

Financial Analysis Techniques



*This material is the intellectual property of the original author and is intended for the personal use of visitors to **NextForge.com**; this document may not be used for commercial purposes.*

*For an unrestricted copy for use inside your firm or with third-parties, please contact the author or **NextForge**.*

Table of Contents

1. Introduction
 - Purpose of This Manual
 - Purpose of Financial Analysis
2. What Constitutes A Good Financial Analysis?
3. Financial/Business Analyst Skills and Background
4. Role of the Financial/Business Analyst
5. Getting Started: Financial Statement Analysis
6. Tools and Techniques
 - Descriptions and examples
7. Specific Industry Measures
 - Oil & Gas, General Manufacturing, Telecommunications, Aerospace & Defense, Utilities, Insurance, Banking, and Investment Companies
8. Functional Measures
 - Operations, Quality, Materials, Yield, Engineering, R&D, Sales and Marketing, and Finance
9. How to Select the Appropriate Tools and Approach
10. Business Case Development
 - Financial Analysis Linkage
 - Other Analytical Studies Linkage
 - Specific Categories of Benefits
 - How to Put Together a World Class Business Case
11. Some Do's and Don'ts
12. Initial Data Collection List
13. References

Appendices

- I. Tangible Benefits
- II. Intangible Benefits
- III. Opportunity Charting Overview

SECTION ONE

The Purpose of This Manual

- To provide a basic tool set for both internal and external consultants with the responsibility for financial analysis and business case development during an analysis assignment.
- To provide a framework to build on for financial analysis.
- To serve as a guideline to develop and elevate the financial analysis competency within an organization
- To create a basis for consistency in financial analysis techniques and business case development methodologies.

The Purpose of Financial Analysis

- Gain credibility and alignment with the management team
- Understand the financial drivers and issues of the business
- Assess the financial health of the organization
- Identify and prioritize areas of high potential for cost savings and financial improvement
- Provide focus and lead the initiative team to areas of opportunity for more in-depth analysis
- Get behind the obvious symptoms to the underlying, root cause issues
- Surface concerns that might help elevate both the level of the issue(s) being addressed to the appropriate organizational level
- Develop relationships
 - Sources of information for the analysis and the project
 - Establish link for working benefits and baseline measures
 - Establish a peer relationship between the initiative and the senior financial staff
- Provide the basis for the business case (benefits) that will be necessary to objectively justify the solution implementation to the authorizer(s).

This list of objectives applies in almost all cases to every analysis undertaken.

SECTION TWO

What Constitutes A Good Financial Analysis?

Financial analysis is not a "Black Art" or something that can be done only by those with significant experience or financial background. The purpose of financial analysis was described in Section One, but how do you know when you've "got it."

The vast majority of large organizations are well staffed with a group of trained and capable accountants and/or analysts. They usually do not need a team to redo their work and recheck their numbers. What the targeted analysis is looking for is a different point of view.

This section cannot tell you which of the tools and methodologies discussed later will be appropriate for a "good" analysis because every situation is different and requires a different perspective. Some of what's needed can only come with experience, but a large part comes from picking up on the clues provided to you. Basic analysis of financial statements, market share position, recent trends, and Pareto analysis can provide the initial signs of where trouble exists. But most important and a point that cannot be overemphasized is "**Listen to the business owner!!**" They live with the situation everyday, and while they might be too close to the symptoms to recognize the real problem, they can provide the right clues and usually point a team in the right direction to focus their efforts.

A good financial analysis helps to educate the team as to the existing business situation of the organization and provides clues as to why. It elicits responses from senior leaders like "I didn't know that," "I never thought to look at it that way," and "I didn't realize it was that bad."

Developing an understanding of the financial situation and the numbers is only one part of the job of the Business/Financial Analyst. Just as important is the building of relationships within the financial organization up through the CFO. Developing smooth working relationships and credibility in the understanding and analysis of their business situation is critical. Developing the business case (or benefits package as it has sometimes been referred to in the past) is discussed in a later section of this manual, but that part of the package comes together much easier when the team has managed to build a solid financial foundation.

In summary, a good analysis builds the team's understanding of the business, highlights areas of significant opportunity and leads the team to more in-depth analysis of those areas, builds credibility with the financial staff and senior management of the organization, develops good working relationships with the financial staff, and lays the groundwork for a compelling business case to support the project design.

SECTION THREE

Financial / Business Analyst Skills and Background

The following are specifications of capabilities for the Financial/Business Analyst role. These are intended to be guidelines only, and as always, exceptions can and do exist.

| <u>Capability</u> | <u>Minimum Level</u> | <u>Ideal Level</u> |
|------------------------|--|---|
| Financial Skills | <ul style="list-style-type: none"> • Capable of reading and interpreting financial statements (balance sheet, income statement, funds flow or cash flow statement) • Capable of developing and applying creative financial and non-financial measures • Basic accounting literacy (such as general ledger systems, understanding double-entry accounting, cost accounting, and allocation methods) • Basic financial analysis skills (such as pro forma projections, ROI analysis, and ratio analysis) | <ul style="list-style-type: none"> • Capable of designing and developing financial statements and managerial accounting reports • Capable of developing or applying advanced concepts in accounting and/or finance theory • Has developed annual and long-range budgets and business plans • 3 to 5 years experience in a financial analyst position in industry or in consulting • Has held a division controller or V.P. of Finance position |
| Math Skills | <ul style="list-style-type: none"> • College-level algebra | <ul style="list-style-type: none"> • Linear and matrix algebra • Statistics proficiency • Calculus proficiency |
| Computer Skills | <ul style="list-style-type: none"> • Spreadsheet (Excel) basics (can convert a set of numbers into a chart) • Basic computer literacy | <ul style="list-style-type: none"> • Spreadsheet (Excel) fluent • Capable of using a statistics package • Proficient in utilizing graphics and presentation packages |
| Operations Experience | <ul style="list-style-type: none"> • 2 years experience in the value-chain of a firm • 1 to 2 segments of the value-chain | <ul style="list-style-type: none"> • 5 to 7 years experience in the value-chain • 3 or more segments of the value-chain (preferably with some experience in manufacturing/operations or sales/marketing) • Knows what drives the numbers |
| Management Experience | <ul style="list-style-type: none"> • Has managed one value-chain function • Has managed a group of at least five individuals | <ul style="list-style-type: none"> • Has been a general manager or • Has been on general manager's direct staff • Has managed 2 or more value-chain functions |
| Work Experience | <ul style="list-style-type: none"> • 5 to 7 years industry experience or • 2 to 3 years industry experience post-MBA | <ul style="list-style-type: none"> • Experience in 2 or more industries • Experience in more than one function |
| Educational Background | <ul style="list-style-type: none"> • Undergraduate degree in business, economics, math, computer science, engineering, or physical sciences • Course work in managerial accounting, finance, or economics | <ul style="list-style-type: none"> • MBA or equivalent • Emphasis/concentration in accounting or finance |
| Other Criteria | <ul style="list-style-type: none"> • Balanced background between financial skills and experience and operational experience and understanding • Strategic analysis skills desired | |

Accounting and Finance Concepts to Know

- Standard cost accounting methodologies
- Activity Based Costing
- Net present value
- Shareholder value
- Discounted cash flow
- Internal rate of return
- Return on investment
- Payback and breakeven
- Leverage
- Cash flow
- Inventory turns
- DuPont Analysis
- Pro Forma analysis

SECTION FOUR

Role of the Financial/Business Analyst

Initially, the financial/business analyst is responsible for obtaining the appropriate financial data as early as possible to understand the financial condition of the organization and to target appropriate areas for more in-depth analysis. If at all possible, this should be done prior to or at the outset of a business analysis; ideally, this could even occur before the full analysis team is onboarded. It is also important for the financial/business analyst to work closely with the initiative leadership to ensure that they are directing the remainder of the team to the right areas. Some general guidelines on getting started are included at the beginning of Section Five.

Throughout the business analysis, this individual will also be responsible for developing a relationship with the top financial individual and the financial staff as appropriate and insuring that there is agreement with the business leadership on all numbers to be presented. If total agreement can't be reached, be sure that you are clear with the business financial staff on the reason for the disagreement and that it is one that you and the team can live with and rationally explain to senior leadership. The analysis team will always want to obtain buy-in from the top financial staff on the numbers, methodology, and Business Case, unless to do so would damage the team's credibility or present information that is believed to be fundamentally wrong.

This individual has the responsibility for developing the Business Case and preparing the team to present it and/or to present it himself. Preparing the Business Case is a major piece of work and is critical to the presentation of the approach for the proposed project. More information on the actual development of the Business Case is discussed in a later section.

Finally, where practical and timing permits, it is the responsibility of the financial/business analyst to work with the designated project manager and other implementation staff to determine appropriate measures to be utilized during the course of the project to determine the project's impact on the business.

SECTION FIVE

Getting Started – Financial Statement Analysis

- 1) **Interview the Controller** or appointed accounting manager to determine type and availability of financial reports and obtain most recent copies where available. Financial reports typically include one or several of the following:

Reports to provide a Business Perspective:

- Business Plan (short and long-term)
- Operating Budget and Variance from Actual (current year)
- Other Internal Performance Reports
- Recent Annual Forecast

Reports to provide a Historical Financial Perspective:

- Annual Report (may be of limited use within an operating division)
- Balance Sheet
- Operating (Income) Statement
- Statement of Changes in Financial Position
- Statement of Changes in Shareholders Equity
- SEC Filing Forms 10K or 10Q *
- General Ledger
- Trial Balance
- Chart of Accounts

- 2) **Request the Controller** to walk-you-through available reports as necessary.
- 3) **Review available** reports to gain a further understanding of the reports and of the business.
- 4) **Discuss** any additional questions with the Controller or appointee.
- 5) **Inquire of the Controller** as to any changes that may have occurred to the business in the recent past. You may need to take these changes into consideration as you perform your analysis. Focus should be on the timeframe used to develop your trend analysis.
- 6) **Gain an understanding** of the changes in Balance Sheet composition over time; perform the following ratio analysis on the financial statements received for the years in the period under analysis (you may want to run some of these numbers on a semi-annual or quarterly basis, depending on how volatile the business is):

Current ratio
A/R aging
Inventory turns

Debt / Equity
A/P aging
Cash Flow / Share

To get examples of the formulas used to calculate these ratios, see the segment on Ratio Analysis or Industry Measures. Set up an Excel spreadsheet or other tool to compute this information. Major swings in any of the above ratios may highlight opportunities for additional studies or diagnostics to be performed.

- 7) **Use the Balance Sheet and Operating Statement** to complete the Excel spreadsheet of individual line item trends. If operating within a Division, it may be necessary to use a Division's General Ledger or Trial Balance for this exercise. Five years of data will generally provide a good illustration of the business, however, fewer or more years may be appropriate given historical changes that may have occurred in the nature of the operations of the business.

Trending selected individual accounts over the most recent 12-18 months may also be appropriate to gain a better understanding of recent business trends.

- 8) **Review prepared spreadsheet** to identify changes in account balances or relationships which are inconsistent with or adverse to positive business performance.
- 9) **Determine** areas which the analysis team should consider for focused studies and diagnostics.

Balance Sheet Analysis – Specific Approach

1) Cash

- Identify if cash balances have been depleted during the trended period. Depletion of cash probably indicates a need to improve cash flow through improved asset-liability management and/or improved operating performance.

2) Accounts Receivable

- Calculate Accounts Receivable Turnover and Average Collection Period to determine the business's efficiency of collecting receivables and effectiveness of credit policies.
- Organizations typically allow 30 days for receipt of receivables payments, however, this should be confirmed with the business team. Based on the calculation above, if the average collection period is significantly greater than the allowed 30 days there is probably an opportunity to improve collection efforts and therefore improve cash flow.
- In addition to the above calculations, you should request from the Controller an accounts receivable aging schedule which would provide details of receivables according to aging categories such as 0-30 days past due, 31-60 days past due, 61-90 days past due, etc. This can be used to discuss specific reasons for past due balances.

3) Inventory

- Calculate the number of Inventory Turns (on an annualized basis) as described in Section Six under Ratio Analysis.
- Trend out the percentages of Raw Material, WIP, and Finished Goods as a percentage of total inventory for the last 3 to 5 years (see spreadsheet completed above).
- High Raw and WIP levels may indicate cash flow opportunities or production problems
- A high FG level may indicate a sales or marketing opportunity; in addition, it may evidence a communication disconnect between manufacturing and sales/marketing or inadequate market and production planning.

