lender's desired debt service ratio.

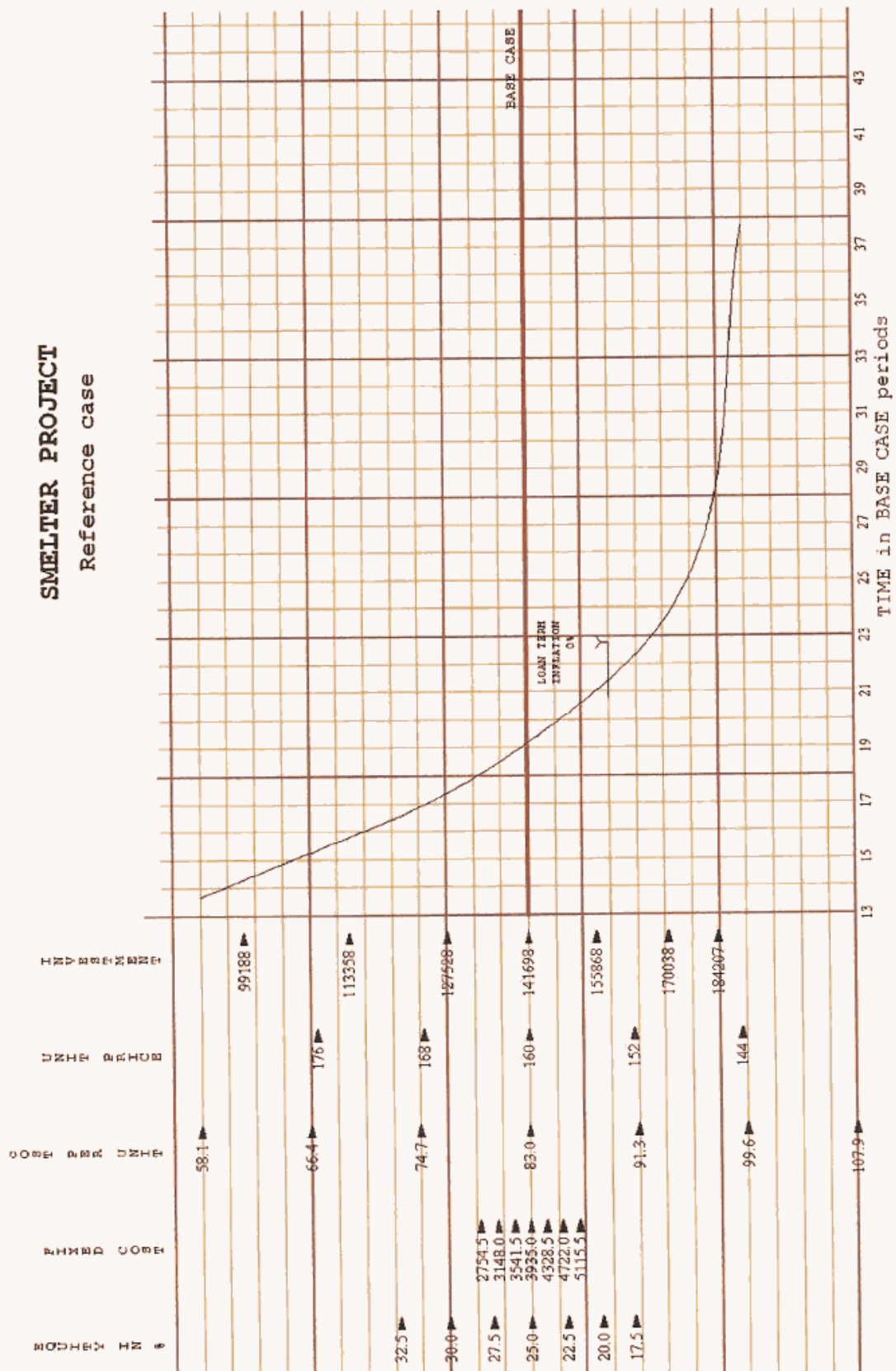
The debt ratio changes every time a payment is made. The "curt" repayment schedule takes the difficult early years of the loan into account.

The GRAPH assumes that the debt service takes up 3/3 of the funds flow. If the lender wants the debt service to be only 2/3 (instead of 3/3) of the funds flow, even during the difficult early periods of the outstanding loan, then

Propose to lengthen the loan term by 1/3 of the shortest repayment term ( $1.33 \times 19.17 = 25.5$  year term).

If not, you have to change your plan, so that the repayment period, indicated by the X-axis, becomes 2/3 of the present reading ( $19.17 \times .66 = 12.65$  years) which means a combined change in Y-axes values totaling more than +13 gridlines! If a combination of both solutions cannot lead to an agreement with the lender, your project is not viable.

# SMELTER PROJECT Reference case



GRAPH 11

## **GRAPH 12 - An exercise in understanding Leverage**

Graph 12 shows a single Y-axis and can therefore include more than one curve correctly. The chosen Y-axis represents the sensitivity of the Investment in the SMELTER PROJECT.

