

# Indirect Cost Management

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## *Abstract*

In the last few years, it has become clear that the allocation of indirect costs by traditional costing methods is not meeting the needs of management in today's manufacturing environment or in the service industries.

The purpose of this article is to present the changes that have taken place in the manufacturing environment in the course of the last few years, and to formulate a methodology for the reduction of indirect costs and their improved management.

### *Introduction*

Indirect costs are defined as those which are not directly related to the products. These costs are allocated to the direct production costs. The relative weight of indirect costs has risen along with increased mechanization and automation in industry. For example, in some cases in the electronics industry, the indirect cost component constitutes up to 75% of the product's total cost.<sup>1</sup>

The allocation of indirect costs is carried out in two principal ways:

a) Costs are accumulated in functional cost centers or "service divisions" and allocated to the production divisions by means of different allocation bases (e.g., rent and maintenance by floor space,

personnel department by number of workers). Within production divisions, indirect costs on different products are allocated in proportion to direct work hours or machine hours.

b) Direct allocation of indirect costs not accumulated in such service divisions are usually in proportion to direct work hours.

These allocation methods were applied as early as the 1920s by the major U.S. industrial plants. They suited the manufacturing environment of the time, i.e., mass production of a few products in order to exploit the advantages of scale. However they are inadequate in today's manufacturing environment, characterized as it is by small-series production which emphasizes high quality, maximum flexibility in manufacturing processes and a widening range of products meeting the client's needs.

Any allocation of indirect costs is bound to be arbitrary. Since the allocation of indirect costs among a great number of products will, in most cases, cause internal subsidization and incorrect costing, managers comparing costing data to market prices, in order to make decisions as to the product mix within market constraints are liable to reach erroneous conclusions. The same goes for "make or buy" decisions and investment decisions in plants. Costing data become irrelevant for management purposes and serve external accounting needs only.<sup>2</sup>

In addition, management accounting treated indirect costs as if they were a reservoir of unidentified costs to be allocated among the products. For this reason, defective products' repair and rework costs were added on to the indirect costs, and income from the sale of by-products was subtracted from them. Thus, traditional costing methods merely allocate indirect costs without managing them or finding ways to reduce them. In other words, the link between indirect costs and the profit-loss bottom line is severed. This disconnection between costs and results increases the tendency to concentrate on cost-reduction (effectiveness) instead of trying to raise profits. For example: a plant manager wishes to increase profits for the current year. He will often cut back on maintenance or research and development activities. The long-term consequences of such actions are obvious.

Many plants tend to "push services" instead of having their production divisions draw them. For example, maintenance services are often subject to the maintenance department's limitations and not to the constraints and priorities of the production process. Sometimes we meet heads of maintenance departments who are unaware that breakdowns in production bottlenecks may cause substantial delays in the manufacturing process and in supply times.

Another distortion caused by traditional costing methods is the tendency to rely on misleading "local" indicators, while ignoring the global view. For example, the purchasing manager might prefer to buy components in large quantities and obtain price discounts, thus lowering his "raw materials price per unit." The high-quantity purchase increases inventory, as well as raising indirect costs related to inventory carrying costs. Usually, however, these costs are arbitrarily allocated among all products. The managerial echelon is thus unable to relate to the price discounts obtained and the subsequent rise in indirect costs.

It should be noted that the use of standard costing cannot solve the problem of indirect cost management. The standard costing method compares arbitrarily established indirect costs to actual ones. It does not deal with the problems caused by the distorted allocation of indirect costs, and by the lack of connection between costs and bottom-line results.

### *Characteristics of the Modern Manufacturing Environment*

In order to compete in today's manufacturing environment, the plant must meet the following challenges:

1. **Commitment to Quality** — The consumer has become accustomed to high-quality standards set by Japanese products. The consumer will not compromise on quality, not even for a lower price. High-quality products are therefore essential to competitiveness.<sup>3</sup>
2. **Shortening of Lead Times** — Product development and manufacturing lead times are constantly being reduced. Manufacturers' reaction time to engineering and marketing changes should be as short as possible.
3. **Cost and Inventory Reduction** — In order to be competitive, manufacturers must offer attractive quality, price and supply times. The Japanese experience has shown the way for the West to manufacture with low inventory levels in general, and to reduce these levels in the manufacturing process in particular.
4. **Increased Manufacturing Flexibility and Product Range** — The competitive plant must be able to manufacture a wide range of products in small lots, in accordance with demand.

