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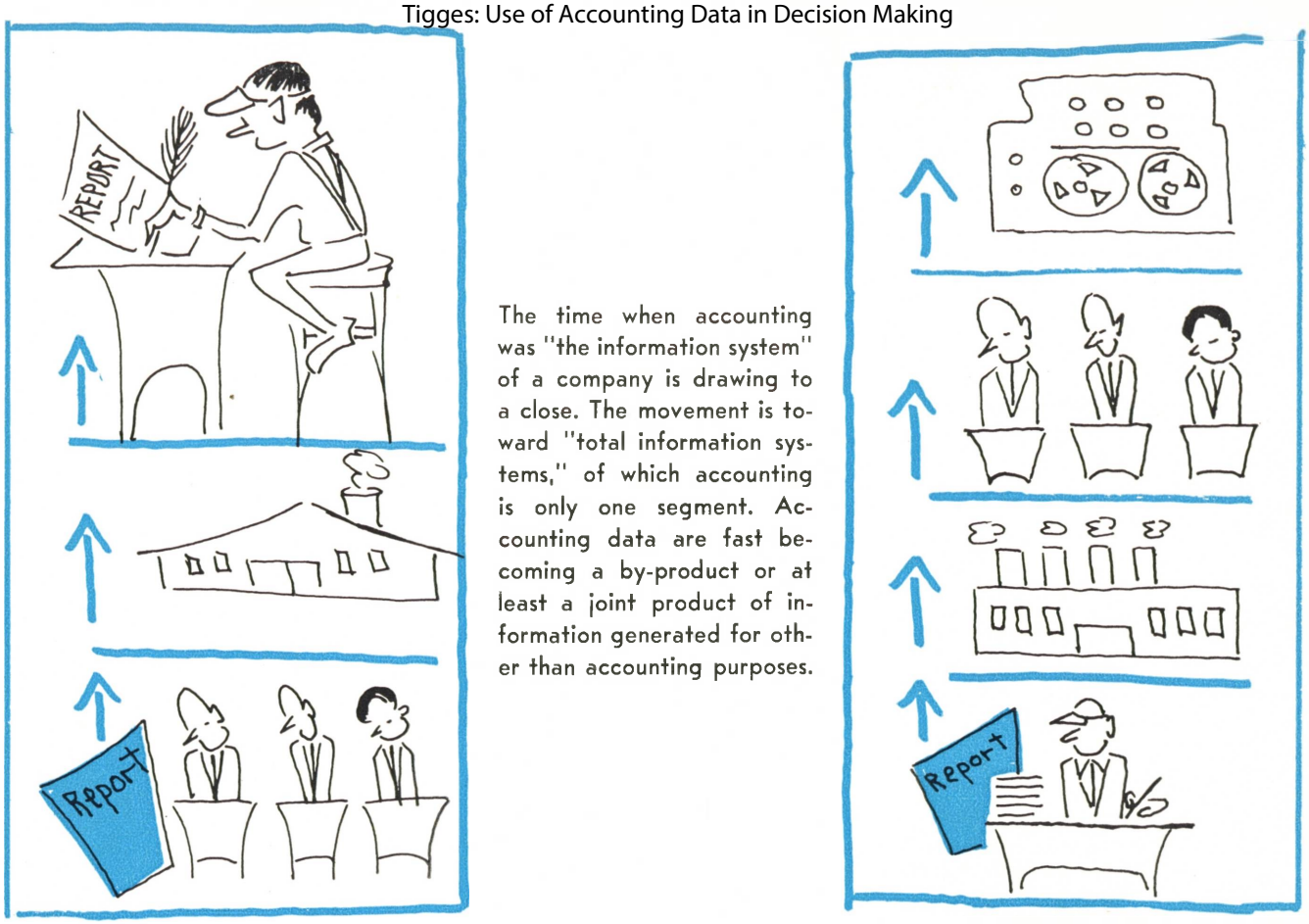
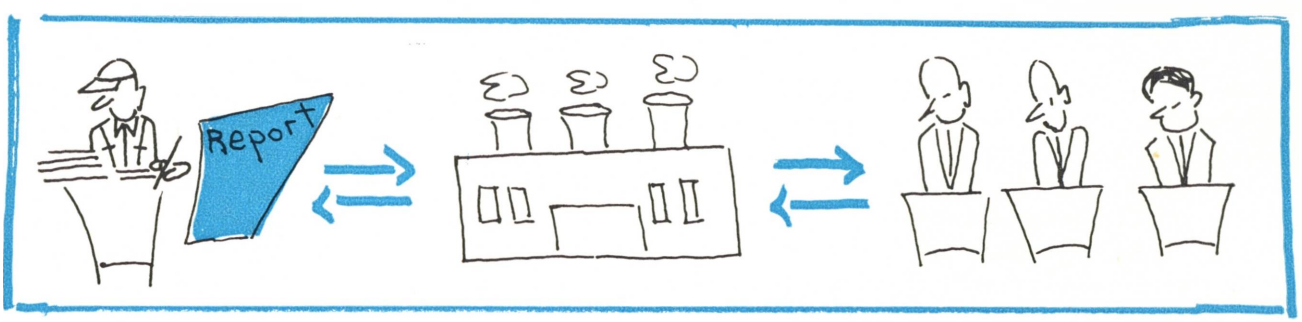


The time when accounting was "the information system" of a company is drawing to a close. The movement is toward "total information systems," of which accounting is only one segment. Accounting data are fast becoming a by-product or at least a joint product of information generated for other than accounting purposes.



