

HOW COSTLY IS EXPANSION?

Expansion : The Goal Of Most Businesses

It is axiomatic that businesses, both manufacturing and service, exist to make a profit. While businesses may project a short term decrease in profits for various reasons, the ultimate goal of any business is to increase its profits. Increased efficiencies and more complete understanding and control of costs can result in increased profits. But ultimately and intuitively management of most businesses believes that to "make more profit you have to make more product." Inevitably a business with this philosophy reaches the limits of its capacity and must consider expansion of that capacity.

Unfortunately that capacity is often measured purely in terms of production output for manufacturers, square footage for retailers, seating capacity for food businesses, or trucks for a transportation company, to provide only a few examples.

To evaluate the available resources for expansion and the related costs of expansion, the business must be analyzed as a complete entity. The theory of activity-based costing teaches that to understand the true cost of producing a product or service, **all** of the activities and processes associated with that product or service must be accounted for. Ultimately all of the costs of the business must be allocated among the products or services that it brings to market. Nowhere is this principle more critical than when a business is considering expansion.

For an expansion to take place three areas of consideration must be addressed:

FINANCIAL AVAILABILITY

Does the company have the equity required to finance the expansion? If not, can it finance the expansion through borrowing or investment? Is the cost associated with financing justified by projections. To answer this question, both *profits and cash flow* must be taken into account.

One of the most common mistakes made by new businesses and companies undergoing significant expansion is to underestimate the capital required. Too often only the additional cost of space, equipment, and direct labor are considered. But presumably increased accounts receivable and increased inventory will have to be financed. What impact will the expansion have on operating costs ?

Physical Requirements For Expansion

Are existing facilities and equipment adequate to support the planned expansion? If not, what will the cost of additional space and/or new equipment be? Related to these questions of physical capacity are other issues. Is skilled labor available? Is it feasible to add more shifts? If additional shifts can be added, it would seem that this would be the most cost-effective solution, but if **all** the associated activities and related costs are considered, it may not be. The cost of financing new equipment or additional space may compare favorably with the addition of a shift. What will be the additional maintenance cost and cost of useful life associated with doubling the use of the equipment if a new shift is added? How much capacity will lie idle during the second shift, when physical expansion might be planned to maximize utilization?

If the expansion involves new products or the increased production of existing ones, "make or buy" analysis may be required. Is it less expensive to buy some of the parts comprising the

product, rather than invest in the capacity to produce all of them? The application of activity-based costing to "make or buy" decisions is reviewed in more detail in another article in this issue.

The Cost And Capacity Of Human Resources

Does the business have the non-physical capacity to expand? Are supervisory personnel adequate (Perhaps they are for expansion in one shift, but not for the addition of a shift?)? Is the sales staff adequately staffed to generate the required additional sales? What about the capacity of Order Entry or Customer Service? Is purchasing adequately staffed to find new vendors and handle the new volume of purchases? Are there sufficient clerical staff to handle additional receipts and to collect delinquent accounts? What will be the cost of training new employees? Issues like these must be addressed for accurate projections of profit and cash flow from expansion.

The theories of activity based costing have been discussed in previous issues of the *Quarterly Report* and are beyond the scope of this article. However, to understand fully the present and required capacity of these functions, it is necessary to define the activities that comprise them and the related processes. One benefit of doing so, is that personnel time in underutilized (and therefore, overly costly) activities may be diverted to other required activities, a process which could provide the capacity for expansion *at no additional cost*.

One area of cost and capacity that is frequently ignored is Management itself. What will the incremental increases in the demands on management's time. If this aspect of expansion is ignored one of two things happen. Management is able to give inadequate attention to the expanded portion of the business, or worse, inadequate attention to both the traditional and expanded portions. Or new management level personnel will have to be hired, a requirement that may involve unplanned for cost.

ANALYZING WHEN IT IS APPROPRIATE TO EXPAND

There are many factors involved in the decision to expand, not all of which are purely financial. New technology may be required in order to remain competitive or to replace obsolete equipment. Competition may be so fierce that margins are small and the business needs the capacity to produce greater volume to remain profitable. A projected decrease in the demand for a product line may necessitate replacing it with a new line before sales of the old products decline appreciably. These and many other factors may influence the decision to expand.

However, there are some techniques for purely financial analysis that should accompany the decision to invest in expansion. These analyses are relatively technical and would require a separate article to do them justice. All of these approaches to the evaluation of a proposed investment require accurate projections of **both profitability and cash flow**. Marketing may project a large market and management may project high profits, once a certain level of sales are reached. The expansion looks attractive. But other factors may affect management's evaluation of the planned expansion. The simplest analysis involves "Annual Break Even."