In order to meet these challenges, the plant should first and foremost alter its "production philosophy." An approach centered on large-lot production of inventory, in order to exploit scale and learning advantages, is no longer suited to the manufacturing environment.

Many plants have adopted the Japanese "just in time" method. This approach stresses simplified production processes, high quality and maintenance levels, and production techniques based on "pulling" raw materials and components only when needed.<sup>4</sup>

Other plants have adopted the OPT (Optimized Production Technology) production management method. This approach is based on analyzing the production process, identifying its bottlenecks, and synchronizing production subject to its constraints.<sup>5</sup> This approach has been extended to the general case of "management by constraints." According to this method, the constraint which prevents increased profits (be it external — a market constraint, or internal — a manufacturing constraint) is identified. All decisions are thereafter subjected to this constraint in order to exploit it to the maximum until it is broken.

The great improvement in computation capability has created both a challenge and an opportunity for today's manufacturing plant; the computerization of production processes enables it to tighten control, especially on the production floor.

Investments in mechanization and robots are seen by many as a "magic wand" solution to all problems in the management of production. Experience has shown that such investments are often undertaken needlessly and in great hurry. The present trend is to try and exploit existing resources more fully and judiciously before gradually investing in mechanization and robots, if needed.<sup>6</sup>

### *A Methodology for Indirect Cost Management*

Management accounting was directed at the search for appropriate allocation bases and methods. In today's manufacturing environment, indirect costs constitute about 75% of total production costs. Thus the manager's main problem is not necessarily the allocation issue, but rather the ability to control and cut back on indirect costs. Savings and efficiency drives have traditionally been directed towards direct costs. Today it is imperative to improve the control and management of indirect costs.

What is needed is cooperation between the costing and the production sectors. Managers and costing officials must abandon the "management by numbers" approach, get down to the production floor, learn the production process and understand the system's constraints and bottlenecks.

Experience has shown that plants which recognized and faced the problem head-on achieved dramatic results. They adopted modern production techniques such as group technology, "just in time" (JIT) techniques to improve their productivity. Many of the cost drivers were identified and eliminated. Managers have improved their ability to relate costs to products, and thus, costs which in the past were treated as indirect costs have eventually become direct costs. For example, IBM and Caterpillar managed to reduce indirect costs from 75% to 25% of their products' total cost.<sup>7</sup>

The fact is that organizational changes and a revision of manufacturing concepts can result in a reduction of indirect costs as well as an improvement in their attributability. For example, a move to the "just in time" method caused changes in the purchasing methods of raw materials. Instead of big-lot orders, there are now frequent small-quantity ones. This change brought about a substantial reduction in inventory-carrying costs (financing, insurance, discards and losses, stockroom personnel, stockroom rental and maintenance) and a substantial reduction in inventory control and accounting.<sup>8</sup>

We now propose a four-step methodology for indirect cost management.

### *Step 1 — Analysis of indirect costs and their causes*

Everyone agrees that indirect costs must be cut back. The risk is that, without a proper analysis and understanding of these costs and their causes, we might "throw the baby out with the bath water." An arbitrary cutback in the maintenance department's expenses, for example, may severely disrupt the production process.

Traditional costing methods concerned themselves with the classification of costs (direct-indirect, fixed-variable). A necessary condition for the management and control of indirect costs is an analysis of the cost drivers, or factors. For example, the operating costs of a certain plant's accounting department seem especially high. The accounting department itself is in a permanent backlog and unable to provide the updated information needed for decision-making, despite investments in computers and recruitment of excellent staff. The routine solution: additional investment in computers. The desired solution: analysis of cost drivers. In Israel, for instance, we find many cases in which the accounting department is "clogged" by numerous credit purchases in small sums from individual suppliers. Each supplier must have his own account and his tax payments collected at source according to the proper authorization (the tax rate varies for each supplier and one supplier may have his rate changed within a given year). In addition, the accounting department's employees must conduct tiresome arguments over the telephone with suppliers who complain that they have not been paid. In such a case, significant reductions in the accounting department's costs might be brought about by a drastic cutback in the number of suppliers. This may cause a certain increase in purchasing outlays, but the savings in the accounting department will more than make up for it.