4) Prepaids and Other Current Assets

- Trend the level of these assets (as a percentage of total assets) over a period of 3 to 5 years (see spreadsheet completed above). High levels of these amounts may highlight cash flow improvement opportunities.

5) Property, Plant & Equipment

- Determine the depreciation method used. (see footnotes to the financial statements in the annual report or the 10K).
- Using Schedule V and VI from the 10K, see how many capital additions and retirements have been made. Again, this is to highlight profit or cash flow enhancement opportunities.

6) Other Assets

- Trend the level of these assets (as a percentage of total assets) over a period of 3 to 5 years (see the spreadsheet completed above). High levels of these amounts may highlight cash flow enhancement opportunities.

7) Accounts Payable

- Using the age of A/P as calculated above, benchmark the age of the business's A/P against that of the major competitors. The opportunity may exist to increase cash flow by stretching the age of A/P.
- Identify the top 10 trade payables to determine critical vendor relationships

8) Accruals & Other Current Payables

- Trend the balances of these accounts over a 3 - 5 year period (see spreadsheet completed above). Again, increases in these amounts may indicate a weakening of cash position.

9) Debt

- Using the overall debt/equity ratios calculated above, benchmark the business's position against that of major competitors. Possible opportunities may include: refinancing, paydown of long-term balances, or conversions to equity.

10) Equity Structure

- If the business has convertible preferred stock, an opportunity may exist to convert these shares to common to avoid required dividend payments, thereby saving cash.
- Other opportunities may include collection of outstanding note receivables from officers, or repurchase of equity as treasury stock.

Statement of Operations Analysis – Specific Approach

1) Sales

- Understand the difference between gross sales and net sales. Typically, the difference will consist of sales discounts (given for early payment), product warranty returns & allowances and freight costs.
- Understand the breakout between cash sales and credit sales. The balance sheet ratios discussed above should be calculated using net credit sales (especially when discussing Accounts Receivable).
- Obtain sales and cost of sales information for individual divisions/product lines where appropriate over the period trended.
- In addition, obtain sales and gross margin information for the top N customers (e.g. 20) for the period trended. Such information will help to focus on the overall profitability of the business/division.

2) Cost of Sales / Gross Margin

- Obtain a breakout from the business of cost of sales as follows:
 - Material
 - Direct & Indirect Labor
 - Other Direct Costs
 - Variable & Fixed Overhead
- Trend these components (as a percentage of net sales) over the same 3 - 5 year period that is being analyzed (see spreadsheet prepared above). It may also be helpful to trend these amounts on a quarterly basis (using the 10Q reports as a comparison benchmark).
- Large swings in these percentages may indicate several opportunities, including:
 - Product cost reduction (increasing material component of product cost)
 - Production problems (increasing labor cost component)
 - Production volumes low - factory under-absorption (increasing overhead component)
- Depending upon the scope of the analysis, it may be helpful to obtain product specific product costs or manufacturing transfer prices. If transfer prices are obtained, be sure to also capture the appropriate manufacturing variance amounts (e.g. purchase price variance, labor application variance, overhead under/over absorption) on a per product basis. Other variances to obtain include: Rework, Scrap, Material Usage, Obsolescence charges and reserves. These variance amounts will provide a simple way to highlight potential manufacturing opportunities.
- Along with Cost of Sales, Gross Margins should also be calculated. Depending on the scope of the analysis, gross margins should be computed on a product specific, business segment, or geographical basis.

3) Operating Expenses

Includes: Research & Development, Sales & Marketing, General & Administrative

- These expenses should be analyzed on a trend basis as a percentage of net sales for the identical 3 - 5 year baseline period (see spreadsheet prepared above). If large fluctuations are noted, it may be necessary to analyze these amounts on a quarterly or monthly basis.
- There may be a need to obtain further breakdowns of what is contained in these line items (costs allocated to a specific product or division). It may also be helpful to obtain a rollup of these costs by division (if appropriate).

To determine if quick hit opportunities can be identified, perform the following steps:

- Break down Operating Expenses by category (e.g. G&A, R&D, Sales & Marketing) between Personnel Related and Non-Personnel Related Expenses. Personnel Related expenses should also be separated into Salary vs. Hourly employees (Exempt vs. Non-Exempt).
- Calculate actual annual cost per employee (including benefits) for the period under analysis (for both Exempt and Non-Exempt employees).
- Headcount by major division/group/department should be obtained. This information should be split between direct and indirect labor (as well as Exempt vs. Non-Exempt).
- Other quick hit opportunities may include:
 - Freight expense (as a percentage of sales, or selling expense)
 - Utilities expense (as a percentage of G&A expense)
 - Warranty expense (as a percentage of sales, or selling expense)
 - Benefits expense (as a percentage of total Employee related expenses)\
- Note that for the above expenses, they may be classified into many different areas on the operating statement. For example, benefits expense will appear in all Operating Expense Categories as well as in Cost of Sales.

4) Cost of Quality Information

- Cost of quality information should be computed as part of the financial analysis. Cost of quality is computed as follows:

$$\text{Cost of Quality} = \text{Cost of Conformance} + \text{Cost of Non-Conformance}$$

The Cost of Conformance is composed of the cost of "doing things right"; that is, the cost of the quality department, training costs, etc.

The Cost of Non-Conformance is composed of the costs associated with "fixing" products or processes to ensure that they conform with the "customer's" requirements; that is, the cost of scrap, rework, purchase price variances, etc.

The total Cost of Quality can then be measured as either a percentage of Cost of Sales or of Sales directly. More information on this calculation is available in Section Six of the manual.

SECTION SIX

Financial Analysis Tools and Techniques

Listed below are a number of financial tools and techniques. Each will be described in more detail and some examples provided in the pages to follow. Included in the individual sections will be a partial listing of various measures that the techniques can be applied to. In most cases the initial data can be obtained from the basic financial statements (income statement, balance sheet, cash flow, etc.) of the organization, but more detail is usually required to achieve a full financial picture. A preliminary data collection list to assist in getting started is included in Section Twelve.

1. Trend Analysis
2. Sensitivity Analysis
3. Pareto Analysis
4. Ratio Analysis
5. ROI and DuPont Analysis
6. Mission/Support Cost Analysis
7. R&D Conversion Rate Analysis
8. Growth Rate Analysis
9. Element Decomposition Analysis
10. Shareholder Value Analysis
11. Stock Price Analysis
12. Competitive Benchmarking
13. Pro Forma Analysis
14. Variance Analysis
15. Breakeven Analysis
16. Supply and Value Chain Analysis
17. Innovative Analysis
18. Other Methods of Analysis

These tools can be applied to a number of areas. Section Five, Getting Started, discussed P&L, balance sheet, cash flow, and overhead analysis for example, but financial statement analysis is basically the utilization of the other techniques described below applied to a given area.

Not addressed in this manual is the analysis of financial and accounting systems. Separate analysis of systems, policies and procedures can often reveal underlying causes for managerial decisions, indecisions, and behavior and can be the cause for many symptomatic problems.

1. Trend Analysis

This is a very simple tool that can be applied to almost any set of financial measures, whether in dollars, percentages or ratios. A minimum of three or four periods is necessary to establish a trend, but more is better. To establish annual trends, at least three years of data is required, but five or more is better to gain credibility. If you have monthly or quarterly data, then you may not have to go as far back with your data.

There are two types of trends to plot. The first uses purely historical data, and if the business is the source of your data, then there can be little argument about the trend assuming there is one. (Although, if the trend is not complimentary toward management, you will probably be presented with a variety of reasons/explanations/excuses as to why the trend is that way and that it may not be relevant. Pay close attention to the reasons that are given, as this can often lead you to underlying causes and also often reveal things about management style and attitudes that do not come out through the normal interviewing process.) Historical trending is useful in showing the direction of a measure, the duration of that trend, and whether it is a cyclical, intermittent, or constant trend. The second type combines historical performance with projections. These projections can be done with the business's plan or forecast data. We (URC) can also do our own projections based on historical trends, but we will discuss this further under Pro Forma Analysis. This combination can be very useful in determining realism in a plan and in raising questions about how the business plans to effect a change if the trend line shows a shift from the historical performance to that planned.

Be sure to plot trends, as just looking at the data (numbers) often does not clearly identify a trend while a graph or chart can clearly illustrate it visually.

Another use of trend analysis can be to utilize it on a comparative basis. Comparisons can be made to other companies in the industry, other divisions within the business company, or to other measures. This last comparison mentioned can often be useful in identifying cause and effect relationships or in identifying leading indicators.

As stated above, trend analysis can be applied to most any measure to show an organizations performance over time against that given measure. A partial list of measures that it can be applied to is given below.

- Revenues
- Operating Profit
- Gross Margin
- Commercial Expenses (SG&A)
- R&D Expense
- Returns
- Scrap
- Cost of Sales
 - Fixed Costs (Overhead)
 - Variable Costs (Labor, Material, Overhead)
- Each of the above lines as a percent of revenues
- Inventory Levels (Total / Raw Material, WIP, Finished Goods)
- Inventory Turns Total / Raw Material, WIP, Finished Goods)
- Accounts Receivable (Dollars, Days)
- Accounts Payable (Dollars, Days)

- Headcounts (Salaried, Hourly, Direct, Indirect)
- Yield Percentage
- Average Price per Unit
- Average Cost per Unit
- Return on Investment
- Variances
- Expenses
- Capital Spending
- Cost of Quality *
- People Effectiveness Index **

Trends can be applied to entire businesses, segments, or to departments to meet the analytical need. Trends can also be applied when looking at some of the other diagnostics discussed later in this section such as financial ratios, R&D conversion rates, and mission/support cost analysis.

* Cost of Quality is a measure of all costs associated with producing and delivering to customers a quality product as a percent of total production costs. These costs include failure costs, diagnostic costs, and prevention costs. A typical calculation is:

$$COQ = \frac{\text{Scrap} + \text{Rework} + \text{Cost of Returns} + \text{Warranty Cost} + \text{QA Dept Cost} + \text{Training Cost} + \text{Inspection Costs}}{\text{Cost of Sales, adjusted for the change in inventory}}$$

** The People Effectiveness Index is a measure of dollars of revenue received per dollar spent on people. It is a refinement of the old measure of revenue dollars per employee. People costs typically include salaries, wages, bonuses, commissions, benefits, training, recruiting, and relocation costs.

In both cases, various companies may include different categories of cost within their definitions if they use either of these measures. As these are typically looked at as measures of improvement over time, the important aspect is consistency in the definition of costs so progress can be accurately tracked.

2. **Sensitivity Analysis**

Sensitivity analysis is a relatively simple technique to show what the effect of a change in one area may be to another area. Typically, the measure being affected is a bottom line measure such as net profit or ROI, but it can be any measure that is of importance to the business. The analysis itself consists of taking any given element, and changing it by a certain amount (1%, 5%, 10%, 25%, etc.) to determine the impact on the bottom line measure. This type of analysis can be very dramatic in demonstrating to a business the leverage of focusing on a particular area or the futility of doing the same if it is a low leverage area.

3. **Pareto Analysis**

This is another relatively simple technique for identifying areas that are principle contributors to a given cost or other measure. The Pareto Principle is basically the old 80-20 rule, that states that 20% of the items bought, sold, etc. make up 80% of the value of those transactions. The technique is particularly useful when looking at things like sales, customers, inventory, and expenses. It is also very useful in de-layering costs, progressively going deeper and deeper to examine what constitutes the largest elements within a given cost structure.

Simply stated, the analysis consists of breaking down any set of costs, revenues, etc. into it's component elements and then ordering them from largest to smallest. This analysis is also best presented graphically.

A sample list of some things that you may want to use this technique for is as follows.

- Revenues by product line
- Revenues by specific product
- Revenues by customer
- Revenues by sales region
- Gross margin by product line
- Gross margin by customer
- Gross margin by salesman
- Variances by product
- Variances by operation
- Expenses by category
- Expenses by department
- Inventory by product line
- Inventory by part number
- Accounts receivable by product line
- Accounts receivable by customer
- R&D expense by product line
- Returns by product line
- Scrap by product line
- Scrap by operation
- Headcount by department
- Various expense categories by department

Obviously, this type of analysis can be applied to non-financial measures as well.

4. Ratio Analysis

Ratio analysis is a standard technique often used by stock analysts, bankers and other financial analysts to assess the financial health and the financial management of an organization. These tests are usually applied to the entire company, but can also be utilized to assess some aspects of it's various business segments. Usually, all the data required is contained within the basic financial statements of the organization, and principally on the balance sheet.

