Operational Cost

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Abstract

Operational costs are those recurring costs incurred in the operation of a business. Seemingly simple in concept, the identification, allocation and control of these costs are complex and have generated a plethora of management practices. This article clarifies what constitutes operational costs, including the distinction between direct, indirect, variable and fixed costs. It then looks at some of the most common practices of accounting allocation, including absorption costing, marginal costing, activity-based costing, throughput accounting and target costing. Finally, it explores lean manufacturing, total quality management and the theory of constraints as methods companies have used to control costs.

Overview

Operational costs are the recurring costs incurred by a company in the course of running its business. They encompass virtually all the expenses incurred by a company, except the costs of financing (interest), income tax and depreciation. Thus, on the income statement, operating income is identified as remaining monies after the cost of revenue and other expenses are deducted from revenue.

Categories of Operational Cost

As an example, Dell Inc.'s 2005 income statement is shown below in Table 1 for illustration purposes. The two broad areas of operational costs are the cost of revenue and the operating expenses.

Table 1: Dell 2005 Annual Income Statement (COMPDOC)

	(In thousands)
Revenue	55,908,000
Cost of Revenue	45,958,000
Gross Profit	9,950,000
Operating Expenses	
Research & Development (R&D)	463,000
Selling, General & Administrative Expenses (SG&A)	5,140,000
Nonrecurring	
Other Operating Expenses	
Operating Income	4,347,000
Income from Continuing Operations	
Total Other Income/Expenses Net	255,000
Earnings before Interest & Taxes	4,602,000
Interest Expense	28,000
Income before Tax	4,574,000
Tax Expense	1,002,000
Net Income	3,572,000

Direct & Indirect Costs

Operational costs include direct costs and indirect costs.

- Direct costs are those that can be directly attributable to specific products the company produces, and typically include materials and production labor.
- Indirect costs are not directly allocated to specific products and are not directly impacted by the level of production (at least over a short term).

The cost of revenue is generally comprised of direct costs, though certain manufacturing overhead is generally included

through cost allocation, as we'll see later. Operating expenses are indirect costs.

Variable & Fixed Costs

This all seems relatively straight forward, but things get a little more complex beneath the surface. In addition to thinking of costs as direct and indirect, we must also consider whether they are variable or fixed.

- Variable costs vary in direct proportion to the volume of product being produced. For instance, if a widget factory produces 10,000 widgets per day and demand suddenly increases to 5,000 per day, there are correspondingly immediate costs incurred by the factory, including an increase in raw materials being purchased and added production line labor. Variable costs appear on the income statement in the cost of revenue.
- Fixed costs, on the other hand, relate to manufacturing and general overhead costs that cannot easily be allocated to specific production units. These costs are not immediately impacted by increases or decreases in production, and are therefore "fixed." On the income statement, fixed costs are included in both the Cost of Revenue (manufacturing overhead — a direct cost) and Operating Expenses (indirect costs).

There are two variations of fixed and variable costs worth noting. The first, "step" costs, are those that will change once certain levels of production are reached. For instance, as the production in the factory grows, at some point it will overcome the capacity of the janitorial staff to support it, and will need to add more staff.

Another variation is a cost that includes a mix of direct and indirect costs. An example might be electricity to the factory. While the factory as a whole uses a baseline of electricity, each production unit also uses a portion of electricity to power its own equipment.

This is not simply an exercise in accounting mania, but has real implications for organizations, because fixed costs are very often the larger percentage of overall costs. You can see from Dell's income statement that the cost of revenue (which includes an unknown amount of manufacturing overhead, a direct, fixed cost) consumes a whopping 82% of revenue, and operating expenses consumes another 56%. Once these are paid for, Dell is left with a mere 7.8% of revenue in operating profit. In fact, manufacturers (and many other industries) consider 10% operating profit to be quite good.

This then, is why cost accounting is such an important topic. From pricing product to capacity planning to profitability analysis, an understanding of the true costs of products is vital to a company's financial health.

Identification of Operational Costs in Manufacturing

There is an old adage in business — "you can't control what you don't measure." The first step in accounting for and controlling costs, then, is to understand what they are. The following provides more detail on the costs involved with manufacturing companies.