### *Step 2 — Reducing Indirect Costs*

After having analyzed the causes of indirect costs, we can try to reduce them. The goal is to cut back on indirect costs without harming production and management needs. Several methods may be of assistance:

- 1) Transaction Cost Analysis — This approach assumes that the very number of transactions (and not their individual magnitude) is the main cause of indirect costs. For this reason the control of indirect costs requires a case-by-case analysis of all transactions and an attempt to reduce their quantity.

The purchase of raw materials, for example, is made up of the following "transactions:" filling out the order; approval of the order by authorized personnel; arrival of the raw materials and checking against shipping invoice; registration of the goods entering inventory; invoice processing, registration and payment (including tax deduction at source); issue of goods to assembly line; control and supervision of inventory in the production process. (This apparently leads to the intuitive tendency to purchase large lots. However, one can open one purchase order and receive the goods in small lots without any additional paperwork.)

Each "transaction" brings about additional costs. But any costs added on to the raw materials' original cost up to their point of entry into the production process contribute nothing to the value of the raw materials or of the finished goods (not-adding-value costs). The "just in time" method (JIT) calls for small-lot purchases which flow directly from the supplier's stockroom to the production line. In this way, all raw material record keeping, storage and control processes can be avoided. Suppliers are issued "open" orders and the number of transactions is minimized.<sup>9</sup> Even if the JIT method is not fully implemented, it can be of assistance in simplifying record-keeping procedures in certain production divisions. The shortening of lead times in a printed circuits plant, for instance, can obviate the need for inventory control and supervision in the production process. The registration of components' entry into the production process and of the finished product's exit will suffice.

- 2) Pareto (ABC) analysis — It is well known that 20% of items account for 80% of a given phenomenon. For example, 20% of the items in inventory make up 80% of total inventory value. Thus, in analyzing indirect costs one should concentrate on those types of transactions which cause most of the indirect costs.
- 3) Changes in the production line — In today's manufacturing environment there is a move away from functional production lines towards focused and/or cellular manufacturing. Hopefully, entire stages in the production process will be carried out in one focused production cell from beginning to end, by a consolidated team of workers. Experience shows that focused manufacturing brings about a wel-

come involvement of workers in the improvement and efficiency of production processes, a sharp increase in product quality levels, and significant savings in inventory freight costs between production sites.

- 4) Organizational changes — The move towards focused manufacturing is accompanied by an organizational change, since many tasks formerly carried out by functional service departments are now performed by the workers in the production cells. Routine maintenance tasks carried out by maintenance workers, for instance, now take place in the production cell. The quality control division delegates authority to the assembly line workers, and the quality control process takes place in the assembly line itself.<sup>10</sup>

These methods cause a reduction in indirect costs as well as improving identification capabilities. Costs formerly considered indirect (such as maintenance and quality control expenses) are now direct costs incurred in the production cells.

*Step 3 — Allocate the remainder of indirect cost by means of economic bases*

The first two steps substantially reduce indirect costs. The third step deals with attributing the remainder of indirect costs to the different products. The emphasis is on their allocation by means of bases which are as economically logical as possible. The following allocation methods may be of assistance:

- 1) Analytic method — This method is based on the assumption that the vast improvement in data processing capabilities (through computing systems) enables a more suitable allocation without additional investment. By this method we create a great number of cost centers and allot them their corresponding indirect costs by means of different allocation bases. Whereas in the past, when data processing capabilities were limited, the emphasis was on simplifying allocation methods and bases, today's aim is to achieve as accurate an allocation system as possible.
- 2) Billing services at market prices — By this method, service department expenses are allocated, not at cost, but rather at market prices. The method lends itself to cases in which there is an efficient and available market for the services supplied by the plant's own service divisions. This method has a number of advantages: costs are not billed arbitrarily but rather directly to whoever ordered the services; responsibility passes from service department heads to production division heads; fixed

indirect costs “vanish”; inefficient service departments can be localized.