There are four basic types of ratios used, profitability ratios, liquidity ratios, activity ratios, and leverage ratios. Profitability ratios measure management's overall effectiveness as shown by return on sales or investment. Liquidity ratios measure an organization's ability to meet it's short-term obligations. Activity ratios measure how effectively a firm is utilizing it's resources. Leverage ratios measure the extent to which a firm is financed by debt. Some of the primary ratios, their calculation, and their use are listed below.

Profitability Ratios

| | |
|---|--|
| <p>Return on Sales (Profit Margin on Sales)</p> $ROS = \frac{\text{Net Profit After Tax}}{\text{Revenues}}$ | <p>Can indicate problems in pricing, costs or both.</p> |
| <p>Return on Investment (Return on Total Assets)</p> $ROI = \frac{\text{Net Profit After Tax}}{\text{Average Total Assets}}$ | <p>Indicates return company is earning on its investment and can be compared across businesses, companies, etc. Many companies use variations on this basic measure and you need to verify what they include in their equation. Can indicate problems in either product profitability or in asset management or both. ROI relates the results of operating performance to the investments that the company has made regardless of how the investments were financed.</p> |
| <p>Return on Equity (Return on Net Worth)</p> $ROE = \frac{\text{Net Income}}{\text{Net Worth (Shareholder Equity)}}$ | <p>Similar to ROI calculation but does not consider debt as part of the investment equation. Net income should exclude extraordinary items. Average shareholder's equity is the sum of paid in capital, contributed surplus and retained earnings at the beginning and end of the period (typically the last fiscal year) divided by two. Measures the return on the total investment shareholder's have made in the company and should also be compared to similar companies as well as the financial market in general. Different than return to the shareholder in that this measures return for the company as opposed to return for an individual based on the point in time of the investment.</p> |
| <p>Share Price</p> | <p>The price at which the common stock of the company trades in the financial markets. It indicates the future performance expectations of the company by investors.</p> |

| | |
|--|--|
| <p>Earnings per Share</p> $EPS = \frac{\text{Net Period Earning} - \text{Dividends}}{\text{Average Number Shares Outstanding}}$ | <p>EPS is a popular press indicator of a company's performance over a period of a quarter or a year. EPS is an accounting measure and can be quite different from operational performance of the company.</p> |
| <p>Cash Flow</p> | <p>A measure of net cash generated by the company from both operations and investments. Calculated by summing all cash inflows and outflows for the company. These include, but are not limited to, net earnings plus depreciation, minus the increase in working capital, minus capital expenditures.</p> |
| <p>Shareholder Return</p> $\text{Return} = \frac{\text{Share Price Gain} * + \text{Dividends}}{\text{Stock Price at Purchase}}$ <p>* Share Price Gain = Current Stock Price – Price at Purchase</p> | <p>Measures the return a shareholder has received on his investment in the company. Typically measured over a 1 year or longer period and compared to the performance of stocks of companies in the same business or to the financial markets in general.</p> |
| <p>Expense Ratios</p> $ER = \frac{\text{Period Expense}}{\text{Period Revenues}}$ | <p>Calculated as the particular expense item divided by revenues. Typically measured as a trend over time and compared to similar companies.</p> |

Liquidity Ratios

| | |
|--|---|
| <p>Current Ratio</p> $CR = \frac{\text{Current Assets}}{\text{Current Liabilities}}$ | <p>Compare to Industry Averages. Should be concerned if it is far from industry averages and investigate further.</p> |
| <p>Quick Ratio (Acid Test)</p> $QR = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$ | <p>Compare same as Current Ratio. Generally, looking for this to be above 1.0.</p> |
| <p>Working Capital Turnover</p> $\text{Turns} = \frac{\text{Revenues}}{\text{Average Period Working Capital}}$ | |

Activity Ratios

| | |
|---|---|
| Inventory Turnover $\text{Turns} = \frac{\text{Revenues}}{\text{Inventory}}$ | Compare with industry averages. Two problems exist with this measure. Sales are at market price and inventory is carried at cost, so it actually overstates the true turnover. However it does allow comparison by using statistics compiled by Dun & Bradstreet. The second problem is that sales are for an annual period and the inventory is for a period in time. Therefore, it is desirable to average the inventory for the period in question, particularly if the business is cyclical or seasonal. A truer picture of actual turns can be obtained by dividing Cost of Sales by the Inventory level although even that will continue to overstate the actual turns. |
| Days Receivable $\text{Days} = \frac{\text{Receivables}}{\text{Sales per Day}}$ | Compare to Industry averages and to the company's credit terms. Can also do an aging schedule if the data is available. The financial community typically uses 360 days per year for computing daily sales, rather than 365. |
| Days Payable $\text{Days} = \frac{\text{Payables}}{\text{Purchases per Day}}$ | The data for this calculation may be harder to obtain. However a lengthening trend in this area can be an indication of cash flow problems. |
| Fixed Asset Turnover $\text{Turns} = \frac{\text{Revenues}}{\text{Net Fixed Assets}}$ | Compare to industry averages. Indicates how well capacity is being utilized relative to the industry. |
| Total Asset Turnover $\text{Turns} = \frac{\text{Revenues}}{\text{Total Assets}}$ | Compare to industry averages. Indicates if the company will need to invest soon, and if they have too much invested in assets relative to their sales level. |

Leverage Ratios

| | |
|---|---|
| Debt Ratio $DR = \frac{\text{Total Debt}}{\text{Total Assets}}$ | Debt includes current liabilities and all bonds and loans. Measures percent of funds provided by creditors. If it's too high, may reduce the ability of the company to borrow further. Compare to industry averages. (Can also use Debt/Equity ratio for the same purpose.) |
|---|---|

| | |
|---|--|
| <p>Times Interest Earned</p> $TIE = \frac{\text{Gross Income}^*}{\text{Interest Charges}}$ <p>* or use (Profit BT + Interest Charges)</p> | <p>Measures the ability of a company to meet its interest costs. If the ratio is too low, it puts doubt on the ability of a company to sustain itself in a downturn. Compare to industry averages.</p> |
| <p>Fixed Charge Coverage</p> $\text{Coverage} = \frac{\text{Profit BT} + \text{Interest} + \text{Leases}}{\text{Interest} + \text{Lease Obligations}}$ | <p>Similar to Interest Coverage ratio, but covers more items. Again, compare to industry averages.</p> |

There are limitations to ratio analysis, as with any other analysis methodology, and should only be used as indicators and not results of a study by themselves. The ratios are constructed from accounting data, which is subject to interpretation and manipulation. For example, different firms in the same industry may use different depreciation or inventory valuation methods, thereby effecting profitability and balance sheet statements. This can also be true for treatment of R&D expenses, pension plan costs, mergers, reserves, etc.. Different fiscal years can also affect comparisons.

As with many of the other financial analysis methods discussed in this section, it can also be very useful to trend some of these ratios to determine whether the situation is changing in either a positive or negative way.

In discussing the ratios above, it usually indicates that a comparison with industry averages should be done. There are a number of subscription and publicly available resources to help in obtaining this comparative data. Examples of resources are listed below.

- Dun and Bradstreet Database – Tracks 14 ratios by industry. It is accessible on an on-line basis and can provide several years history.
- Robert Morris Associates – Publishes Statement Studies annually. Tracks 11 ratios by industry. 1987 - 1990 reports available.
- Almanac of Business & Industrial Financial Ratios – Available back to 1986
- Disclosure – An on-line system which allows you to pick your own "industry" by naming the companies you want to compare to, or can pick data on individual companies.
- Quarterly Financial Report for Manufacturing Corporations – Published by the Federal Trade Commission and through various trade associations.

5. ROI and DuPont Analysis

Return on investment (ROI) or variations [return on assets (ROA), return on net assets (RONA), and return on equity (ROE)] are commonly used by both companies and external analysts to assess how well the company is utilizing its resources. Most companies have a target rate that they are trying to achieve, usually in the 15 - 25% range, although some may be higher or lower depending on the industry they are in and the aggressiveness of the organization. External analysts will look at this measure and compare the return with others in the same industry to assess the company's performance with an eye on the ability of management to outperform their competition or determine if they lag the industry. With many businesses, this measure turns out to be a problem and they often have immediate or short term objectives to increase their ROI and get it up to target within some set period of time. Typically, most of the effort centers around the numerator of the equation (profits) and less effort is focused on the denominator (investment) side of the equation. An analysis should start with breaking down the ROI equation and gaining an understanding of what drives the equation and how it can best be affected by management.

The basic ROI equation is shown below. Remember that many companies use variations on this equation and you should check with the business's financial staff to understand what measure they use and how they calculate it exactly before starting your analysis.

$$ROI = \frac{\text{Net Profits}}{\text{Inventory} + \text{Receivables} + \text{Fixed Assets} - \text{Current Liabilities}}$$

To analyze the equation, you first need to start by getting the breakdown of the elements of the equation for the most recent period completed, typically the last fiscal year. This lets you understand the order of magnitude you are dealing with and where efforts can best be focused to effect changes. For example, if accounts payable (part of the current liabilities) makes up only 5% of the investment, then increasing your payables by stretching out payments by a week is not going to have any significant impact on the ROI. However, if inventory represents 35% of the investment, then a plan to implement a just-in-time inventory strategy might make a major change in the resulting ROI. In addition to understanding the relative sizes of each of the pieces of the equation, it is also a good idea to understand the trend, not just of the ROI itself, but of each of the individual components to understand if the problem is a profit problem, an asset management problem, or both. Understanding the trends of the individual pieces could result in the initiation of additional studies within a particular area of the organization to understand why the trends are heading the way they are and gain insight into what processes may not be working properly. Another part of analyzing the ROI is to do some comparisons. This should be done within the various business segments of the organization to determine areas of focus and also against competitors to determine how management is doing relative to others in its industry.

One method of analysis that has been used extensively over the years by financial analysts in this area is called the DuPont Analysis. It breaks down the ROE equation into three components.

$$ROE = \frac{\text{Net Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Net Assets}} \times \frac{\text{Net Assets}}{\text{Equity}}$$

The three components address the areas of profitability, turnover of assets, and leverage. This type of analysis is best done on a comparative basis with competitors to see in what areas the organization may be lagging, but trending here can also help.

6. Mission/Support Cost Analysis

Mission/Support analysis can be a powerful tool in helping a business to come to grips with the growth in the cost structure of the organization and as such can be a major part of an on-going implementation project. The analysis, done thoroughly, can be a major undertaking and is usually done with a high level of business involvement. Due to the level of effort, a complete job of this type of analysis typically cannot be done during an analysis engagement. However, a high level analysis can be done to demonstrate the issue to the business and determine if a more thorough analysis and project should be undertaken in this area.

The goal of this analysis is to separate the value-added cost base into two categories of cost. Mission costs, or those costs that are critical to providing the product or service that the organization provides to its customers, and support costs which are those costs and functions that are invisible to the customer and normally are the typical support functions of any company or organization, no matter what business it is in. Mission costs typically include functions such as manufacturing, sales, transportation, shipping, customer service, product design or engineering, and some parts of marketing. Support typically includes functions such as accounting, personnel, quality, health and safety, maintenance, and general management. Costs within each of these areas can often be broken down between mission and support as well, but for a quick analysis it is probably not worth the effort. A general guide though is that functions that are designated as mission typically contain within them support costs while support functions usually have no or very little mission costs. The cost structure that serves as the basis for the analysis is called the value-added cost base. It is calculated by subtracting profits and the cost of component parts and materials from revenues for a given period. This gets around the argument of "what is overhead?" that would have to be addressed if you were to try to apply this analysis to only overhead costs.

This analysis is best done if several periods of data are available so trends and growth rates can be determined. Typical analyses have indicated in recent years that most companies have experienced a higher growth in support costs than they have in either mission costs or in revenues themselves.

The main purpose with this analysis is to demonstrate where the growth in costs is being incurred and a potential way of bringing them under control. Support costs by their nature are not directly related to product volume and should be able to be leveraged as a business grows. Most senior managers believe this and believe that if they could just grow their business a little faster, that their profitability would improve significantly. Through this type of analysis, we can demonstrate where the growth in costs is occurring and that if controls and changes in processes are not put in place, that growth may not help them and could possibly make the situation worse.

It is a relatively easy step to then demonstrate to an executive how profitability can be improved by managing the different type of costs to different goals. This can be done through the use of projections (preferably generated by the business) modified for different growth rates for each of the cost segments.