Cost of revenue represents the direct costs incurred to produce the products sold by the company. The primary costs include:

- Direct Labor (production line staff)
- Materials (used in producing the products)
- Manufacturing Overhead (e.g. non production line staff, general supplies, heat/light/power, freight)

R&D expenses are the costs associated with developing new products and improving existing products. They include:

- Labor
- Supplies
- Royalties & Patents

Selling expenses are the costs associated with selling the products offered by the company. They include:

- Labor & Commissions
- Market Research
- Advertising
- Sales Promotions
- Account Management
- Travel & Entertainment

Administration expenses are general overhead costs incurred by every company running a business:

- Financial functions - accounts payable and receivable, collections, payroll, budgeting, financial reporting, etc.
- Human resources administration - recruiting, training, compensation and benefits administration, etc.
- Information systems management - new systems implementations, systems maintenance, etc.
- Facilities Management — lease management, janitorial functions, landscaping, etc.

In a typical accounting system, accounts are set up that reflect the above categories, and costs are allocated into these accounts as they are incurred. However, reports derived from these accounts are not very helpful in managing operational costs, except for

comparing the costs over time and against budget. For instance, they do not tell us anything about how much direct labor is being spent on different products. Which products are contributing the most margin? Which might actually be unprofitable?

With all this, it becomes clear that the company's management is making important decisions for the firm with too little information. We need another way to identify and control costs.

Cost Allocation

There was a simpler time when a factory generally made a single product and most of the costs were directly allocated to that product. Indirect costs were limited to simple management and administrative functions and comprised a small percentage of overall costs.

However, over time factories became more diversified and began producing more varied product lines. The companies became more complex and factory overhead increased in size to accommodate these changes. Ancillary functions such as Human Resources, Accounting, Compliance Staff, Facilities Management and Information systems, also became larger to deal with the increasing complexity. Pretty soon, as we saw in the Dell example, indirect costs comprised a hefty portion of operating costs.

In order to track and control these costs, a number of methodologies, philosophies and practices have been developed over the years to allocate costs in a more meaningful way. Some of the most prominent are discussed briefly here.

Absorption Costing

The earliest and still widely used method for allocating these costs is referred to as absorption costing. Also called standard cost accounting, and full costing, it allocates manufacturing overhead evenly across products, thus providing a somewhat truer picture of what a product is actually costing the company to produce.

However, this blanket approach poses problems, as the fixed costs become a larger part of the operational costs. It does not take into consideration that some products consume more overhead than others. Further, this method makes the "cost" of the product vary with production levels. If we produce to demand 1000 widgets this month, and only 800 next month, the allocation of fixed costs produces a higher cost-per-unit in the second month. While this is seemingly meaningful and "correct," it makes pricing, among other things difficult.

Marginal Costing

Marginal costing (also called contribution margin costing and break-even costing) is focused on pricing and profitability planning. Rather than trying to allocate fixed costs to production units, the company determines the cost of a production unit using only its variable costs (i.e. materials and direct labor). This cost is subtracted from the unit's selling price to determine its contribution margin — that is, the amount left over that is available for paying fixed costs.

The total annual fixed costs for the manufacturing cell where the unit is produced is then calculated and divided by the contribution margin to determine the number of units that need to be produced (and sold) to cover the fixed costs — or, in other words, the break-even point. The manufacturer would obviously want to produce more than this number to achieve profitability.

Activity-Based Costing

In 1987, Robert Kaplan and Thomas Johnson introduced Activity Based Costing (ABC) in their book "Relevance Lost — The Rise and Fall of Management Accounting." They claimed that traditional cost accounting (i.e. financial reporting) was not timely enough nor detailed enough, and focused on cost reduction rather than identifying how those costs were contributing to profitability.

ABC involves identifying activities associated with specific cost objects (e.g. a product). An activity could be, for example, a purchasing function for reordering parts. The resources (time or labor, paper, phone, etc.) associated with this activity are assigned a cost, and that cost is associated to the cost object (the consumer of the activity) when it needs that activity performed. A cost driver (what triggers the activity to be executed) is identified that links the activity with the cost object to determine when an allocation is required.

This method of cost accounting certainly enables companies to identify their operational costs and make well-informed decisions regarding product and company strategies, but it is a complex and costly system to implement and maintain. Many firms abandoned their attempts at it and Kaplan himself noted that the adoption rate was low and the cost too high in many cases.