In large firms, the service departments may be turned into independent companies. These can then supply services to outside organizations. Conversely, the firm’s divisions are not obliged to “buy” services from the service companies, but rather may purchase them from outside competitors. As a result of this reorganization the service departments undergo a change of orientation: instead of “pushing” their services at their convenience, they must now supply services in accordance with the production divisions’ needs and requirements.<sup>11</sup>

The method is inherently imperfect. It is most suited to large firms whose service departments have become “bloated” over the years and have developed an orientation of service “pushing.”

- 3) Two-rate approach — This solution to the problem of indirect cost allocation was proposed by Hopkinson in 1892! Hopkinson thought of charging consumers with two rates: a) a charge for the right to use the service (stand-by cost); b) a current charge relative to consumption (which serves to cover variable costs).

This method is primarily suited to plants with substantial investments in infrastructure establishment and upkeep. Our electricity and telephone bills are prepared in this way. The two-rate approach can be extended to help solve priority problems among services. A demand for an immediate service will be charged at the expensive rate; normal service will be billed at a lower rate.

The advantage of this approach is that it attributes costs to the factors which cause them. Its disadvantage is its applicability to a limited number of firms.

- 4) Allocation of indirect costs solely to bottlenecks—According to this simple and interesting approach, indirect costs are to be allocated only to bottlenecks which constrain the plant’s production. No indirect costs are to be allocated to non-bottleneck factors.<sup>12</sup>

This approach derives from OPT (Optimized Production Technology), the synchronized production management method, yet can be applied even without fully implementing OPT. What it requires is a correct definition of the manufacturing process and the identification of its bottlenecks.

The allocation of indirect costs to bottlenecks is as arbitrary as any other allocation. Its advantage is that

it draws decision makers’ attention to production constraints and leads to an improved costing of the use of production bottlenecks. The closer the plant is to full capacity production, the better results bottleneck-based allocation will have. In such a case bottlenecks are at maximum production levels and thus prevent increased throughput.

It should, however, be noted that this allocation method deals only with fixed indirect costs and is not suited to variable ones. It is therefore applicable mainly to plants where indirect costs are mostly fixed.

Indirect costs without any reasonable economic allocation base, such as the president’s or board members’ salaries, are in fact joint costs. It is well known that such costs are allocated solely for accounting purposes, and this allocation is administratively meaningless and at times misleading.

We may question the administrative “need” to allocate all indirect costs among the finished products. The purpose of this allocation is to determine the full cost of each product, which is needed by accountants to evaluate inventory; but this is not necessarily an administrative need. It is often preferable to take decisions based on general considerations and indicators which do not require the price of each product. For example: let us envisage a plant which produces a certain component (which in turn is used to manufacture a product). The component can be ordered from subcontractors at a unit price of \$8, and the manager is considering whether to purchase it or continue to produce it. This is a typical “make or buy” decision, which can be taken according to either one of the following criteria:

- a) a “local” criterion — determine the component’s relevant cost and compare it to the \$8 external cost. The problem lies in determining the relevant cost for comparison purposes. It ought to include all direct costs, variable indirect costs, and the fraction of fixed costs to be saved should the production of the component be discontinued. As we will see, “local” considerations often cause erroneous decisions.
- b) a general criterion — evaluate the decision’s impact on the entire plant’s profits, i.e., which expenses will increase and which will decrease. This criterion does not require the allocation of joint indirect costs. Moreover, the use of general indicators takes into account other parameters such as lead time or impact on inventory levels, which are usually ignored when using local indicators.

*Step 4 — Change performance measurements*

Performance evaluation has always been one of management accounting's principal aims. Various indices (such as capital yield) have been developed for this purpose. Performance indices enable management to plan policy in clearly quantitative terms, compare different plant divisions and sectors, and identify activities which are being conducted at substandard performance levels.

Over the years, and mainly as a result of the widespread use of standard costing methods, biased "local" indicators such as "efficiency" (which in fact measures the use of production factors) or "unit cost," have become rooted in traditional costing. At times a manager trying to improve a local indicator will of necessity increase inventory levels and raise indirect costs without increasing production.

The "unit cost" index is often meaningless as well. In the presence of fixed and variable costs, unit costs are largely determined by lot sizes: the bigger the lot, the lower the unit cost, since more units will share the same fixed costs. But large-lot production can have destructive consequences for the plant: longer lead times, lower quality, and a steep rise in indirect costs.