It should be emphasized again that while using this technique in an analysis can be useful to demonstrate the concept and the need for managerial attention, the real power comes from working through the process with a management team so they really understand their cost structure and how they can improve their performance by really managing where money is being spent.

7. **R&D Conversion Rate Analysis**

This technique was developed to understand the effectiveness of the R&D operation of a given organization. It can be used in two ways. The first is on a comparative basis with other companies in the same industry. This is particularly helpful in those cases where the business states that he has the "best engineering talent in the business." A look at this index doesn't directly answer that statement, but it does identify whether the business is getting a better or worse return on the effort that is being put into development. The second use is on a trend basis to determine if the business is improving in this area and whether they are gaining or losing to their competition.

The technique is a variation of the old measure of percent of sales spent on R&D. The difficulty with that measure is that it is only an indicator of input into the development process. While it could tell us whether the business is keeping up with its competitors from an investment standpoint, it does nothing to address the issue of effectiveness of the spending. The R&D conversion rate is a measure of output that tells us what kind of return a company or organization is getting for its R&D investment. It is calculated by dividing the sales of the organization being studied by its R&D investment of an earlier period. How much earlier should be determined by the lead time it takes the industry leader to bring a new product thru development and into the market. This will vary greatly from industry to industry, but a lag factor of one to two years is common for many businesses. If there is any question of the lag time to use, do the analysis for several different lag periods to determine if it makes any difference in the conclusions.

One example of this type of analysis is a recent analysis done with a technology company. This company was looking at its cost structure and had determined that to be competitive, it had to modify that cost structure by reducing its investment in R&D. However, when we examined its conversion rate and compared it with its principle competitors, we determined that it was only getting two-thirds the bang for its bucks as those competitors despite the assertion that they had "the best engineers in the business." When this conversion rate problem was combined with the relative dollar investment being made by the different players in the business, it painted a serious picture showing the business continuing to lose market share and eventually becoming a minor player in the business after once being a major factor.

A word of caution around drawing conclusions from this analytical tool. There are many factors that contribute to the level of an organization's conversion rate and they do not only have to deal with the R&D function. The level of the conversion rate can be influenced by the effectiveness of its R&D effort, (whether the company chooses its projects wisely and how focused its efforts are), by the efficiency of its engineers (are they really the best?, what is the ratio of money actually spent on development versus support efforts?, and are the processes and systems being utilized as effectively as possible?), by the direction set by top management, by the time it takes to bring a product to production from the design table, by the time it then takes the organization to bring the product to market, by the effectiveness of the marketing and sales organization to actually sell the product, and by the rate of growth taking place in the market itself. This is not an exhaustive list of factors that can effect the conversion rate, but it does serve to demonstrate the need for caution in determining the cause for the organization's position relative to its competition in converting its R&D investment.

8. Growth Rate Analysis

This is another relatively simple tool to use and is done by calculating growth rates for whatever particular measure is of interest. Typically it is applied to costs and can be compared to the growth in revenues, or units sold, or to other possible driving factors such as headcount. The methodology can just as easily be applied to any other area such as inventory or accounts receivable. After calculating the growth rate, the typical use is to compare it with that of other measures to try to determine if that growth rate is reasonable for the area in question or whether it is out of line with reasonable expectations. Again, this analysis can also be done by making comparisons with competitors if similar data is available. A final use can be to use the growth rate information in the building of pro forma statements based on historical trends and growth rates to demonstrate the likely situation if no changes are made in existing management methods.

9. Element Decomposition Analysis

This tool is really just another use of Pareto Analysis applied to a specific area. When we need to understand the cost structure of a given area, decomposition is used to break any given element down into the sub-elements of (1) salaries, wages and benefits, (2) travel expense, (3) supplies, (4) outside services, (5) depreciation, (6) utilities, (7) allocations, and (8) all other. (Other categories may be appropriate depending on the organization.) Additionally, each of these areas could be broken down further into various categories which make it up. To take the analysis a level deeper, this breakdown can be done for various departments of the organization, or you can look at each sub-element of cost for the entire organization by department.

A further variation on the theme is to apply trend analysis to the above areas to see which are growing fastest, declining, or holding constant.

This is a useful exercise in gaining an understanding of the cost structure of a business and where the pools of opportunity might exist.

This technique can just as easily be applied to sales dollars, volumes, or profits by breaking them down by market segments, customers, etc..

10. Stock Price Analysis

This type of analysis can be as complex or as simple as the analyst cares to make it. What we usually want to demonstrate here is the performance of the company when viewed through the eyes of the shareholder. A relatively simple analysis can be done by looking at the return the company has provided to its shareholders over a relevant period of time (2, 3, 5, or 10 years for example) and comparing that return to the return the investor would have got by investing in competitors, the market in general, or some other appropriate investment comparison. When performing the analysis, it is appropriate to look at the return comparisons over more than just one time period as that could be misleading and damaging to our credibility. Also, be sure to take into account dividends and any extraordinary payouts or stock splits to investors in addition to the movement of the stock's price.

11. Pro Forma Analysis

This type of analysis can be extremely powerful in discussing with a business where his organization is headed. Pro Forma Analysis is a projection of financial statements (income statement, balance sheet, and cash flow) for some period into the future, typically 3-5 years, but it can be as short as 1 year or as long as 10 years. The first pro forma done (if not already done by the business in the form of a long range plan or even the annual budget) should represent how the business organization is projecting its future. Ideally, the assumptions used to generate that projection will also be available. One of the first checks that we want to do is for the validity of those assumptions and the projections sensitivity to any that might be questionable.

The next pro forma statements should show what the situation will be if no changes are made from current operating conditions and existing trends continue. This is where the power of the tool is often visible as businesses often have not taken the time to determine where their current track will take them. Again, it is important to understand the assumptions inherent in the projections that are being presented, as this is the most likely spot for a manager to become defensive and start to question your logic and assumptions.

After this point, the utilization of this tool is best done in running "what if" scenarios. This can be useful in demonstrating the magnitude of change required to reach profit goals for example, or useful in demonstrating the impact of an action planned by the business.

12. Variance Analysis

This type of analysis is usually utilized for manufacturing operations which employ a standard costing system. The variances being referred to are the deviations in cost between actual costs incurred and the costs that the standards indicate should be incurred to produce that set of products. Variances can be broken down into three basic types, material, labor, and factory overhead. Each of these types of variances can be broken down into further into variances associated with specific types. Material variances typically fall into four groups; price, quantity, mix, and yield. Labor variances fall into two groups; rate and efficiency. Factory overhead variances fall into two groups, although these can be broken down further; controllable and volume.

As mentioned, these variances fall out of a standard costing system. If you feel uncomfortable with this type of accounting system, any cost accounting text can provide a complete framework for understanding and working with this type of system.

Variance analysis is not a tool for giving a complete picture of the cost structure of an organization, or for identifying where the greatest pools of cost and potential benefits are, but rather a tool to measure the variations from expectations (standards) whether it is favorable or unfavorable. A significant difference between standard and actual can imply a problem in either of the numbers being compared, standard or actual. In fact, consistent variances of the above groups could point to the standards being more in question than the actual results. It should also be noted that if the standards are significantly out of whack, you should look into the organization's pricing mechanism, as it may be based on bad standard cost information.

Variance analysis can serve to point us to a particular process or product that needs further attention (i.e. low yield could indicate a manufacturing process or raw material quality problem, a high purchase price variance could indicate a problem in purchasing, materials management, or a changing raw materials market) or to trends that could be developing.

Below are listed the major variances that you might find in various accounting systems, a definition, and how it is calculated.

Material Variances

Price - Usually referred to as a purchase price variance, it is the difference in the standard unit cost of a raw material or component and the price actually paid times the number of units purchased. On a monthly statement or report, it is the sum of all the variances of individual parts purchased during the reporting period. Typically, standard costs include inbound freight, although not always. Calculation:

$$\text{Std. Cost} = \text{Act Qty Purch} \times \text{Std. Price/unit} = 5000 \times \$0.50$$

$$\text{Act. Cost} = \text{Act Qty Purch} \times \text{Act. Price/unit} = 5000 \times \$0.47$$

$$\text{Purchase Price Variance (PPV)} = 5000 \times \$0.03 = \$150 \text{ favorable}$$

Quantity - Also referred to as a usage variance, it is the difference between the standard amount of components or raw materials needed to make a certain amount of a finished product and the amount actually used. Usually standards are set around an economical lot or batch size that is optimal to run given the facilities existing operating conditions. Calculation:

$$\text{Actual Qty Used} = 2050 \text{ pcs.} \times \$1.00 \text{ std. unit cost} = \$2050$$

$$\text{Std Qty Allowed} = 2000 \text{ pcs.} \times \$1.00 \text{ std. unit cost} = \$2000$$

$$\text{Material Quantity Variance} = 50 \text{ pcs.} \times \$1.00 = \$50 \text{ unfavorable}$$

Mix - This variance is the difference between the cost of combining raw materials in the ratios dictated by the standard formula and the ratios actually used. Calculation:

| | | |
|----------|--------------|-----------------------------|
| Standard | Ingredient A | 10,000 lbs @ \$.40 = \$4000 |
| | Ingredient B | 5,000 lbs @ \$.25 = \$1250 |
| | Ingredient C | 2,000 lbs @ \$.50 = \$1000 |
| | Total | 17,000 lbs \$6250 |
| Actual | Ingredient A | 9,000 lbs @ \$.40 = \$3600 |
| | Ingredient B | 6,000 lbs @ \$.25 = \$1500 |
| | Ingredient C | 2,100 lbs @ \$.50 = \$1050 |
| | Total | 17,100 lbs \$6150 |

$$\text{Mix Variance} = \$100 \text{ Favorable}$$

Yield - This variance is the difference between the final amount of product produced and the amount expected (standard) based on the input. It is also referred to as a scrap or damage variance. Calculation:

$$\text{Standard} = 100 \text{ units input} \times 95\% \text{ std yield} = 95 \text{ units} @ \$2.00$$

$$\text{Actual} = 100 \text{ units input} \times 87\% \text{ act yield} = 87 \text{ units} @ \$2.00$$

$$\text{Yield Variance} = 8 \text{ units} \times \$2.00 \text{ std cost} = \$16 \text{ unfavorable}$$

Labor Variances

Rate - This variance is the difference between the standard or budgeted wage rate and the actual rate paid to employees. Because actual wage rates are generally planned and budgeted at the same time standards are set for the year, or wages are set by contract, these variances are typically small, but represent the sum of the differences between each individual's wage rate and the standard for the department, area, or organization. Calculation:

$$\begin{aligned}\text{Std} &= 2000 \text{ act hrs worked} \times \$7.50 \text{ std wage rate} = \$15,000 \\ \text{Act} &= 1500 \text{ act hrs worked} \times \$7.25 \text{ act wage rate} = \$10,875 \\ &= 500 \text{ act hrs worked} \times \$8.00 \text{ act wage rate} = \$ 4000 \\ \textbf{Rate Variance} &= 15,000 - (10,875 + 4000) = \$125 \text{ Favorable}\end{aligned}$$

Efficiency - This variance represents the difference between the standard number of hours it should take to produce a certain amount of product and the amount of time it actually required, both costed at the standard labor rate. A second variance, which can be included here but is usually reported separately due to timing issues and reporting clarity, is rework labor. Calculation:

$$\begin{aligned}\text{Standard} &= 2.5 \text{ std hrs/unit} \times 500 \text{ units} = 1250 \text{ hrs allowed} \\ \text{Actual} &= 500 \text{ units} = 1150 \text{ hrs actual} \\ \textbf{Efficiency Variance} &= 100 \text{ hours} \times \$7.50 \text{ std wage rate} = \$750 \text{ Fad}\end{aligned}$$

Factory Overhead Variances

Overhead Variances are due to two major causes. The first is a variation in spending that is not attributable to changes in volume. The second is due to the volume in production running above or below budget, causing a variation in spending.

In the sample calculations shown below, the budget was as follows:

Fixed expenses of \$96,000, or \$8000/month
Variable expenses of \$90,000 or \$7500/month
Product volume of 2500 units/month
The standard hourly overhead rate was \$6.20
(\$3.20 fixed OH and \$3.00 variable OH)

In January, actual standard hours earned were only 2000 hours and actual expenses were \$15,675.