When both the ROI After Taxes and the ROE After Taxes are plotted one can see that for the Base Case assumptions, the ROE shows a higher percentage than the ROI. Obviously, the leverage was positive.

The Base Case of the SMELTER PROJECT assumed that 75% of the funding would be borrowed.

Interest rate would be 10%. The Simple Interest loan is retired with 30 equal yearly loan repayments.

If the same financing structure is used to fund a smaller investment, the difference between the ROI and ROE increases and the leverage effect is amplified.

If the same financing structure is used to fund a 10% larger investment, the leverage effect will nearly disappear.

An investment of more than 10% larger than the one assumed in the Base Case would generate a negative leverage effect, because the ROE After Taxes would be smaller than the ROI After Taxes.

To shift the ROE curve to the left, so that a higher investment would still yield a positive leverage, changes must be made to the financing structure:

- The repayment schedule must be extended

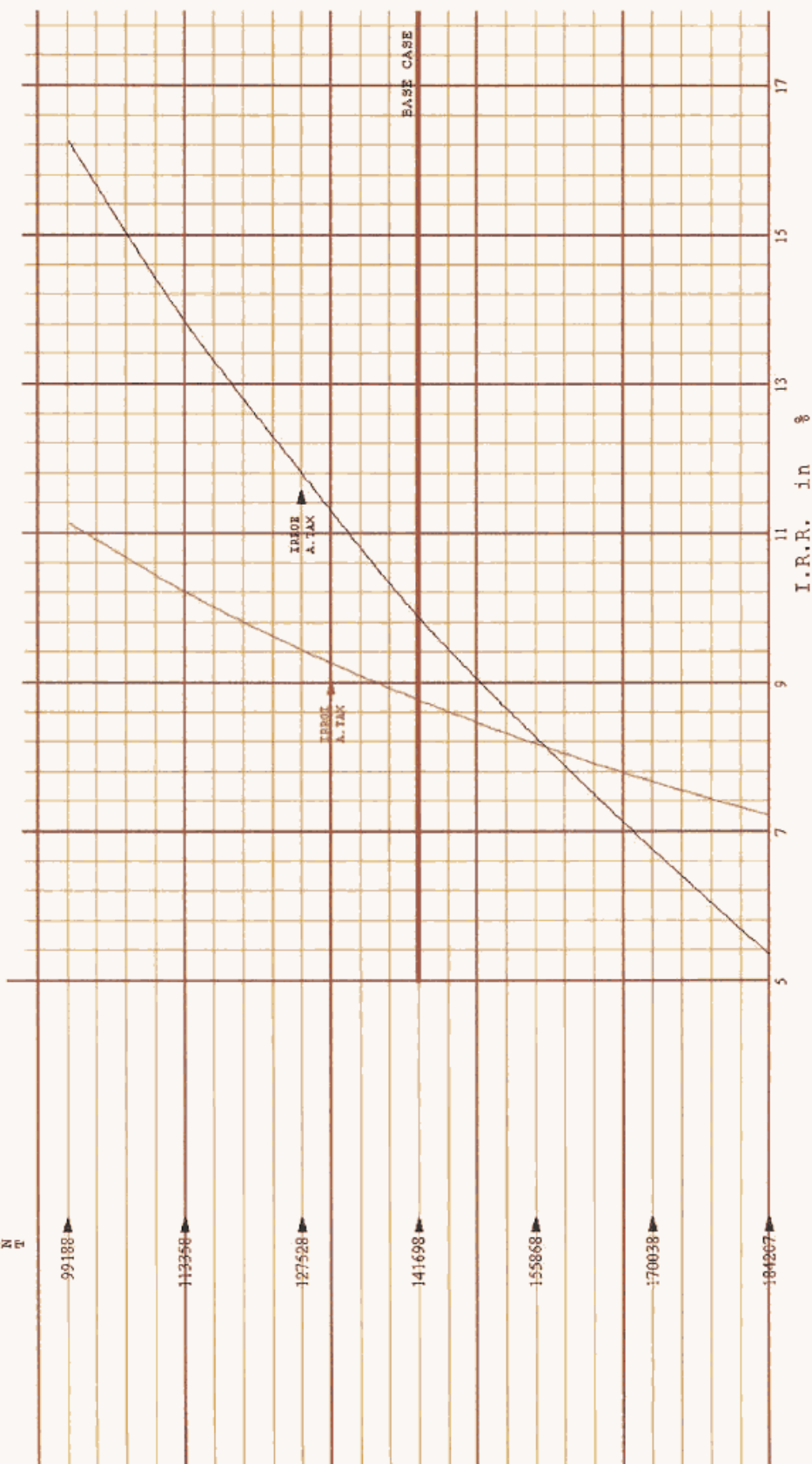
- The equity percentage of the financing package must be increased

- The interest rate must be decreased

- Or an adjustment must be made in a combination of the above alternates.

# SMELTER PROJECT Reference case

INTEREST



GRAPH 12



## **4. Valuing a Business**

There is more than one way to value a business.

### **1. The market value of the assets.**

This method of valuation is useful in case the seller eliminates his business completely. It can also be used to value a business if no goodwill exists and the buyer has to start from scratch.