His improved version came in April 2007, with the co-authored book "Time-Driven Activity-Based Costing." Kaplan recognized that the practice of assigning costs to activities was the primary cause for the complexity and cost of ABC, and replaced this core aspect of ABC with a much simpler model. In time-driven ABC, the company need only estimate the cost rate of supplying capacity for each department or process, and then determine how much of that capacity is used by each transaction, product or customer.

Another update on ABC has been the development of Resource Consumption Accounting (RCA), which is a blend of activity based costing and Germany's cost management system, Grenzplankostenrechnung (GPK).

These approaches all focus on the resources that are consumed by activities or cost centers in order to determine the profitability of specific products, set pricing and to identify wasteful practices.

Throughput Accounting

Throughput accounting (TA) was developed in response to the application of the Theory of Constraints (discussed later). In this accounting, only total variable costs (TVC) are allocated as cost of revenue. TVCs are those costs that truly vary with the addition of each product unit. Thus, these are generally just the material costs, though in certain cases, direct production labor may be included if it is truly piece-based labor. In TA, all other costs are operating expenses.

The advantage of this method is that it allows management to more easily identify the impact to unit costs (how much more money will we generate?), fixed costs (how much more in operating expenses will it cost us?), and captured costs (what will we have to have to make it happen — e.g. equipment?) when making decisions about production.

Target Costing

Target costing (TC) is a unique approach to costing that is preemptive rather than reactive. That is, instead of analyzing costs to set pricing, the market is used to determine the best competitive price of the product. After deducting a desired profit margin from the price, the remaining amount becomes the target cost for the production of the unit. The manufacturing process is then defined to produce the unit at that cost and continuous improvement efforts are aimed at keeping the costs at that target.

This method is used most often in conjunction with lean manufacturing (discussed below).

Controlling Costs

The next step after allocating and understanding unit costs, of course, is controlling them. Numerous methods have been developed over the years to do just this, from focusing on the intricacies of the manufacturing process to enterprise solutions dealing with such decisions as the physical location of the plant and the efficiencies of administrative overhead. Some of these approaches are explored here.

Lean Manufacturing

Lean manufacturing arose out of Toyota's Total Production System (TPS), particularly for its focus on eliminating waste. The book "Lean Thinking" by James Womack and Daniel Jones, released in 2000, resulted in a growing popularity in manufacturing for lean practices.

Lean manufacturing focuses on the elimination of muda, the Japanese word for waste. Taiichi Ohno, Toyota's Chief Engineer and later CEO, identified seven wastes in the context of the TPS:

- Overproduction — Producing more than the customers need.
- Waiting — Idle time of people waiting for something.
- Transportation — Moving materials from one place to another without adding value.
- Inventory — Holding too much inventory (raw materials, work-in-progress and finished goods.
- Motion — Inefficient people movement.
- Over-processing — Making to a higher standard than is needed by the customer.
- Defects/Correction — Time spent detecting, correcting, disposing of and preventing defects.

There are a myriad of lean tools that have been developed to tackle these wastes. A few of the more notable are:

- 5S — Basic workplace housekeeping. Seiri (Sort — put things in order), Seiton (Straighten — arrange things so that they're easily accessible), Seiso (Shine — keep things clean), Seiketsu (Standardize — consistency in how things are done), Shitsuke (Sustain — commitment to keeping to these practices).
- Total Productive Maintenance (TPM) — A system to ensure that machines and equipment are in top condition, thereby reducing or eliminating emergency and unscheduled down time.
- Kanban — A "pull" system using signals to communicate the need for more material. Materials should not be stockpiled, but made available as they are needed.

Lean manufacturing, unlike TOC, focuses on reducing costs by eliminating waste. It is not concerned, per se, with maximizing throughput like TOC, but achieves that as a natural outcome of waste reduction.

Total Quality Management (TQM)

Another management practice arising out of the Toyota Production System is total quality management (TQM). TQM focuses on continuous improvement of the quality of products produced and eliminating the costs associated with poor quality. The philosophy behind TQM is that it is much more expensive to deal with the repercussions of poor quality (detecting, fixing, customer complaints) than to prevent their occurrence in the first place.

A key measure for this practice is the Cost of Quality (COQ). This includes prevention costs (avoiding quality issues), appraisal costs (inspecting for errors or defects), internal failure costs (fixing/rework), external failure costs (customer returns and other issues associated with defective items that were shipped) ("Strategic cost management," 2000). Thus, TQM focuses on reducing costs by improving quality.