In conclusion, the use of local indices should be abandoned, and general indicators which take the impact of management's decisions on indirect costs into account should be adopted in their stead.

The Optimized Production Technology method recommends using three indicators:<sup>13</sup>

- 1) Throughput — items manufactured and sold (excluding production to inventory);
- 2) Operating expenses — all of the plant's operating expenses. There is no need to distinguish between fixed and variable costs, or between direct and indirect costs;
- 3) Inventory — all three types of inventory (raw materials, work in process and finished goods) defined by the raw material cost, without any added value. Thus, production of goods that are not sold or ordered will increase operating expenses without affecting throughput.

We suggest three additional control measurements:

- 4) Lead time — the time between the decision to initiate production and delivery to the customer;
- 5) Quality — the product's quality index as reflected by quality costs or estimated by yield;

- 6) Due date performance — An index that shows the ability of the plant to meet the quoted lead time. Going back to our previous "make or buy" problem, we see now that the decision should be taken in light of the six global measurements listed above, and not necessarily by comparing locally internal and external production costs.

**Conclusion**

Management accounting tended to concentrate on direct costs, while indirect costs were arbitrarily allocated among the products. Today these indirect costs constitute most of the product's total costs, so that there is a clear need to improve their control and management.

We have presented a systematic approach to indirect cost management based on: a) an analysis and understanding of the causes of indirect costs; b) an analysis of the modern characteristics of the manufacturing environment; c) a formulation of general performance levels.

Tighter management and control of indirect costs are challenges which require the cooperation of all the managers of the plant (accountants, engineers and marketing executives). Management accountants must get down to the production floor and be fully involved in the manufacturing process.

**Notes**

(1) See for example Jeffrey G. Miller and Thomas E. Vollman, "The Hidden Factory," *Harvard Business Review*, Sept.-Oct. 1985, pp. 142-150.

(2) For an exhaustive discussion of the irrelevance of traditional costing methods see H. Thomas Johnson and Robert S. Kaplan, "Relevance Lost -- The Rise and Fall of Cost Accounting," *Harvard Business School Press*, Boston, Mass., 1987.

(3) The sale of cars with 5 / 50 warranties is an example of quality-based competition.

(4) For an explanation of the method and its implications on management accounting see Robert D. McIlhatten, "How Cost Management Systems Can Support the JIT Philosophy," *Management Accountant*, Sept. 1987, pp. 20-27.

(5) For an explanation see for example Robert Lundrigan, "What is This Thing Called OPT?," *Production and Inventory Management*, Second Quarter, 1986.

(6) See discussion in Richard J. Schonberger, "Frugal Manufacturing," *Harvard Business Review*, Sept.-Oct. 1987, pp. 95-100.

(7) The examples are detailed in Ford S. Worthy, "Accounting Bores You? Wake Up," *Fortune*, Oct. 12, 1987, pp. 43-48.

(8) When production takes place in small lots and with short lead times it is possible to use backflush costing -- all price accounting records are kept at production's end (debit finished products, credit raw materials). For additional explanations see Foster, G. and Charles T. Horngren, "JIT: Cost Accounting and Cost Management Issues," *Management Accounting*, June 1987, pp. 19-25.

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(9) See additional examples in Miller and Vollman, cited in (1).

(10) This change also derives from the adoption of a more modern and general perception of the quality control process, and a move towards total quality control. For a discussion of total quality control see Richard J. Schonberger, *Japanese Manufacturing Techniques*, Free Press, New York, 1982 (chapter 3).

(11) For empirical evidence of this method's implementation see H. Thomas Johnson and Dennis A. Loerke, "How Warehouse Manages Corporate Overhead Costs," *Management Accounting*, Aug. 1987, pp. 20-26.

(12) For an illustration of this method's implementation in an accounting firm see Y. Eden and B. Ronen, "Service Organizations Costing: A Synchronised Manufacturing Approach," *Industrial Management*, September-October 1990, pp. 24-26.

(13) For a detailed explanation see E. Goldratt and R.E. Fox, *The Race*, North River Press, Croton on Hudson, New York 1986, and Ronen B., and Starr M.K. "Synchronised Manufacturing as in OPT: From Practice to Theory," *Computers and Industrial Engineering*, August 1990.