### **2. The book value of the business.**

This method can be used when the business is sold and a loss or a profit has to be declared for tax purposes. This method is also used to recover from an insurance company. It is the least desirable method to define the value of a business because it values the book value, not the business.

### **3. The value of a going concern with an S.P.G.**

This method is used to value the actual business activity, which may include “goodwill” or “blue sky” value.

## **5. Calculating the value of a going concern:**

- Establish the expected cash flow without depreciation or taxes during the life of a major asset.
- Establish the cost of necessary improvements to make the operation efficient and comply with local and international standards.
- Define the cost of maintenance, repairs and replacements during the forecasted period.
- Decide what your ROI before Taxes should be.
- Assume and calculate the effect on the ROI for a sufficient range of possible values for major assumptions in the business plan.
- Make a Strategic Planning Graph and value the business depending on the judgments about expected revenues, operating costs and the cost of improvements and replacements.

### **RAPH 13 - Value a Business using the NPV method**

The Net Present Value of a business is defined by discounting the cash flow with a specific discount rate. Should that discount rate be altered, the NPV would change. A higher discount rate would result in a lesser NPV and conversely, a lower discount rate would yield a higher NPV.

The next Graph is produced, based on assumed revenues and operating costs.

Major assets are assumed to last for 25 years.

Revenue per year was documented to be 54000

All payments are in cash. No loans, all 100% equity

Fixed Costs are presently 3935 per year.

Variable Costs are presently 30000 per year.

Improvements of 25000 are said to be taken into account.

The return on Investment before Taxes is 15.63%.

The value of the investment is 100,000.

The GRAPH 13 allows finding the increase or decrease of the NPV of this cash flow for a range of alternate discount rates.

On the Y-axis you find a range of NPVs of the cash flow. (the value of the business)

On the X-axis you see a range of discount rates

The curve is a set of coordinates between the NPV values and the rates of discount.

Select any discount rate from the X-axis, say 20%

Find the associated NPV of the cash flow - via the curve - on the Y-axis.

If you paid 100,000 for the project, with a target discount rate of 15.63% the Net Present Value of the cash flow of this project becomes ZERO.

If the target discount rate is 20%, the NPV value of the project's cash flow becomes ZERO if you invested 75,000.

If you paid 100,000, you would fall short of your target by 25,000:

$$75,000 - 100,000 = -25,000$$

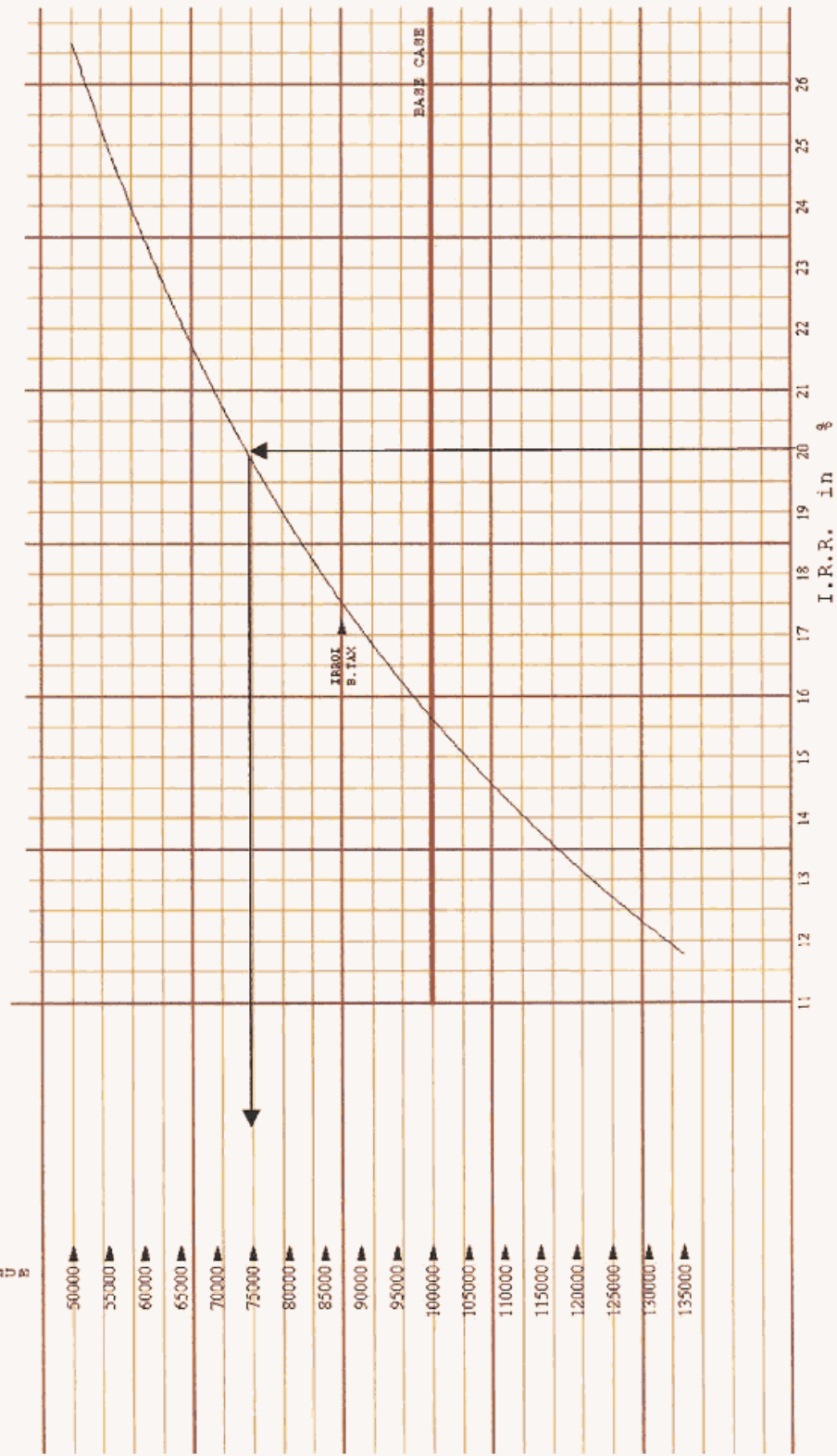
If you paid 50,000 and your target was an ROI before taxes of 20%, your NPV would be:

