

The design component of efficiency

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Justify investments

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The textbooks are full of different methods to justify capital investment. They range from simple Years of Payback to the more complex Return on Investment and Net Present Value calculations. They all have their specific advantages and present you with different views of the investment justification. Common to all methods is that they compare the total investment with the benefits of that investment. However, the result is only as good as the accuracy of the data used.

To calculate your total investment, you need to recognize that, in addition to the purchase price of the equipment, there are additional costs. These include freight, insurance, installation costs, and required modification on your building, engineering (layout, code compliance), as well as initial tooling.

Depending on the accounting practices of your company, certain costs are expensed immediately, or are added to the capital requirement and appreciated over the expected life of the equipment.

Also, there are other real costs to be considered, including: training of the maintenance and operation staff by a factory technician; the cost of disposing of the old equipment to create space for the new; the cost of traveling to source, test and approve equipment; testing material and test-related expenses, etc.

It is a little more complex to define the benefits. Perhaps the best approach is to look at two issues: What are the reasons for the investment? And what will change on the P&L Statement and Balance Sheet because of the investment?

Capacity increase and volume increase

If the equipment increases the overall sales volume of the operation, then the gross margin of all the additional volume can be counted as a benefit. On the other hand, if you buy a new machine with higher capacity, but there is no reason to believe that the sales volume will go up, you cannot use the possible additional volume as a benefit. Also, if the additional volume could be achieved by outsourcing or by overtime, the benefits should then be calculated as the cost difference between the outsourcing or overtime cost and the projected future cost.

Other cost issues include material-cost savings, direct labour costs, indirect labour costs, factory overheads, sales, general and administration costs, new products or product line extensions, quality improvement, replacement, rebuilding or maintenance, infrastructure and code compliance and safety.

Material-cost savings occur where the new equipment provides better yields or allows the use of lower-cost alternatives (i.e. where a roller application in finishing has a higher transfer efficiency, which equals less material cost).

Direct labour cost savings occur when the equipment produces faster, requires fewer workers or has less production steps than what it replaces.

Indirect labour costs mean less indirect labour is required, i.e. for inventory control, material handling, maintenance, etc.



Factory overheads influence costs if the equipment has an impact on such costs as electricity, waste removal, etc.

Sales, general and administration is an often-forgotten area to look for cost improvement. Benefits may be found in advanced software, new organizational tools, etc.

In order to establish the real benefits we have to analyze the facts. The punch line of a favourite joke illustrates the risk of using false assumption:

If you walk instead of taking the bus, you could save \$2.50. However, if instead of not taking the bus you would have not taken a taxi would you have saved \$25.00? You need to go to the bottom of presented facts.

Adding new products or a new product-line extension influences equipment justification the same as does a volume increase. The benefits are the gross margin of the additional sales.

Quality improvement

Quality improvement is often a valid reason for equipment justification, however setting the benefit values is more difficult. Will the quality problems be solved by the equipment, or could they be solved also by continuous improvement, lean management and other methods? If the equipment is the solution, then scrap and rework reductions are clear cost saving.

Replacement, rebuilding and maintenance

These are very common justifications for new equipment. Seldom do I find companies to have any credible data to compare the cost of fixing the old machine versus the hassle-free operation of a new piece of equipment.

Infrastructure

Investment for a dust collector, compressor or transformer is often difficult to press into a financial decision model. However, these are required, and you cannot do without them.

Code compliance

On such issues as environment, electrical, safety, etc., code compliance most of the time is mandatory and normally does not show a payback in financial models. Normally, if safety or environmental compliance is the issue, little financial justification is required. If it is needed, it is needed. A back injury can easily cost \$60,000, and a fatality can run into millions.

Most investments are decided on a mixture of reasons, and have a mixture of benefits. Analyzing and understanding them is an important step. If you look at your analysis you will recognize that all along you made assumption after assumption. If you consider a potential error rate on any of these assumptions, what accuracy does the final result provide?

We must recognize that the calculation is only a back-up for the decision you have already made, based on intuition. Very few textbooks say that, but strategy, intuition and other unquantifiable reasons must be a major part of your investment decision. These calculations help us to sort our thoughts and give us more insight. However it requires that we do our homework to specify and get the technically and organizationally correct equipment.