Therefore, the total overhead variance for January is as follows:

| | |
|--------------------------------|-----------------------|
| Actual overhead | = \$15,675 |
| Overhead charged to production | |
| 2000 hrs earned x \$6.20/hr | = \$12,400 |
| Total Overhead Variance | = \$ 3275 Unfavorable |

Controllable Variance - Sometimes referred to as a spending variance, this is the difference between actual expenses incurred and the budget allowance based on the standard hours earned (or allowed) for the products produced. Calculation:

| | |
|---|----------------------|
| Actual Factory Overhead | = \$15,675 |
| Standard = Budgeted Fixed Exp | = \$8000 |
| Earned Variance Exp = 2000 hrs x \$3.00 | = \$6000 |
| Total Allowed Overhead | = \$14,000 |
| Controllable Variance | = \$1675 Unfavorable |

Volume Variance - This is the difference in overhead due to processing volumes higher or lower than budgeted. It is actually the difference between the variable budget based on the actual production volume and the overhead dollars earned (or absorbed) for that volume. This is sometimes referred to as over or under absorption in an absorption cost accounting system. Calculation:

| | |
|--|----------------------|
| Overhead charged to production (earned) | |
| = 2000 std hrs x \$6.20/hr | = \$12,400 |
| Variable Budget Allowed | |
| = \$8000 fixed expense + (2000 x \$3.00/hr variance exp) | = \$14,000 |
| Volume Variance | = \$1600 Unfavorable |

13. Breakeven Analysis

This is a relatively easy calculation based on a few assumptions to determine at what sales volume a company or organization will breakeven (make no profit or loss). This can be useful in at least two types of analysis. First, using it in combination with a trend analysis to determine how the breakeven point has moved over some period of time. This is often particularly useful; when dealing with executives who believe that the solution to all their problems is to grow out of it by increasing sales volumes. By demonstrating the dynamics of the breakeven point, it is often possible to open the manager's eyes to other possible or necessary solutions to his profitability concerns. Secondly, it can be useful in showing the leverage that can be obtained by making changes in the organization's cost structure. Typically, this would be in the area of reducing fixed costs.

To derive the breakeven point, you need the following information for an organization for a given period:

1. Fixed Costs (FC) - in total dollars
2. Variable Costs (VC) - as a % of sales

Then the calculation of the breakeven point for that period is:

$$\begin{aligned}\text{Breakeven Point} &= \text{Fixed costs} + \text{Total Variable Costs} \\ &= \text{FC} / (1 - \text{VC})\end{aligned}$$

Example: XYZ Company had \$20,000,000 in fixed costs for the year. Its variable costs were 60% of sales. Then the breakeven point would be:

$$\text{B.E.} = \$20,000,000 / (1 - .60) = \$50,000,000 \text{ in sales revenue}$$

It can often be difficult to get precise information about the split of fixed and variable costs. If this is a problem, then by working with an income statement and an organization expense schedule (usually budget reports), pick out your fixed cost components from the expense sheets, subtract it from the income statement expenses, and calculate the variable cost percentage. If you do this consistently, and keep track of assumptions, the results should be accurate if not precise, and reasonable to test with your contacts in the financial organization.

It is also possible and sometimes very useful to represent the breakeven point graphically, showing the fixed expenses, a line representing variable expenses moving with unit volume on top of the fixed expenses, and then a line representing the sales dollars also moving with the unit sales volume. This can clearly demonstrate the leverage volume does or doesn't play in helping a business reach their profitability targets.

Breakeven analysis is useful in understanding relationships between volumes, prices, and costs and therefore helpful in evaluating pricing and cost control decisions, and decisions about increasing or decreasing capacity. However, due to assumptions made in the calculation, it does have some limitations. The main assumptions are (1) a constant sales mix, (2) consistent sales prices for any incremental sales, (3) constant variable cost percentages as volumes change, and (4) no change in the fixed cost base no matter how large a volume change is projected. In reality, the greater the change from the existing situation, the more likely each of the above items are to change also. So use this type of analysis with caution, understanding the assumptions, and as one of a series of analytical tools to build your case.

14. Supply & Value Chain Analysis

This type of analysis is actually more than just a financial analysis technique and typically will require the input of all team members to build a complete understanding. It could just as easily be listed as a technique within a strategy analysis tool kit. The concept of Value Chain Analysis was first put forward by Michael Porter in his book “Competitive Advantage: Creating and Sustaining Superior Performance.” For someone wanting to gain additional insight into this methodology, it's recommended that you obtain a copy of this book.

The technique is used for understanding and analyzing business units based on the way they perform key functions and where they truly add value in the process. It also can provide a way to look for competitive advantages through the comparison of the operations of competitors.

The basic methodology is to apply it to individual business units competing in a specific industry. It should not be applied to industries as a whole or to a company that is competing in several industries. The first step is to identify value-adding activities. These are activities generally falling into the following categories: Inbound logistics, operations, outbound logistics, marketing and sales, and service. These activities can be further broken down into three types; direct activities which are those that clearly add value, indirect activities are those activities necessary to perform direct activities (such as servicing production equipment), and quality assurance activities that assure the other activities are done properly. The second step is to identify support activities. These activities generally fall into the following four categories: procurement, technology development, human resource management, and firm infrastructure. The third step is to identify linkages in the value chain and then to finally identify sources of competitive advantage in the value chain.

As supply and value chain analysis has been applied within United Research, we have endeavored to conceptually depict the value chain flow in the manner of a brown paper flow. We have then sought to identify the associated demographics with each value-adding or support activity. These demographics include facts such as size of staff, expense budget, sales, volume of transactions or units handled, number of customers, number of suppliers, concentration of customers, etc.. Then as we go through the analysis process, we try to associate each of our findings from all analysis studies with specific segments of the value chain. In this way, we can obtain a greater understanding of how our business's business works, where they truly add value, and where they are reducing the economic value of their product. If it is possible, we should also attempt to identify the value of the product as the business takes it through each stage of the value chain to determine whether the organization should be involved in each step of the value chain.

This technique is relatively new in our analysis process, and as we utilize it further we should capture lessons learned that can be added to this discussion.

15. Innovative Analysis

We have attempted in this section of the manual to provide you with some of the basic tools and techniques that are available to you. These methods certainly are not an exhaustive list. Situations are going to occur where none of these techniques adequately describe the business situation or bring the team to the level of understanding necessary to adequately lay out a project approach to bring the business to a world class competitive level. In those situations, it is necessary to get 'out of the box' and develop the appropriate diagnostic to properly understand the issues. The R&D Conversion Rate methodology was created for such a case. Unfortunately, without knowing a given situation in advance, we can't provide you with any magic formula. The best advice we can give is to be creative, tap into the creative capabilities of your teammates and the other resources with financial capabilities around the company. Good Luck!

16. Other Methods of Analysis

The methods discussed in the previous sections of this manual represent some of the more basic tools available to us as well as some of the techniques that are becoming more common in analysis. These methods certainly don't represent all the possible ways to evaluate an organization on the basis of its financial performance, nor is it intended to limit anyone from utilizing other available methods or from devising their own techniques. Hopefully, this section has provided you with the basic tools and techniques to get you through most of the analytical requirements that you will face.

Listed below are some additional techniques available to you and a brief description of their application. A more detailed description of each of these techniques is available in "The Vest-Pocket CEO," compiled by Alexander Hiam.

Altman's Z-Score Failure Forecast: Utilized to predict the likelihood of bankruptcy in manufacturing companies up to two years in advance. Measuring an organization's financial health from balance sheet and income statement information.

Arthur Young Sustainable Growth Analysis: Utilized to understand and model the impact of changes in financial and operating strategies and variables on the organization's sustainable growth rate. Also useful in determining if an organization's plans for future growth are reasonable.

Bank of America's Nine Warning Signals: Useful in identifying businesses that are suffering from financial or other business problems. Also useful in evaluating primary suppliers or customers if a business is heavily dependent on another company.

Ellsworth's Financial Policy Analysis: Utilized in the evaluation of the alignment of financial policies with current strategies and objectives of an organization.

Ernst Growth/Liquidity Analysis: Useful in several ways, first in providing a clearer picture of trends in liquidity and investments in growth-producing assets. Also useful in managing cash flow during periods of high growth and investment, estimating sustainable growth rates and external financing needs, and in developing strategies based on the growth and liquidity position of an organization and its competitors.

Holt/CMA Q Ratio: This measure can be used to track financial performance of a company from a shareholder's perspective. Also useful in analyzing business units within a company and their contribution to overall shareholder value.

Marakon Profitability Matrix: Utilized for preparing an audit of future profitability for evaluating strategic plans and projections of business units, evaluating the potential future contribution to or drain on a company's financial resources and performance by a business unit, and analyzing cash-flow positions of a unit based on its current strategy.

The V Matrix: Another methodology to evaluate shareholder value contribution. Measures corporate performance by comparing earning power to cost of capital to evaluate the returns provided to shareholders by the company. Evaluates the success of strategies by comparing financial performance of different companies.

SECTION SEVEN

Specific Industry Measures

Listed below are financial and non-financial indicators/measures that have proven effective in the past for specific industry groups. The lists are not intended to be inclusive nor exclusive, but are provided as a starting point for determining the appropriate measures for your particular business situation.

Each indicator name is accompanied by a headline on the indicator's definition, significance, and/or application.

Financial measures that are typically common to all businesses and industries were addressed in the Ratio Analysis segment of Section Six. What follows below tend to be more specific industry-related measures.

Aerospace/Defense

- **Overhead rate** – This measure plays a critical role in the cost competitiveness of bids made. Tracked over time it gives a picture of the relative cost structure of the contractor as it relates to direct labor. Unfortunately, it is a measure too heavily relied on as direct labor costs become a smaller and smaller part of the cost structure of most products.
- **Burn rate** – the rate per week (or month) the dollars are being spent to execute/fulfill a contract. This indicator is helpful in projecting cost to completion and potential overruns.
- **Program Win Ratio** – a measure of expended dollars and efforts on appropriate targets and a measure of how competitive the company is.

$$= \frac{\text{Number of Successful Bids}}{\text{Number of Bids Made}}$$

- **Number and Costs of Internal R&D Projects** – This is an indicator of the company's commitment to develop technical superiority and differentiation.
- **\$ Amount of Customer Funded Research** – an indicator of customer interest in R&D efforts as well as the firm's ability to attract funding to improve its technical competency.
- **Number of Profitable Bids** – reflects the ability of the company to predict its costs and manage its projects.
- **Delivery of Products On-Time, Within Budget, and Within Specification** – can be measured as a percent of products delivered. These are quality and profitability measures.
- **Subcontracts Delivered On-Time, Within Budget, and Within Specification** – reflects the company's ability to manage subcontractors.
- **Amount of Follow-on Contract \$ Generated** – indicates the ability to maintain superiority within a contract area and creativity to identify and market additional product.
- **Award Fees** – critical measure of ability to generate future revenue.
- **Proposal Production Time/Costs** – indicates the ability to respond to RFQs in an efficient manner.

Oil & Gas

- **Funds Flow from Operations** – this indicator is arguably one of the most important, as it directly links to shareholder value and profitable growth. It is drawn directly from the financial statements.
- **Funds Flow After Capital Expenditures (CapEx)** – a proxy for a one year "net cash flow" for the entire company.

$$= \text{Funds Flow from Operations} - \text{Capital and Exploration Expenditures}$$

- **Return on Equity (ROE)** – designed to balance out the funds flow based indicators with an earnings based indicator. This balance is important because investors in the mining industry tend to focus on earnings whereas Oil & Gas investors prefer cash flow.
- **Total Net G&A** – total net general and administrative expenses are measured after charge-outs to partners: consequently, focusing attention on the total overhead costs of doing business. (However, for analytical efforts focusing on where costs may be reduced, the total amount of spending incurred by the business should be examined.)
- **Return on Liquid Assets - Cost of Capital** – the return on assets less the cost of funds is a measure of the profit of the treasury operations. Both elements should be measured on an after tax basis. Return on liquid assets is the rate of return on funds invested by the treasury group. Cost of capital is the weighted average of debt and equity costs, as measured by the Capital asset Pricing Model (CAPM).
- **Tax Ratios** – the first ratio reflects the firm's ability to defer tax liabilities and the second its ability to avoid taxes.

$$\frac{\text{Current Taxes} / \text{Total Taxes}}{\text{Total Taxes} / \text{Pre-tax income}}$$

- **Additional Sales Volume** (Shared by Exploration, Operations and Marketing) – measures and focuses on the overall efficiency of finding, developing, tie-in and marketing of products. It is defined as an incremental production from all wells excluding those classified as proven producing at the beginning of the year.
- **Finding and Development Costs** (Shared by Exploration and Operations) – key indicator used to assess past performance and is defined by the following equation (in \$/BOE):

$$= \frac{\text{Exploration Direct \& Indirect Costs} + \text{Development CapEx}}{\text{Net Proven Discoveries} + \text{Extensions} + \text{Revisions} + \text{Improved Recovery}}$$

- **Exploratory Finding Costs** (Exploration) – key exploration measure focuses on reserve additions. It is defined as (in \$/BOE):

$$= \frac{\text{Exploration CapEx and G \& A} + \text{Development Land and G \& A}}{\text{Proven Exploration Discoveries} + \text{Development Extensions}}$$

- **Exploration Reserves Added** (Exploration) – measures the exploration discoveries for a period of time. Uses Proven and Probable as defined by the Reserves Group in the company.
- **Lifting Costs** (Operations) – measures the efficiency of production operations (Net \$/BOE Produced). It includes all net expenses after recoveries, but not G&A.
- **Net G&A / Net BOE Produced** (Operations) – measures overall efficiency in terms of BOE produced.
- **Net G&A / BOE Discovered** (Exploration) – a measure of internal efficiency. It is defined as net total G&A expenses, after recoveries, per BOE discovered using proven and probable discoveries only.
- **Sales Volume** (Shared by Operations and Marketing) – measures the net oil and gas sales volume from both company and non-company operated production.
- **Liquid Hydrocarbon Sales Price** (Marketing) – defined as the hydrocarbon sales price and, when compared to the industry average, provides a measure of marketing effectiveness.