$$75,000 - 50,000 = 25,000$$

BEFOREHAND VALUE

# WHAT IS THIS BUSINESS WORTH?

The Value will depend on the ROI B. Tax



GRAPH 13

#### GRAPH 14 - Value a Business using the Strategic Planning Graph

The following Graph is produced, based on existing revenues and operating costs.

Major assets are assumed to last for 25 years.

Revenue per year was documented to be 54000

All cash payment makes equity 100%

Fixed Costs are presently 3935 per year.

Variable Costs are presently 30000 per year.

Improvements of 25000 are said to be taken into account.

The return on Investment before Taxes is 15.63%.

The asking price is 100000. After careful study the buyer makes the following changes to the data assumed by the seller and used to make GRAPH 14.

The Fixed Costs will have to increase by 20%

The Variable Costs will have to be increased by 10%

Improvements to the building and the operating equipment will be 20% more costly than originally assumed in the data that are the basis for producing GRAPH 14.

The buyer revises some of the assumptions:

Fixed Costs move from 3935 to 472

This change represents -1.1 grid lines

Variable Costs change from 30000 to 33000

This change represents -5.1 grid lines

Improvements increase from 25000 to 30000

This increase represents -1.1 grid lines

Total change is -7.3 grid lines

The buyer wants a return on investment of 15% Before Taxes.

GRAPH 14 shows that we can drop the Base Case by -1.2 Grid lines to bring the ROI Before Taxes from 15.63% to 15%

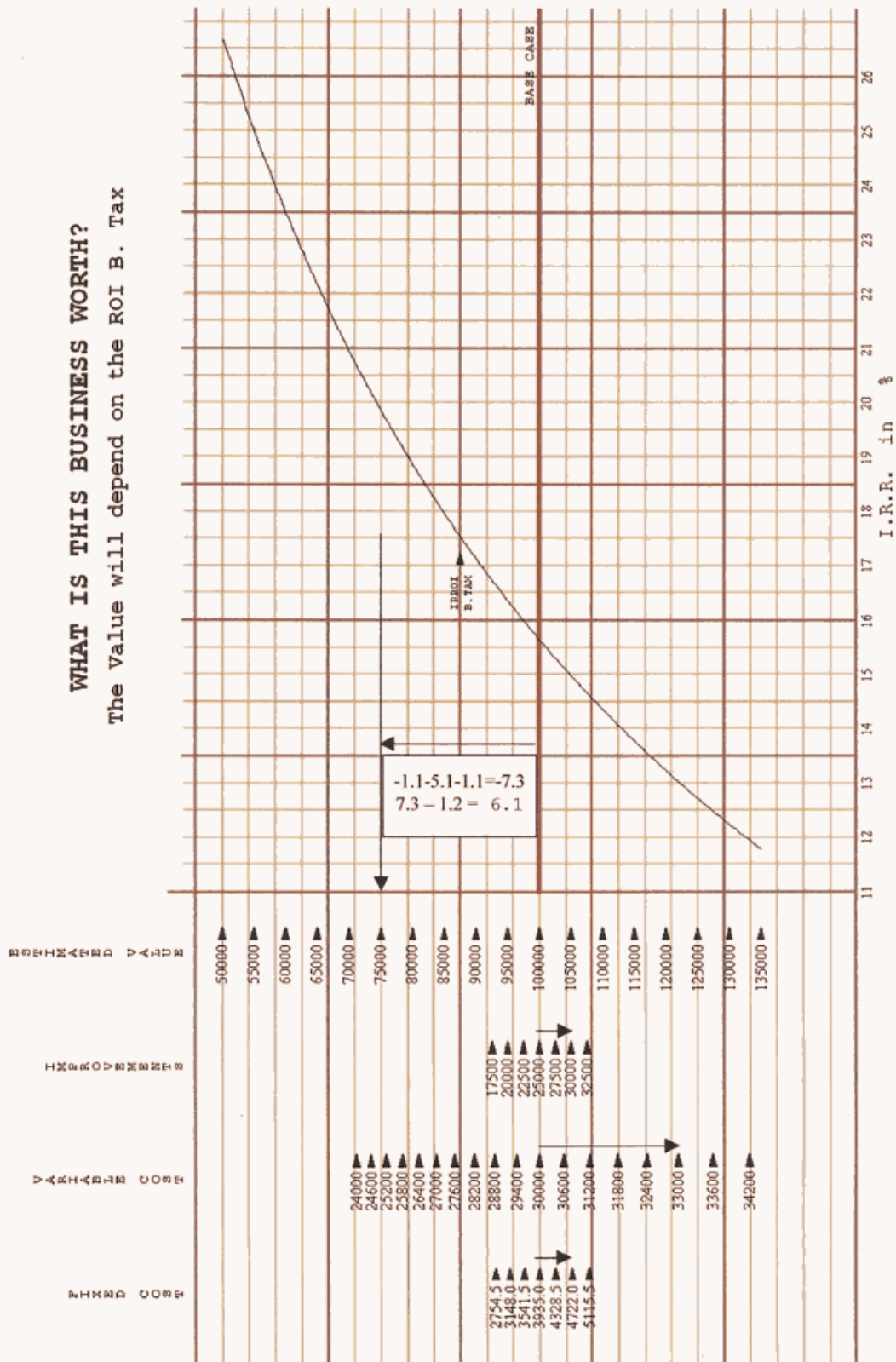
Taking that -1.2 Grid lines into account we need to compensate for only  $-(7.3 - 1.2)$  Grid lines.