Annual Break Even Analysis

ANNUAL MACHINE COST

(Assumes Capital Available to Purchase Equipment)

COST OF MACHINE	\$20,000
ANNUAL ECONOMIC DEPRECIATION RATE	10%
ANNUAL DEPRECIATION	\$2,000
TOTAL ANNUAL MACHINE COST	\$2,000

INCREMENTAL LABOR COSTS

LABOR COST (\$16/HR)	\$33,000
PAYROLL TAXES AND INSURANCE	
(Includes Health Insurance and Workers Compensation)	\$6,500
TOTAL INCREMENTAL LABOR COST	\$19,500

INCREMENTAL UTILITY AND SUPPLY COSTS

UTILITY COSTS	\$950
SHOP SUPPLIES AND SMALL TOOLS	\$1,560
TOTAL INCREMENTAL UTILITIES AND SUPPLY COSTS	\$2,150

TOTAL INCREMENTAL COSTS	\$44,010
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The example above illustrates the additional or incremental costs associated with a hypothetical expansion project. The project requires a new machine, which the company can purchase utilizing its own cash. Depreciation costs are based on actual fair market depreciation. The cost of the man hours to operate the new machine are also calculated as are the additional utility costs and some miscellaneous costs such as shop supplies and small tools. The total annual incremental cost is calculated at \$44,010. Management wants to determine what billable hours would be required to break even.

BILLABLE HOURS REQUIRED FOR BREAK EVEN

TOTAL INCREMENTAL COSTS	\$44,010
BILLING SHOP RATE	\$35/HR
NUMBER OF BILLABLE HOURS REQUIRED FOR BREAK EVEN	1,257

Having determined the number of billable hours required to break even, Management should consider whether it has the capacity to break even. Since one additional employee was

considered for the incremental labor costs, management must evaluate the capacity of that employee. A full time employee working a 40 hour week for 52 weeks has 2,080 available hours. From this available time, hours should be subtracted for: Vacations (14 days or 112 hours), Holidays (6 days or 48 hours), sick time (5 days or 40 hours), and non productive time for training and down time (14 days or 112 hours). Using these assumptions available time would be reduced by 312 hours to 1,768 hours, substantially more than the 1,257 hours required to break even.

If sales and marketing has determined that there is sufficient demand to produce the \$44,010 in sales, it would appear that the cost of the expansion is justified. However, the expanding company must also determine the cash flow requirements for the first year.

FIRST YEAR CASH FLOW BREAK EVEN

INCREMENTAL COSTS	44,010
DEPRECIATION (NOT A CASH EXPENSE)	-\$2,000
REDUCTION CASH REQUIREMENT (ALL EXPENSES AVERAGE 15 DAYS DEFERRED PAYMENT)	-\$1,726
EQUIPMENT FINANCING (5 YEARS AT 9%)	\$4,982
TOTAL CASH REQUIRED FIRST YEAR	\$45,266

This example, *unlike the initial example*, assumes that the Company was required to finance the equipment purchase. The cash requirement for this financing is \$4,982 per year. Obviously depreciation is not a cash expense. Also the example assumes that the company is able to defer paying its expenses on average for 15 days. Its cash expenses are \$42,010 (not including finance expenses) which divided by 365 days is an expense of \$115.10, which over a 15 day period reduces the company's cash requirement in the first year by \$1,726.

Cash flow break even is still within the capacity of one additional worker as illustrated in the table below.

FIRST YEAR CASH FLOW BREAK EVEN

CASH REQUIRED	\$45,266
ACCOUNTS RECEIVABLE (AGING 60 DAYS)	\$8,905
BILLING REQUIRED	\$54,171
BREAK EVEN AT \$35/HR	1,548 HRS.
AVAILABLE HOURS	1,768 HRS.

In this analysis cash must be reserved to finance accounts receivable of 60 days or 1/6 of the annual billings of \$54,171. Also the example assumes that there is no year end cost associated with inventory.

Using the example of the break even cash flow requirements, will the expansion be profitable in the first year?

PROFITABILITY WITH BREAK EVEN CASH FLOW

BILLING	\$54,171
INCREMENTAL COSTS	-\$44,010
INTEREST	-\$1,665
NET PROFIT	\$8,496

This simple analysis demonstrates the advisability of the proposed expansion. However, suppose that the new machine and new employee require supervision and no supervisors are available to provide it. To hire a supervisor with salary and benefits would cost the company \$47,000. Under this scenario all former analysis is dramatically changed. A single machine operating at normal capacity (1,750 hours @ \$35/hr) can generate only \$61,250. Incremental costs plus the cost of the supervisor are over \$81,000 even if the machine is not financed.

Each new machine has the capacity of generating \$15,575 of profit (\$61,250 minus the incremental cost of \$45,675). It would take three machines (assuming one operator is required for each) to generate enough margin to cover the additional cost of the supervisor.

But the analysis does not end there. The expanded costs require over \$180,000 in sales. Will the new market support this level of sales? Are there additional costs associated with this increased volume? More sales expense? More clerical expense for processing orders, accounts receivable, and accounts payable? Certainly there will be more pressure on cash flow associated with increased accounts receivable. The increased cost of the machines make the necessity of financing more likely.

Perhaps most important and most often ignored, can management continue to exercise control over the increased scale of operations? If the additional management responsibilities caused a loss of control that resulted in only 30 minutes per day per worker of reduced productivity, the effect would be significant. In the above example the average worker would lose 110.5 hours at \$35 per hour or \$3,855. On the three new machines this would amount to \$11,565. Assuming the management dilution also affected the rest of the business the impact could be very substantial.

This example is simplified, but illustrates the importance of considering all costs when a company contemplates expansion. There are many additional increasingly sophisticated analyses that can be made. Marketing analyses can project whether the required level of sales can be achieved and *the time period required to achieve this level of sales.*

The use of computerized accounting systems and spreadsheet software can provide the models required by activity based costing to help determine exactly how costly projected expansion may be, and therefore how profitable it can be.