The Theory of Constraints

Physicist Eliyahu Goldratt in his best-selling novel "The Goal" introduced the Theory of Constraints (TOC), in 2004. The core principle of TOC is that companies exist to make money, and they should do whatever is needed to enable its processes to

generate more money. Dr. Goldratt proposed that constraints in those processes inhibited companies from maximizing this goal, and that organizations should focus on those constraints. There are five steps to achieving this:

- **Identify** the system's key constraint. This would be the one thing in the organization that most impacts the achievement of the goal. It might be specialized equipment that has limited capacity relative to the capacity of other equipment in the chain, or a specialized skill set, or even an insufficient number of customers (if the capacity of the operations is greater than the demand).
- **Exploit** the constraint. Determine how the organization is going to enable the constraint to maximize its throughput.
- **Subordinate** everything in the organization to this constraint. The organization puts in place processes that ensure the constraint is exploited to the fullest to achieve maximum throughput. Everything is focused on optimizing the constraint. The constraint or control point becomes the "drum" for the entire organization, setting the pace for production, and is driven by demand.
- **Elevate the constraint.** Enlarge the constraint to achieve more capacity. If the constraint is the equipment, add more equipment. If the constraint is insufficient customers, enlarge the marketing and sales force.
- **Constraint shift.** In the course of these activities, the key constraint may shift. For example, if the equipment is optimized, the shipping process may become a bottleneck. This, then, becomes the new constraint, and requires moving back to Step 1.

The interesting thing about TOC is that it moves always from the traditional practice of focusing on costs, and instead improves the ability of the company to optimize its moneymaking capabilities. In the course of this, relevant cost reduction naturally takes place.

The strength of TOC is in its simplicity (in concept, if not in implementation) and the focus it creates within an organization to streamline its value chain processes. Unlike ABC, which focuses on allocating overhead costs to identify inefficiencies, TOC lumps all overhead costs into one bucket and doesn't worry about allocation at all. It's theory surmises that those inefficiencies that matter will be addressed through the 5 steps, and those that aren't identified, don't matter anyway.

Enterprise Level Cost Approaches

Of course, cost control doesn't stop on the factory floor. Companies have implemented a variety of cost control measures over the years to keep down manufacturing and administrative overhead, including outsourcing, relocation, compressed workweeks, safety practices to reduce claims, and even outsourcing the Human Resources function.

Conclusion

While the various approaches outlined above resolve the issues of allocation and control in theory, in practice they are very difficult and complex to implement, and therefore costly. So, ironically, companies are spending more money to control costs. And they are often failing to get these systems in place. In fact, about 60% of U.S. firms started ABC projects, but only 20% were able to complete them (Shaman, 2003).

Some approaches, like throughput accounting, attempt to get around the complexity by shifting focus away from tedious analysis of costs. But all of them have had their successes and failures. It may be that the nature of business best dictates the approach that works best. It remains to be seen if there will be a clear winner.

Terms & Concepts

Absorption Costing: The practice of allocating fixed costs evenly across products.

Activity-based Costing: A method of cost accounting that allocates costs based on the activities involved.

Break-even Costing: See Marginal Costing.

Contribution Margin Costing: See Marginal Costing.

Direct Costs: Those costs that can be directly attributable to the production of a specific product.

Fixed Costs: Those costs, generally overhead costs, which are shared across production units.

Full Costing: See Absorption Costing.

Indirect Costs: Those costs that are not directly related to production.

Lean Manufacturing: A comprehensive cost control practice that focuses on eliminating waste in the manufacturing process.

Marginal Costing: A method of cost accounting and planning that determines a production unit's contribution margin and level of production needed to cover fixed costs and a defined profit margin.

Standard Cost Accounting: See Absorption Costing.

Target Costing: A cost accounting method that determines the expected, or target, cost of production based on the planned selling price and profit margin.

Theory of Constraints: A management practice that focuses on maximizing throughput (output) of product by resolving bottlenecks or constraints in the value stream.

Throughput Accounting: A method of cost accounting, based on the Theory of Constraints, where all costs are considered either Total Variable Costs or Operating Expenses.

Total Quality Management (TQM): A method of cost control that focuses on eliminating costs associated with poor quality.

Variable Costs: Those costs that vary in direct proportion to the level of production.

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Essay by Joyce Gubata, MBA

Joyce Gubata is a freelance business writer and consultant with over 20 years experience in business operations, marketing and sales, information technology, and consulting for companies of all sizes in multiple industries.