This means moving the Base Case line up to a lesser value by 6.1 grid lines.

**An investment of 75000 results in a 15.04% ROI Before Taxes.**

# WHAT IS THIS BUSINESS WORTH?

The Value will depend on the ROI B. Tax



GRAPH 14





# **CHAPTER 11 - The Real World and Strategic Planning**

Now that you know the nuts and bolts of a strategic financing plan it is time to stress that business is also a social activity, not an exercise in accounting or finance. So, you need to concentrate on the following disciplines to help you go forward.

- Public relations
- Public image
- Industrial relations
- Labor relations
- Advertising and Promotion
- Political Lobbying
- Flowing with the stream

It is important to realize that discussions on the golf course, at the restaurant, and even in the bar can be more important than those held in the boardroom.

Your image, your speech, and your facial expression are at least as powerful as your financing document.

The following stories are a small selection of some of the most peculiar actual experiences I have been exposed to during my 40 years in planning and finance. They are illustrative examples of how business actually takes shape and where “Nuts and Bolts of “Strategic Project Structuring” are overshadowed by social factors of the real world.

# 1. A Fish Cannery

Sardine fishing off the Moroccan coast was done in large rowboats. These boats were manned by some ten men. As the catch goes on, nets are emptied into the boat... an open craft without holding tanks. The men just row and continue their work standing in the fish. When their vessel arrives in the harbor, the men unload their fish and transport it to the local cannery.

This is how the unloading progresses. A couple of men, sitting on their knees in the bath of sardines, scoop up a basket of fish. It is then handed to the next fellow. This one is standing up so that he may lift the load easier. Then in turn, the basket is grabbed by a man standing on the shore. A few more men form the end of the chain and fish is finally dumped into a small truck. This activity continues until the boat is emptied and the fish catch of the day finds its way to the cannery. By then the sun is already high in the sky!

We obtained the necessary funding from a US Government institution to make a feasibility study about the modernization of the fishing industry in Moroccan waters. From the onset, it was emphasized that all foreign fishing vessels should be kept out of Moroccan waters to prevent Spanish, Portuguese, Italian, French and Greek fishermen from depleting the supply of sardines.

The Moroccan Government politely told the American specialists that it would be difficult for men with rowboats to police the Moroccan waters and keep at bay all the foreign motorized fishermen.

We talked about mechanizing the fishing operation. We would provide speedy vessels equipped with block and tackle to handle the nets. The new boats would have depth sounders and fish finding equipment, radar, air-conditioning and special holding tanks out of which the fish would be vacuumed into trucks, equipped with holding tanks, using a slurry system. The factory would have automated sorting and fish cleaning equipment. Whatever could not be turned into sellable fish meal would be transported via a long pipe to be discharged into the ocean far from the tourists on the beautiful beaches.

Strong opposition was voiced against the elimination of jobs that our plan envisaged. But we could convince the opposition that the modernized operation would expand and absorb more than the present labor force.

The next big hurdle was the absence of a trained labor pool that would operate the modernized cannery and the vessels. Operating canning equipment would be easy to learn. However, the vessels would have an American captain, familiar with all the electronics and machinery. That captain would be paid by the US until the locals could take over.

At that time it was vital for the US to get an agreement from the Moroccan government that allowed US manned vessels in the waters off the coast of west Africa, thereby making it easier for the US to control the Russian vessel traffic through the Strait of Gibraltar.

The feasibility study was a success!