General Manufacturing

- **Inventory Turns** – Defined in Section Five under Ratio Analysis. It compares materials usage relative to materials on hand. A low number indicates an excessive amount of capital tied up in inventory and high carrying costs.
- **Inventory Carrying Cost (Dollars)** – measures the actual cost of carrying the inventory including the cost of money, storage, administration, handling, obsolescence, etc.

$$= \text{Average Inventory} \times \text{Carrying Cost \%}$$

- **Margin** – indicators of the efficiency of the business and the profitability of the marketplace. Can be trended as actual dollars or measured as a percent of sales. Should be applied to each individual business unit as well as the organization as a whole.

$$\text{Profit Margin} = \text{Revenue} - \text{Total Costs}$$

$$\text{Gross Margin} = \text{Revenue} - \text{Cost of Sales}$$

$$\text{Contribution} = \text{Revenue} - \text{Variable Costs}$$

- **Cost of Quality** – This was defined in Section Six under Trend Analysis. As quality is becoming more and more a banner in American Industry and management has adopted TQM or TQC or similar operating philosophies, this measure will become increasingly important. Each company may have their own variation on the actual calculation of this number, and if they are calculating it already, then we should utilize their definition as long as it includes all the main costs of quality outlined in Section Five. If the business has not measured this cost in the past, then the definition outlined in Section Five should be used as a way of determining the need for the implementation of this operating philosophy.
- **Scrap, Yield Loss** – Defined both in terms of dollars and as a percent of production. This area often has high potential for improvement if the manufacturing and support processes are not under control.
- **Rework** – Defined in dollars and as a percent of direct labor hours. It is part of the cost of quality that should be targeted for elimination through TQC or TQM efforts.
- **Controllable and Non-Controllable Costs** – refers to the ability of the organization to influence their level. Cost reductions, in the short term, typically come from the controllable costs. Examples of non-controllable items are things such as depreciation, property taxes, insurance, and corporate allocations.
- **Throughput** – measured as the number of units of product produced per hour (or other appropriate period of time). It relates to the efficiency of resources employed.
- **Machine Utilization** – a measure of efficient use of equipment. The denominator represents the time the machine should be available for use, however, actual run time is affected by set-up time, machine breakdowns, maintenance, material and labor availability. Sometimes planned maintenance is subtracted from the total time available.

$$= \frac{\text{Machine Run Time}}{\text{Total Time Available}}$$

- **Capacity Utilization (%)** – A measure of the output of a plant or line as opposed to an individual piece of equipment. A lot of companies have established their own definition of this measure to eliminate actual causes of underutilization of capacity. Take a careful look at a business company's definition of capacity utilization, if they already have one, as it can contain paradigms that can cause erroneous beliefs about what can be done with existing facilities.

$$= \frac{\text{Actual Output of the Process}}{\text{Theoretical Output if Ran all Available Time}}$$

- **Overhead Burden** – the costs associated with production other than direct labor and direct materials. Typically these include both variable and fixed costs. If the costs are allocated to individual products in direct relationship to direct labor and are a significantly larger cost component than the direct labor is, then it would call the cost accounting methodology into question. It is also useful to understand the breakout of the cost structure to focus cost reduction efforts and to compare against others in the business if that data is available. Finally, this is a valuable piece to trend over time to determine which cost elements are showing the most growth.
- **Cost/Employee** – defined as the total cost for an employee, it includes salaries, wages, benefits, overtime, payroll taxes, etc. It is an indicator used to determine the cost impact of marginal changes in the number of employees. If possible, it is useful to breakdown the number between various categories of employees, such as salaried and hourly, particularly where the average cost may be significantly different.
- **Overtime** – can be defined in both dollar terms (as the premium paid) and in overtime hours as a percent of regular or total hours. Can be an indicator of out-of-balance staffing levels, planning or scheduling problems, or poor processes and systems.
- **On-Time-Delivery** – a measure of quality and customer satisfaction. It also relates to inventory levels and can have cash flow implications. This is also a measure that companies typically set their own definitions around and the measurement can be very misleading depending on the rules in place. Issues such as early shipments, partial shipments, rejected shipments, etc. all have to be dealt with in understanding the true on time delivery picture.

$$= \frac{\text{\$ (or units, shipments) Delivered to Customers On Time}}{\text{Total \$ (or units, shipments) Shipped}}$$

- **Manufacturing Cycle Time** – a measure of the average time a product takes to be produced from the time it is released to the manufacturing floor to the time it is ready for shipment. A shorter cycle time can allow for reduced WIP and Finished Goods inventories and provide quicker response to customers needs.
- **Lead Time** – the time a company requires between receipt of an order and when they can ship the product to the customer. It includes order processing time, material procurement and scheduling time, the manufacturing cycle time and delivery time. Once again, the shorter the lead time, the more responsive a company can be to it's customers and have an increased probability of receiving additional orders.
- **Market Share, Share per Territory or Region** – indicators reflect the company's competitive position and its sales and marketing effectiveness in total and in specific markets.
- **Revenue Productivity** – measures of the ability of the organization to generate revenue

Revenue/Employee
Revenue/Salesperson
Revenue/Territory

- **Customer Satisfaction** – indicators of quality and customer satisfaction
Customer Complaints/Unit
Warranty Expense/Unit
- **Resource Effectiveness** – measures of the level of resources utilized in different parts of the value chain.

Sales Cost/Unit
Distribution Costs/Unit
Production Costs/Unit

Telecommunications

- **Revenue Mix** – revenue is broken down between local calls, toll calls, access calls, and others. This is used to compare relative contribution of different segments of the business.
- **Employees/5000 Access Lines** (or per 10,000) – a measure of the efficient use of human resources.
- **Access Line Ratios** – average “performance” of an access line compared to various categories of other aggregate performance measures on a per-line basis; divide the corresponding aggregate measure by the total number of access lines supported. Would want to trend over time and compare to industry averages if available.

Total Revenue

Local Call Revenue

Access Revenue

Toll Call Revenue

Other Revenue

Total Expenses (resources necessary to operate, maintain, and service)

Property, Plant, and Equipment (net book value of infrastructure to support)

Net Operating Income (a measure of profitability)

Depreciation Expense

Depreciation Reserve

Maintenance Expense

- **Depreciation Reserve / Total Plant & Equipment Investment (%)** – measure of depreciation relative to total expenses.
- **Maintenance Expense / Revenue (%)** – an indicator of the cost of doing business and relative health of the infrastructure. Trend over time and compare to industry averages if available.
- **Maintenance Expense / Total Plant & Equipment Investment (%)** – an indicator of the cost of doing business and relative health of the infrastructure. Trend over time and compare to industry averages if available.
- **Time Taken to Fill a Service Order** – measure of responsiveness to customers and resulting customer satisfaction.
- **Trouble Reports/100 Lines** – an indicator of quality of service.

Utilities

- **Dividends** (Dividend Yield) – Dividend payouts and the stability of the payout greatly effect the performance of a utilities stock as its investors typically hold the stock for current income. Dividend Yield is the dividend as a percent of the stock price.
- **Return on Assets** – an accounting measure important in this industry, as utilities typically have very large asset bases; a measure of how efficiently those assets are being used.
- **Total Cost / Unit** – an important indicator as price per unit is usually regulated and therefore profit can only be improved through managing and reducing costs per unit.
- **Days Accounts Receivable** – a measure of how effectively the cash flow is being managed.
- **Accounts Receivable on 30/60 Days Arrears Status** (\$ and % of Total) – measures for managing potentially delinquent and bad accounts.
- **Number of Vehicles/Employee** (or per Customer) – vehicles used are very expensive and represent a significant investment in assets, these indicators can provide insight into fleet utilization, particularly when compared to others in the industry.
- **Overtime Hours / Regular Hours** – a significant portion of overtime hours can be controlled, although some is necessary for emergencies and storm days, etc.
- **Inventory Levels, Turns, and Accuracy** – all are measures of the ability to effectively manage inventory costs.
- **Number of Customer Calls** – measures related to customer satisfaction and quality of work
$$\frac{\text{per Customer per Year}}{\text{Total Number of Calls per Month (or per Year)}}$$
- **Revenue per Employee** – demonstrates how workforce growth is being managed with respect to revenue.
- **Power Outage Hours** – of customer service, satisfaction and quality of work and equipment.
$$\frac{\text{Power Outage Hours Weighted By Number of Customers Affected}}{\text{Power Outage in Terms of Lost Revenue}}$$
- **Capacity Utilization (%)** – measure of capacity in use to capacity available. It is a measure of future capacity expansion needs when compared with demand forecasts.

Insurance

- **Expense Ratio** (% Expense to Premiums Written) – a measure of the efficiency of underwriting

$$= \frac{\text{Underwriting Expenses} + \text{Commissions} + \text{G \& A costs}}{\text{Net Written Premiums (NWP)}}$$

Net Written Premiums = Direct + Assumed - Ceded and Direct = Total premium dollars
Assumed = Premiums received from other carriers for reinsurance
Ceded = Premiums give to others for reinsurance

- **Loss Ratio** (% Losses to Premiums Earned) – measure of the effectiveness of underwriting.

$$= \frac{\text{Losses} + \text{Loss Expenses}}{\text{Net Earned Premiums (NEP)}}$$

- **Loss Adjustment Ratio** – measures the efficiency of claims handling

$$= \frac{\text{Loss Adjustment Expenses}}{\text{Net Earned Premiums (NEP)}}$$

- **Combined Ratio** – The breakeven point is 100%. Therefore, a combined ratio of less than 100% represents an underwriting profit and one above 100% represents a loss. Note that the combined ratio may acceptably exceed 100% for certain lines, as losses are paid in future years relative to premiums and the resulting positive cashflow has economic value.

$$= \text{Loss Ratio} + \text{Expense Ratio}$$

- **Common Stock to Surplus** – a measure of the riskiness of the firm's portfolio

$$= \frac{\text{Market Value of Common Stock in Firm's Investment Portfolio}}{\text{Statutory Net Worth}}$$

- **Common Stock to Total Investments** – a measure of the riskiness of the firm's portfolio

$$= \frac{\text{Market Value of Common Stock in Firm's Investment Portfolio}}{\text{Reported Value of the Total Investment Portfolio}}$$

- **EPS Sensitivity to Change in the Loss Ratio** – the degree to which Earnings per Share (EPS) will be affected by a one percentage point change in the firm's loss ratio.
- **Insurance in Force** – the aggregate face value of all life insurance policies outstanding.
- **Investment Income** – dividends, interest, capital gains, and rents received on investments less the expenses related to the investments. See note on Combined Ratio.
- **Percent Investment Income to Total Investments** – a measure of how effectively the firm is investing its money when compared with the returns of competitors and the financial markets as a whole.

$$= \frac{\text{Investment Income - Associated Expenses}}{\text{Total Investments}}$$

- **Percent Price to Book Value** – measure of the firm's performance as viewed by the financial markets.

$$= \frac{\text{Average Price per Share for the Year}}{\text{Book Value per Share}}$$

- **Policyholder's Surplus** – the book value as determined by statutory accounting techniques. Statutory accounting, unlike GAAP, does not permit deferral of policy acquisition costs.