## 2. Port development

The Ports of “Suez” and “Said” had to be rehabilitated. The yearly flooding of the Nile receded more and more. The Aswan dam and nature worked hand in hand decreasing the availability of arable land but the Egyptian population kept on growing.

Extensive studies were made to define what the Egyptian population needed and what they could produce. Node and Link studies would analyze the movement of material within the country and by subtracting the domestic production from the need of the population we could define overages and shortages. The overages would be exported and the shortages would be imported.

The cargo was then split into break-bulk, live stock, cement, grain, bulk, containerized cargo, pilgrims and other travelers. From that information we could define what kind of equipment would be necessary and finally, what kind of port needed to be developed to house and facilitate the harbor activity and reduce the vessel waiting time to a minimum.

It was obvious that an enormous grain handling facility was required in both ports.

Port Said would have the large grain handling facility, and Suez would only be allotted a very small grain handling facility because Egypt would thus have to depend more on grain coming from the West.

The voluminous feasibility study was never used to select the best place for a grain handling facility.

In this case politics chose a different choice than the one indicated by a strategic financial study.

### 3. Aqueduct Power Supply

Electricity is a commodity that cannot be stored. It has to be used as it is produced. Around major metropolitan areas power is mostly used during the day when industrial and commercial use is heavier than during the night. To adjust to this difference in demand for power, electricity prices per Kilowatt hour are more expensive during the day than during the night.

An entrepreneur had a great idea to benefit from the power shortage in the Midwest. He would drill a hole in the ground and sink a pipe into it. The pipe would reach an underground waterbed.

The project plan was to use cheaper excess electric power from the nearby nuclear plant during the night. This power would activate an air pump that would then blow air into the pipe. The air pressure in the water would displace the underground water and sort of drive it uphill. During the day the nuclear facility was operating at capacity, but this least expensive producer was not able to satisfy the metropolitan industrial needs, at peak times. Therefore, other than nuclear and more expensive facilities having to pitch in to fulfill the daytime demand, had as a consequence that the price of electricity was rising during the day.

So the project's strategy was to sell electricity to the grid during the day and charge higher prices than it would pay to pump air during the night. When the pump stops forcing air into the pipe, the underground river water returns to its original position, thus pushing the air back out through the pipe. This airflow would then be used to operate a turbine, produce electricity and deliver it to the Grid at a good profit for the aqueduct project.

All the profitability measures showed the project to be very desirable. Tentative and conditional agreements with bankers and electric companies were in the project's portfolio. The investment was relatively small and the risk was practically non-existent.

But the project never got off the ground because the landowner was farming the property above the underground waterbed. Someone had convinced him that the enormous air pressure under his land could push his potatoes out of the ground and prevent his carrots from growing straight down. There was no way to argue or negotiate with the old man or even to make him sit down and listen.

The feasibility report, however, indicated "GO!"

## 4. Uranium Mining Project

A chemical engineer out of Texas had planned the following project. He would drill small holes of about one foot in diameter and about six feet deep. The holes would be drilled in rows. The initial uranium mining site would cover an area of several acres.

Once the drilling completed, water would be pumped into 50% of the holes, one row would receive water, the next row would not. As the water sank into the ground, the holes would be constantly refilled to the top. This process would be continued until the dry holes started to fill up with ground water, leached from the holes that were kept full.

The leached groundwater would then be collected and treated in a laboratory where yellow cake, a product that is used to make uranium, would be extracted from it.

All plans were detailed out and the distribution of profits could satisfy all parties. The returns would be exceptionally high and the proposal was eventually made to the rich weighty Texan landowner.

He listened with attention without blinking an eye, staring at us from under his pricey Stetson hat. He sat motionless at the other side of the table in the dimly lit bar. When our proposal was completed, he took a twenty dollar bill out of his wallet, rolled it up fine and stuck one end inside the pink glass container, that held a small burning candle that created a relaxed atmosphere. The money took fire and he lit his cigar with it and then said: "If you all think I would let you all turn my land into Swiss cheese and make me pay even more taxes than I pay already, you all are on the wrong trail. Get out of here with your silly papers before somebody gets real hot, boys!".

The promising project was put together in a most professional way. But there was no hope for a Uranium Mining project in that part of Texas.

## **5. Comparative Study for a major bank**

An executive of a major bank asked to take a closer look at the methodology we use to make a STRATEGIC PLANNING GRAPH. One of the Vice-Presidents suggested to make a study about a Canadian goldmine, a project they had studied already in-house. It would that way be possible to check if our outcome was similar to theirs. If it was not, one of the two methods was wrong and it would be of interest to find out why.

The outcome was very different. The model used by the bank omitted some key ingredients and it was very easy to convince them that they had made a mistake.

The Vice-President who had commissioned this test said that he was annoyed because the financing had been approved, based on their in-house work, and they could not change their agreement at this point in time.

One has to understand that the bank's client "X" in question was a very influential engineering firm and a long-time trustworthy repeat-customer of the bank.

So I was told: "When "X" asks, "X" gets"... But I was made to understand that if I kept quiet about this, our relationship with the bank would flourish.

A good feasibility report bears sometimes very unexpected fruit.



## 6. A Greek Cannery

A Greek group of farmers got together to find a solution to their excess crop of peaches. The quality of the peaches was superb, but so many farmers had planted superb peaches that the market could not possibly absorb the crop before it rotted and had to be discarded.

They agreed that a cannery would be the solution. The farmers formed a co-op, went to the bank and received the necessary money to build a cannery and thereby give their fruit harvest a chance to reach a larger market and be sold over a much longer period of time.

The first batch was ready for shipping, but the cans started popping in the warehouse. Fermentation was first thought to be a processing error that could be corrected, but the situation was much worse. The fresh fruit peaches are of the 'freestone' variety that should not be canned. In short, the cannery went bankrupt and the lending bank wound up owning a peach cannery.

Our rescue plan was as follows:

Cut down most of the existing peach trees and keep only what the fresh fruit market can absorb.

Plant yellow cling peaches, a variety that can be canned.

Plant an equal amount of pear trees. The plan was to offer a complete array of canned fruit that would include fruit cocktail. A complete selection of canned pears, peaches and fruit cocktail is easier to market than peaches alone.

It was realized that the farmers needed revenue from an other source for several years, until the trees were mature enough to yield a crop sufficient to warrant canning. Asparagus would be planted in the orchards. Asparagus could be harvested after a few seasons and their yield could be sold in the fresh market as well as be canned.

To help out during the first year, tomatoes would be planted. It takes less than a year to ripen tomatoes and the cannery would buy used equipment to make tomato paste, a product that can later expand into sauces, soups, drinks and catsup.

The farmers were unimpressed with our twenty five year forecast and with the financial statements that showed sizable profits. They objected to cutting down their beloved peach trees. They did not see the benefit of planting trees that would take many years to mature into a viable crop. Asparagus takes too much work and how would they market all these tomatoes?

An American firm would be hired to manage the cannery and to market the product. Nothing motivated the Greek farmers. However, a contract was proposed where an American firm would buy all the tomatoes, pay for them in cash and then sell them to the cannery. The cannery would market the finished product. That made more sense to them.

After the first crop of tomatoes was sold, the farmers became more trusting and started to cut their old freestone peach trees to replace them with pear trees and the yellow cling peach variety. The whole project turned to be such an overwhelming success that the plan was copied and executed in other places in Greece.

The contract to buy the tomatoes impressed the farmers much more than the professional feasibility study they were presented with.



## 7. Steel Mill

A steel mill in Indonesia, built by the Russians, had installed a facility to make sponge iron using a Mexican HyL process. The direct reduced iron was stacked up in a mountain of hundreds of tons. The billets re-oxidized slowly and at night one could see the mound of sponge iron glow. No shipper wanted to load that stuff and the facility cried for help.

An American engineering firm had come up with the idea of using that sponge iron to produce steel products in-house such as rebar, pipe, structural steel, spiral-weld pipe, corrugated metal and steel plate. These products could be stored and transported.

The investment required was prohibitive and the risk was too great and the project could not be financed. The plan needed restructuring.

An American steel manufacturer was retained to make a domestic market study for those different steel products. Using that information it could be determined at what time the market would be large enough to support an investment to produce a specific product. Cash flow would have to be sufficient to justify financing the additional investments associated with each specific product. The plan was now stretched over several years but it was accepted by the Government that owned the facility. All sponge iron would eventually be used up in-house.

After a few years had passed the Government asked advice on how to keep the facility viable. The local market grew a little faster than expected and the steel mill started to build the expansions ahead of the planned schedule. Too far ahead! It was soon realized that the mill could not sell its products at a price equal to that of imports because too low a production volume, in spite of a better than expected market expansion, made the cost per unit too high.

Political pressures, caused by splitting off the steel mill from the oil production authorities, made it imperative to show a better bottom line for the restructured facility. It was suggested that the harbor, the water treatment facility and the power plant would be owned by the government and that the steel mill would be a partially privatized enterprise.

Although this restructuring improved the bottom line of the steel mill, the expansions were too far ahead of the original plan. Competition from foreign imports caused selling at a price below production cost.

We proposed drastic measures and the following steps were suggested:

The only legal person who could import metal would be the steel mill.

The only source of steel products in the country would be the same steel mill.

The mill could then mark up the merchandise so the business could break even

That plan was accepted by the Government. After several years the market had expanded sufficiently so that the economies of scale permitted competition with imports and the restriction on steel imports could be lifted.

The mill has expanded its operations several times since then.

Eager politicians do sometimes make decisions without proper Project planning!

## **8. Hydro-electric Power facility**

A country on the West coast of Africa contracted an American firm to build a hydro-electric power plant. The feasibility study was completed and the parameters of the project were agreed upon.

The job was split into several sub-contracts such as the dam, the penstocks, the lifters, the turbines, the control panel, and the transmission lines.

The bid packages included the specifications, the price, the warranty description, the expected life of the product, the maintenance cost, the spare parts inventory required and the supplier's credit package.

The bids were then compared by making a cash flow for each one and discounting it to find the Net Present Value of each bid.