- **Premiums Written to Surplus**

$$= \frac{\text{Total Premiums Received for Policies Sold During the Year}}{\text{Statutory Net Worth}}$$

- **Premiums Earned** – Premiums are normally received in exchange for insurance protection that will remain in force for a year or more. Premiums accrue to revenues (i.e. are earned) only in proportion to the actual time elapsed under the policy relative to the total policy term.
- **Underwriting Margin** – may be positive indicating an underwriting profit or negative indicating an underwriting loss.

$$= 100\% - \text{Combined Ratio (for property/casualty underwriting)}$$

- **Underwriting Income per Share** – the statutory underwriting profit adjusted for the equity in the amount transferred to or from the unearned premium reserve divided by the number of common shares outstanding at the end of the year.
- **Number of Applications** – an indicator of the effectiveness of generating contract opportunities; also compared to applications on which quotes were submitted.
- **Quote Win Ratio** – an indicator of the effectiveness and competitiveness of the quotes

$$= \frac{\text{Number of Policies Written}}{\text{Number of Quotes Submitted}}$$

Banking

- **Deposits** – total time and demand deposits entrusted to the bank.
- **Earnings per Share** – net profit after taxes and before securities gains or losses, expressed on a per share basis.
- **Funds Borrowed** – Federal funds (free reserves borrowed from other banks), securities sold under repurchase agreements (repo's), commercial paper sold by bank holding companies and non-bank subsidiaries, and any other non-deposit sources of short-term funds.
- **Funds Sold** – Federal funds (free reserves lent to other banks), securities purchased under repurchase agreements, and any other short-term money market investments.
- **Net Profit** – income after taxes but before securities gains or losses.
- **Percent Earned Total Assets**

$$= \frac{\text{Net Profit}}{\text{Total Reported Assets}}$$

- **Spread** – difference between interest rates earned (on loans and other earning assets) and interest rates paid (on deposits and other liabilities that are sources of funds).
- **Total Assets** – total resources employed in the business, including amounts out on loan, long and short-term investments, cash due from other banks, items on deposit with the Federal Reserve and other banks, plus fixed assets.

Investment Companies

- **Annual Change Dow Jones Industrials** – annual change from year end to year end in the Dow Jones Industrial Average, expressed as a percent. Used as the basis for comparison.
- **Annual Change in Net Asset Value** – change in percentage terms of the net asset value per share at the end of any given year from the preceding year end, adjusted for any capital gains distributions.
- **Asset Value per Share** (year-end) – total common equity at year end, with securities valued at market rather than cost, divided by the number of shares outstanding at year end.
- **Assets Year-End** – total investment company assets including stock, bonds, government securities, and cash at year end.
- **Average Annual Dividend Yield** – the yield based on dividends from net investment income excluding capital gains distributions.
- **Capital Gains Paid per Share** – disbursements to stockholders out of gains realized on the sale of securities. The bulk of capital gains distributions normally is taxable to the recipient as a long-term capital gain in the year received.
- **Capital Gains Tax Liability per Share** – the unrealized appreciation multiplied by the tax rate (expressed as a decimal) for long-term capital gains and divided by the number of fund shares outstanding. This liability is one that would be incurred if the fund was liquidated. A negative per share indicates a potential offset to future capital gains liabilities.
- **Discount From or Premium Over Net Asset Value** – If the price exceeds Net Asset Value, the percentage of the excess or premium is shown with a plus sign

$$= \frac{\text{Net Asset Value} - \text{Market Price}}{\text{Net Asset Value}}$$

- **Expenses vs. Assets** – indicator of operating efficiency

$$= \frac{\text{Operating Expenses}}{\text{Investment Company Total Assets}}$$

- **Gross Portfolio Yield**

$$= \frac{\text{Gross Annual Income Before Expenses}}{\text{Total Assets}}$$

- **Income Dividends per Share** – dividends declared from net investment income on a per share basis.
- **\$100 Dow Jones Industrials Grew To** – the amount to which a \$100 investment (divided equally) in each of the 30 Dow Jones Industrial Stocks would have grown from year-end 1960 (or the year in which the company began operations). Used as a basis for comparison.

- **\$100 Net Assets Grew To** – the amount to which \$100 invested in the net assets of a closed end fund would have grown from year-end 1960 (or after first year of the company's operation), assuming all capital gains distributions had been reinvested in additional shares.
- **Percent Cash and Governments** – cash and value of government securities held as a percentage of total assets at year end.
- **Total Assets Managed** – all cash, securities, and other assets being administered by an investment management company.

SECTION EIGHT

Functional Measures

Financial Measures

Share Price
Earnings per Share
Cash Flow
Return On Equity (ROE)
Return to the Shareholder
Return on Investment (ROI)
Funds Flow from Operations
Funds Flow After CapEx
Total Net G&A
Controllable and Non-Controllable Costs
Dividends and Dividend Yield
Accounts Receivable Dollars
Days Accounts Receivable
Accounts Receivable Aging

Cost of Capital
Profitability Ratios
 Profit Margin
 Total Assets Turnover Ratio
 Accounts Receivable Turnover Ratio
Short -Term Liquidity Ratios
 Current Ratio
 Quick or Acid Test Ratio
 Working Capital Turnover Ratio
Long-Term Liquidity Ratios
 Long-Term Debt Ratio
 Debt - Equity Ratio
Tax Ratios
 Current Taxes / Total Taxes
 Total Taxes / Pre-Tax Income

Operations - Productivity

Number of Employees
People Effectiveness Index
Revenue/ Employee
Overtime
Throughput
Machine Utilization
Capacity Utilization
Set-up Time vs. Run Time

Space Utilization
Lifting Costs (Oil & Gas)
Net G&A per Unit Produced
Manufacturing Cycle Time
Lead Time
Production Costs per Unit
Vehicles per Employee
Vehicles per Customer

Operations - Quality

Scrap as Percent of Output
Rejects as Percent of Total Volume
Rework
Errors
Warranty Costs
Returns
Cost of Quality
On-Time Delivery
Maintenance Expense
Maintenance Expense as % of Revenue

Customer Calls Relating to
 Service
 Trouble
 Returns
Time to fulfill a Service Order
Service Outage or Unavailability
 per Month
 per Customer
 per Region
Number of Accidents
Lost Time Accident Rates

Operations - Material

Inventory Turns
Inventory Levels
Inventory Carrying Costs
Obsolescence Expense
Inventory Accuracy
Inventory Adjustments
Shrinkage
On-Time Delivery

Incoming Quality Levels
Shortages to Production
Raw Material Costs
 - Purchase Price / Unit
 - Terms/Conditions
Freight Costs
Storage Costs

Operations - Yield

Scrap as Percent of Output
Yield
Rework
Errors

Engineering

Percent of Milestones On Time
Number of Days Slipped on Schedule
Cycle Time
Cost per Unit vs. Estimate or Target
Project Cost vs. Estimate or Target
Overhead Costs (Direct vs. Indirect)

Overtime (\$ or %)
Number of Engineering Changes (ECNs)
Percent of Engineering Changes (ECNs)
Percent of ECNs That Were Avoidable
Cost per ECN (All Areas)

Sales and Marketing

Sales Volumes (Units)
Sales Revenues
Revenue per Employee
Revenue per Salesperson
Revenue per Territory or Region
Lead Time
Market Share
Market Share per Territory or Region
Sales Costs per Unit
Marketing Costs per Unit
Distribution Costs per Unit
Contract Cancellation Costs
Sales Forecast Accuracy

Revenue Mix
Revenue Contribution per Product Line
Expense per Product Line
Number of Quotes or Bids
Quote Hit Ratio
Number of No Bids Submitted
Product Mix
Number of Calls per Week or per Salesperson
Complaints per Unit Sold
Warranty Cost per Unit Sold
Advertising/Promotion Expense per Revenue \$
Book - to - Bill Ratio
Backlog

Research and Development

Number of Internal R&D Projects
Cost of Internal R&D Projects
Dollar Amount (and %) of Customer Funded Research
Win Ratio
R&D Conversion Rate (See Section Five)
Percent of Revenues From New Products (Last 5 Years)
Number of Profitable Bids
Delivery of Products Within Cost Targets (%)
Delivery of Products On Schedule (%)
Delivery of Products Within Target Specifications(%)
Amount of Contract Follow-on Business Generated
Overhead Expenses and Rates
Burn Rate
Award Fees
Proposal Production Time and Costs

SECTION NINE

How to Select the Appropriate Tools and Approach

When starting a new analysis, it is often difficult to know where to begin, and with all the financial tools and techniques available and usually the preponderance of data generated by the business's financial systems, it can be very difficult to find your way through the swamp to arrive at the critical findings. It certainly is not desired or appropriate, nor is it feasible in the time constraints of an analysis, to attempt all of the diagnostics discussed in Section Four. At the same time, it is highly unlikely that just one or two tools will provide the insight needed. Therefore, with this in mind, the following generic approach is provided with the understanding that each analysis will have variations to it, sometimes in a major way.

The first thing to do upon arrival on the business site, in week zero if at all possible, is to meet with the top financial business to establish a relationship. Indicate that you'll be responsible for the financial part of the analysis and will want to work with him (her) as closely as possible to insure that you are not missing any critical facts and that your analysis is on target. This is the start to developing a relationship that will be critical when it is time to validate and present your findings and, ultimately, the business case for the proposed project. In this first discussion, be sure to identify someone you can work with in his organization that can provide you with all the information you will need as you go through the analysis. It is helpful to have a list of the kind of information you will want with you so that he can select the appropriate person. A sample list of suggested data requirements is provided in Section Twelve of this manual. The person that is identified as your key work with should have access to all the financial data and a knowledge of where to find it. This person should also have a good working knowledge of their financial systems and procedures, and be able to answer most of your questions about how they account for various things. Therefore, this person should not be someone new to their job or to the financial organization, nor should it be someone at a clerical or low level. This is the time to request all of your basic needs for financial data, such as income statements, balance sheets and cash flow statements if available, department expense reports and budgets.

After obtaining the basic information, you should spend the first few days doing a fundamental analysis of the financial statements as described in part 1 of Section Four. This should provide you with a basic understanding of the business's financial position, the major trends that are occurring, and a good idea of where the major pools of financial opportunity are located. At this point you should review your findings with the project manager as well as the rest of the analysis team to help determine what studies should be undertaken next. Also, during this period or week one of the analysis, your primary focus should be on the financial organization. These activities should take you into or through the first week of the analysis, depending on when you're able to start.

At this point is where each analysis will begin to look different. Which areas you look at in more detail and what tools and techniques you utilize will depend heavily on what you found during the first week. For example, if you found that costs were growing at a significantly faster rate than sales, then you would want to do an elemental decomposition to track down where the growth was occurring and you might want to also look at the breakdown of growth between mission and support costs. If you found that the ROI had been trending downward, then you would probably want to decompose the ROI equation and perhaps do a DuPont analysis. Each tool you select at this point should be with a specific purpose in mind, whether that purpose is to confirm a suspicion that you have formed from previous analysis, or to dig deeper into something that doesn't look right. The purpose during this period (about the second and third week of the analysis) is to get behind the obvious trends and gain true understanding of what is causing those trends or problems. To do this properly will also include asking your teammates to be on the watch for certain behaviors, procedures, policies, etc. in the various areas

they are studying to understand what actions may be causing the numbers that you are observing. If at any point in this process you are unsure of how to better understand a problem you have observed, be sure you tap into your teammates' knowledge or contact any of the individuals that have been identified as “expert” resources.

Early on in the analysis, you should also have a discussion with the project manager and other analysts about whether a value-chain analysis should be done. If it is desirable to build one, then the business/financial analyst should take a lead role in putting it together and gathering the data and input from the rest of the team to make it happen as early in the analysis as possible. It should continue to be developed throughout the analysis, but gaining early understanding is critical.

Section Ten talks about building the business case, but at this point in the analysis (end of week three) it should be becoming your principle activity. Earlier, you should have identified the major pools of opportunity from a cost reduction or avoidance standpoint, and during your in-depth analysis, been able to identify opportunities for revenue or profit enhancement. At the same time, your teammates should have been identifying opportunities as they went through their studies and brown papers and getting agreement from the businesses that they were working with about the size of the opportunity if we were to address that area. If everyone was focused on what the opportunities could be from the start of the analysis, then your job of building the business case becomes more of a discussion with the analysis management team about what the project will look like, what areas will be focused on, and how to best present the resulting impact of that project.