The evaluation work was still in progress but even so, during the early hours of the morning, while swimming in the pool of the hotel, I was approached by some of the bidding contractors, who tried to pry how they were doing. Who was first in line? How far behind was their bid compared to that of the winner? And...and... could we tell them how they could improve their bid... they would be willing to do so...

Nevertheless, the bid packages were professionally studied and ranked and the sub-contractors were selected and presented to the Government.

One major sub-contract was awarded to a firm that was ranked far below the one included in our selection of best bidders.

I learned that the contract was obtained using this classic subterfuge. A bank account was opened in Switzerland and a sum of money was deposited in it by the aspiring contractor. At the same time a numbered Swiss bank account was opened in the name of an old man, a native living in a straw hut who had no clue about what was going on, but had the distinct fortune of belonging to the same clan as a deciding politician. A document instructed the Swiss bank that once the contract was won, the money would be transferred from the first account to the second.

Business is a social activity!

## 9. Arbitrage Deals

The deal is to borrow as much as you can from a source that charges you less interest than what you can earn on a deposit somewhere else. Offshore banks are free from many government regulations and even from taxes and can indeed offer more interesting deals than banks in the US or in the Western World.

You can then project a yearly income, equal to the difference between the income from your deposit and the interest you need to pay on your loan.

The whole cash flow string is then discounted to a Net Present Value and that value is sold at a discount, so the buyer can make a significant profit.

One percent on a million dollars yields \$10,000 per year. After 35 years that would become \$350,000.

The net present value of that \$350,000 depends on the discount factor. The net present value for every percentage point difference between your loan and your investment would thus be as follows:

Discount factor used	Net Present Value
1%	247,068
2%	175,010
3%	124,383
4%	88,697
5%	63,451

The net present values of every percentage difference between borrowing and lending would be yours to sell at a discount.

The broker who promises to put such deal together for you will usually ask an up-front fee. Even large reputable corporations have taken such deals seriously. Obviously, the banks themselves are aware of conditions outside their institution and would prevent any outsider to take away a good deal, if there ever was one.

In short, keep your head in the clouds, but keep your feet on the ground.

## 10. Pioneering the STRATEGIC PLANNING GRAPH

Some people have difficulty adjusting to the vast knowledge offered by the STRATEGIC PLANNING GRAPH. Furthermore, they are generally not ready to pay the same amount for a single page study as they would be willing to pay for a hundred page report, even if it does nothing but confuse them to a point where eventually, they have to be untangled by our more sophisticated method anyway.

Some prefer to make their own sensitivity analyses and would rather see formulae in the cells of an Excel worksheet so they can participate in the analysis and have still something familiar to contribute, other than the actual planning.

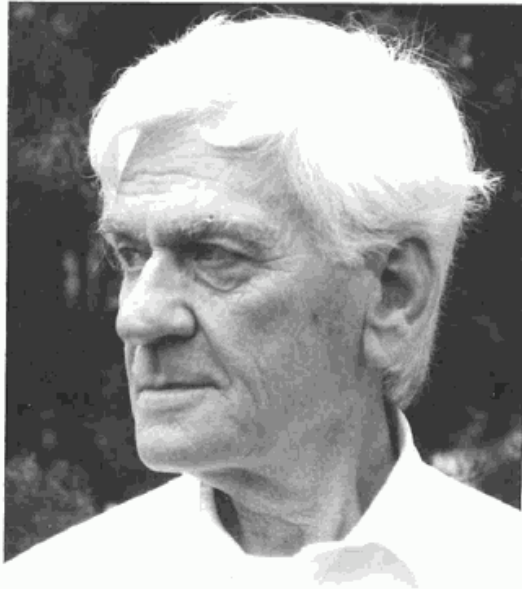
The STRATEGIC PLANNING GRAPH method is new and it meets with the challenge of changing people's habits. It will take some time to bring it fully into play.

Although it is evident that the STRATEGIC PLANNING GRAPH is superior to the older methods of planning, it was brought to light later than others that may have set a trend.

**While it is true that the early bird gets the worm,  
it is nevertheless irrefutable that the second mouse gets the cheese!**



## **ABOUT THE AUTHOR**



### **STRATEGIC PROJECT PLANNING AND FINANCING**

Hugo Daems studied Law, Politics and Business Administration in European Colleges and Universities. He attended the University of California in Berkeley and earned his MBA degree in International Business and Finance. After graduating he found employment with the international finance divisions of several major companies and held positions as controller and lead project planner. He has more than 40 years experience in this field. In 1980 he founded H.E.A.D. CONSULTING, Inc. a Management Consulting company. He developed the "WHAT IF? system, a business management program for sensitivity analyses. He invented and created the "Strategic Planning Graph" for project optimization studies. He has more than 40 years experience in this field. His recognized authority gave his company the opportunity to fulfill many important assignments for projects in all Continents. In 2006 he published a book "PLANNING AND FINANCING" for Engineers, Marketing Managers and Business Leaders who are not familiar with Accounting, Economics or Finance. His book helps bridge the gap between Engineering and Accounting curricula.