SECTION TEN

Developing the Business Case

Up to this point, we have focused on the financial analysis portion of an analysis, but part of what brings an analysis together and allows us to move forward into a major change effort and results delivery project, is the building of a project approach that is consistent with our findings through the analysis and is readily bought into and committed to by the business. To obtain this buy-in, the approach we present them with has to make sense to our top business and his management team, as well as any higher level authorizers, not just on an emotional or intuitive level, but from a rational, economic perspective as well. That is what the business case is designed to do, to appeal to the rational businessman and the bottom-line thinkers within the organization. Don't be fooled by statements that you may here during the analysis that may lead you and the team to believe that the project is already sold, that they don't need to see any financial justification, and effort in that area is not important. Hard lessons learned in the past indicate that a sound business case is almost always an important criteria in the final decision, no matter what the business has indicated to us along the way. The rule here is to always be prepared, and if it turns out to not be necessary, there is little lost and it serves to help the project team focus on the right opportunities when the project starts. Given that as a backdrop, let's talk briefly about an approach to developing the business case.

Once again, it is important to note that every project is somewhat different, and each business case developed needs to be tailored to the support of that project design and the concerns of the business organization. As each one is different, some business cases and benefits packages that have been successful in the past have been included in the appendix here to serve as guides in the development of your business case. As you scan through each of the examples, note that there is not one consistent pattern to the presentation, but each one addresses the critical issues of that engagement.

The business case obviously needs to address what the economic impact of the project will be, outlining the savings through cost reduction and/or cost avoidance, the potential increase in revenues or profits through changes in strategic or marketing processes and policies, as well as the intangible impacts to the organization of things such as improved communications and teamwork. Also included as appendices to this manual are lists of both tangible and intangible benefits that can be used as references. In developing the economic business case, be sure to carefully document all calculations, sources of data, and any assumptions you make in your preparations. It is often not necessary to present all the detail of your calculations, and in fact is usually desirable not to get into that much detail, but you should always have it available if a question should arise and it is also a useful tool for the results delivery team even if the business never has any questions.

SECTION ELEVEN

Some Do's and Don'ts

Here are some tips and helpful hints to serve as a guideline when performing a financial analysis during an analysis engagement.

DO

- Start as early as possible (ideally before the team arrives).
- Have a realistic estimate of the time and resources required.
- Dedicate at least one full-time consultant to the task.
- Establish relationships and make friends with key finance/accounting personnel early.
- Focus on information and data relevant to the business(es) and to the issues at hand.
- Know what specific information you need before making a request from a business owner (shotgun the first time to get the basics, rifle-shot from then on).
- Set clear expectations with business personnel when requesting information (what, how, when, who, etc.).
- Come up for air occasionally, i.e., step out of the detail once in a while to regain a broad perspective.
- Share ideas and solicit feedback from the project team leadership and other team members.
- Seek Project Manager guidance prior to bouncing ideas off business personnel.
- Be persistent on getting data when you require it.
- "Due diligence", i.e., understand all business assumptions, definitions, accounting rules, etc. where it makes sense.
- Check and recheck numbers, models, assumptions, etc. Credibility in any numbers presented is paramount.
- Document all key assumptions, yours and the business's (sometimes top executives and key managers do not understand the numbers their own people generate).
- Get buy-in on all assumptions.
- Maintain data/audit trail and back-up information.
- Document sources (contributor names, reports, outside sources).
- Use business-owned data as much as possible.
- Be creative; stretch business personnel as well as yourself, but know when to back-off on a new idea.
- Look for fresh perspectives.
- Make sure Project Manager understands the key messages from the financial analysis.
- Ensure the linkage between financial analysis, other analysis tasks, and the overall business case.
- Be flexible in the ways you look at and analyze data (be able to use different paradigms).
- Use the business's accounting language.
- Review findings/panel sets with key financial leaders after the Project Manager okays them.
- Look for what is behind the numbers; keep digging until you are satisfied.
- Make the financial analysis "bulletproof"
- Say it visually (graphs, charts, pictures, illustrations, words) for highest communication impact.

DON'T

- Underestimate the task at hand
- Wait to start
- Make too many assumptions or leaps in logic
- Chase numbers only and get buried in detail
- Rely solely on business's directions or input
- Work in a vacuum
- Overly "force fit" or "massage" business data (the rawer the better)
- Over commit on how you will share/feedback information to business personnel (data sources)
- Get distracted
- Follow opportunities outside the scope without Project Manager's direction
- Assume business's data and reporting systems are valid and reliable
- Assume business leaders know what you are talking about or presenting, but don't patronize
- Accept "no" for an answer (Do persist or find workarounds to get to the information the team needs to help the business)
- Be satisfied with the obvious observation. Determine what is behind and causing the observed results.

SECTION TWELVE

Initial Data Collection

1. Questionnaire is step one and should be directed to a senior level manager/controller who would have all the information or people working for him who would have it.
2. Goal from initial data is to:
 - a. determine principle cost drivers
 - b. highlight any prevalent trends
 - c. look for hidden trends - one level below the obvious
 - d. analyze ratios, indices (PEI,COQ, inventory turns, etc.)
 - e. analyze main ROI components

Financial Analysis Questionnaire

Data Requirements

1. Copy of current budgets/ operating plan
2. Copy of most recent long term/strategic plan
3. Current forecast of P&L for the current year
4. Copy of P&L statements for last 5 years
 - Includes: revenues, COS, variances, G&A, R&D, S&M, taxes, other charges
5. Breakout of cost structure for the last five years
 - Cost of Sales (COS) includes: direct labor, direct material, other direct costs, variable overhead, fixed overhead
 - Please list top 5 elements in each category and their % of the total for those periods
 - Please breakout variances under COS to include:
 - rework
 - other labor variances
 - scrap
 - material price
 - material usage
 - overhead variances
 - obsolescence/reserves
6. P&L breakout by product line if appropriate
7. Quality costs by quarter for last 3 years
 - Rework
 - Scrap
 - Quality department cost
 - Other quality related labor
 - Training costs
 - COS +/- change in WIP inventory
 - COQ = quality cost/ (COS +/- change in inventory)
8. Actual expenses vs. budget for last year by major function/department

9. Headcount
 - by major dept/group, last 3 years
 - breakdown between direct/indirect labor within groups
10. Actual annual cost per employee including benefits (exempt & non-exempt)
11. Balance sheet - current and last five years
12. Inventory trend - by month or quarter, last 2 years
 - total \$
 - weeks of inventory
 - obsolescence/excess
13. Accounts receivable
 - total \$ billed
 - any amounts not yet billed, and why
 - aging
14. Fixed assets
 - total \$ (gross & net)
 - direct amount vs. any allocated
15. PEI trend for last 3-5 years
 - (total revenues/total people costs)
16. What is historical trend (5 yrs) on overhead rates?

Definitions

Please define your terms and acronyms for clarification. Particularly tell us what cost items are included in various components.

Information

1. When are revenues recognized?
2. Is this the same time as billing occurs?
3. If not, please describe the difference.
4. Are there any concerns around data integrity?
5. What are the key financial criteria that managers are measured/rewarded against?
6. What control procedures are in place for expenses, direct materials, capital? Describe approval process and authorization limits.
7. What are the organizations financial goals?
8. What is the pricing mechanism? Who determines prices?
9. Describe your costing system
 - if working with standard costs, how are standards set? (both labor & material)
10. Is there any other information that you believe is appropriate to our understanding of the total financial picture

SECTION THIRTEEN

References

This section contains a list of reference materials that can prove very useful in the process of doing a financial analysis or in putting together a business case for the project approach resulting from an analysis. Contained here is a list of books that were of use in assembling this manual and may provide further information on particular tools, techniques or approaches than is provided here.

Reference Materials

- "Reading and Interpreting Financial Statements" - AMA, Bornaby
- "Finance and Accounting for Non-Financial Managers" - Keith & Keith
 - 6 tapes and a workbook
- "Financial Goals and Strategic Planning" - AMA
- "Analysis of Financial Statements" - Bernstein
- "Finance for the Non-Financial Manager" - Spiro
 - A simple explanation of financial concepts
- "How to Read a Financial Report" - Tracy
- "The Interpretation of Financial Statements" - Graham, McGolrick
- "Creating Shareholder Value" - Rappaport
 - Shareholder value analysis and applications
 - Measuring business performance
- "Financial Strategy" - Fruhan
 - "Studies in the creation, transfer and destruction of shareholder value"
- "Quantitative Methods for Financial Analysis" - Brown, Kritzman
 - Oriented towards valuation of assets, corporations and securities
- "Valuing a Business" - Pratt
 - "The Analysis and Appraisal of Closely Held Companies"
 - Ratio analysis, analyzing financial statements, and valuation of various securities
- "Cost Analysis and Control in Banks" - Cole
 - Specific orientation to the banking industry
- "Benchmarking" - Camp
 - "The search for industry best practices that lead to superior performance"
- "Beating the Competition" - Kaiser Associates
 - "A practical guide to benchmarking"
 - Process for benchmarking efforts, how to implement, and examples
 - Strategic, operational, and business management benchmarking
- "Understanding the Competition" - Kaiser Associates
 - "A practical guide to competitive analysis"
- "The Vest-Pocket CEO" - Hiam
 - A handy reference tool containing about 100 analysis tools, some of which are financial.
- "Managerial Finance" - Weston, Brigham The Dryden Press
 - Finance textbook
- "Cost Accounting" - Matz, Usry Southwestern Publishing Co.
 - Text on cost accounting, standard cost systems, and variance analysis
- "Accounting: The Language of Business" - Davidson, Stickney, Weil
 - Thomas Horton & Co.
 - A glossary of terms used in finance, accounting and business

APPENDIX I

Examples of Tangible Benefits

Quantifiable

Financial

- Inventory reduction
- Accounts receivable reduction
- Cost of money of asset reductions
- Overhead reductions
- Direct labor reductions
- Direct material reductions
- Revenue enhancements
- Profit improvements
- ROI improvements

Non-Financial

- Schedule reduction
- Manufacturing cycle time reduction
- Labor efficiencies
- Quality measures (yields, rejects, etc)
- Percent on-time delivery
- Direct labor/Indirect labor ratios

Non-Quantifiable

- Impacts resulting from secondary effects of direct efforts in one of the above areas (ex: direct labor reductions due to material process flow improvements)
- Any of the quantifiable measures that cannot obtain data for
- Potential revenue enhancements resulting from:
 - earlier introduction of product to market
 - increased market share, available market size
 - additional products in the marketplace
 - extended product life cycle
- Savings to future products and product lines

APPENDIX II

Examples of Intangible Benefits

- Improved customer satisfaction
- Improved employee morale
- Improved price leadership
- More effective management (enhanced skills)
- Enhanced market recognition
- Improved competitive position
- Clearer communications
- Design stabilization
- Revitalized teamwork
- Clearer roles & responsibilities
- Clearer accountabilities and authority levels
- Better management discipline
- Development of co-consultants skilled in:
 - project management
 - planning
 - implementation
 - team building
- Information available at critical times
- Improved organization structure
- " Change model" for migration
- Alignment of top management vision
- Heightened cost awareness
- Improved management control systems
- Effective problem management
- More effective cross-functional interfaces
- Better cultural integration
- Streamlined procedures
- Shared vision & commitment throughout organization

APPENDIX III

Opportunity Charting Overview

Objective:

To provide the Project team with an initial assessment of potential project benefits.

Process Steps:

Financial/Business Analyst assesses potential benefits of change opportunities identified through studies and document benefits on Opportunity Charting forms.

Project Analyst reviews all opportunities, eliminates duplications / overlaps, assesses level of confidence, and prepares summary of benefits.

Project Manager makes final determination of benefit #'s to be presented to business leadership and makes presentation.

Project Manager uses benefit numbers as basis for measuring project benefits.

Critical Success Factors:

- Thinking it through.
 - Think like the business owner thinks about his business
 - Ask the next question
 - Cost savings or revenue enhancement?
 - Who is impacted - Total Marketing? Lube & Comm.? Etc.?
 - Is benefit one-time? recurring? cyclical? volume related?
- Validation
 - Validation w/ business personnel whenever possible
 - Validate underlying assumptions, calculations, and logic
 - Use business-owned reports for data where possible
- Completion of Forms
 - Document what you know
 - Document what you don't know
 - Take the logic and calculations as far as is reasonable in the field