USE OF ACCOUNTING DATA IN DECISION MAKING

by K. E. Tigges
Owens-Illinois, Inc.

THE DAYS of accounting's role as "the information system" of a company are fast drawing to a close. It is becoming increasingly difficult to segregate accounting data and accounting reports as entities unto themselves. The movement is toward so-called "total information systems," of which accounting is only one, although a vital, segment.

Accounting data, defined here as the monetary expression of business conditions and activity, have in many cases become a by-product or at least a joint product of information generated for other than accounting purposes. A good example is the sales order entry-billing system. The principal objectives of such a system are to state the conditions of the sale and to authorize delivery of the goods. The system will determine whether goods are available to be shipped and may even be geared to determine whether the order is an economic

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order to produce. Once all of these data are available, the preparation of the billing, its costing, and the summarization of sales and cost data are relatively simple operations. Since the accounting data are really a by-product of the production of the other information, we must look to the level of draw-off of the information as the best way of distinguishing accounting data from operating data.

Accounting reports also are becoming more difficult to distinguish. Even the traditional ones are being supplemented or supplanted internally by new or special-purpose reports as accounting becomes combined with other disciplines. Long-range projections were at one time almost purely financial extrapolations of sales, earnings, and assets. Today business projections are more nearly integrated operating plans with financial interpretations. Performance reporting also reflects nonaccounting conditions such as share of the market, operating efficiencies, and interpretative comments.

Much of the merging of accounting information with nonaccounting information is being facilitated, if not caused, by the advent of computers. Their ability to assimilate and manipulate masses of unlike data into one system has tended to dissolve the lines of distinction among the various types of information and push toward the "total system." With the possibility, if not yet practicability, of almost continuous input of data into these systems, with output on demand through viewing devices, there will be expanded use of exception-type information and also an ability to penetrate deep into the exception to identify its specific cause.

The decisions that a manager makes generally can be broken down into the following categories: (1) Where are we? (2) Where do we want to be? and (3) How do we get there? It is rather obvious that accounting data cannot answer all these questions. It is almost as obvious that, given only the three traditional accounting statements prepared on an historical basis, the manager is not in a position to answer any of these questions fully even from a financial viewpoint.

Long-range projections were once almost purely financial extrapolations of sales, earnings, and assets. Today, business projections are more nearly integrated operating plans with financial interpretations.

Need for projections

Although trend data from the past have been the traditional product of management accounting, projections of the future hold more promise. Forecasts, plans, or budgets permit a realistic interpretation of the potential effects of various actions on future results. For example, if we have an immediate need for a sizable amount of cash, is it best to borrow short term? Will there be a continuing need? If so, can we achieve a better interest rate by medium-term or long-term financing? Only when we know where we are going can we answer these questions.

Our company is in the process of completing a $100,000,000 loan. The financial interpretations of our long-range operating plans played an important part both in management's decision to undertake the expansion and in determining the amount, timing, and nature of the loans. No one will undertake a program of this nature unless he can be assured that each of the expansions will make a substantial contribution to future earnings and that the existing operations are capable of carrying the heavy financing charges and preoperating costs until the new facilities are in operation. Only after the concepts of the plans and programs of the marketing and manufacturing groups have been translated into the universal language—financial statements—does he have such assurance. The financial interpretation of the plans indicated

This article describes the actual operating philosophy of a major American company, Owens-Illinois. It was first presented at a symposium held in March of this year at The Ohio State University. The symposium was designed to explore the ways in which executives in typical American corporations use accounting data in making operating decisions. In order to do this, it drew on the experience of five representative American companies. Presenting the viewpoints of their respective firms, besides Mr. Tigges, were the following:

R. S. Hager, Controller, Stresenburgh Laboratories, Rochester, N.Y.

Orville H. Mertz, Vice President—Finance, Koehring Corporation, Milwaukee, Wisconsin.

J. J. Schofield, Vice President, Finance, Dura Corporation, Oak Park, Michigan.

John K. Smucker, Assistant Controller, Firestone Tire and Rubber Company, Akron, Ohio.

The papers presented were analyzed in written critiques by five professors from various universities. Excerpts from three of the critiques appear on pp. 30 and 31.

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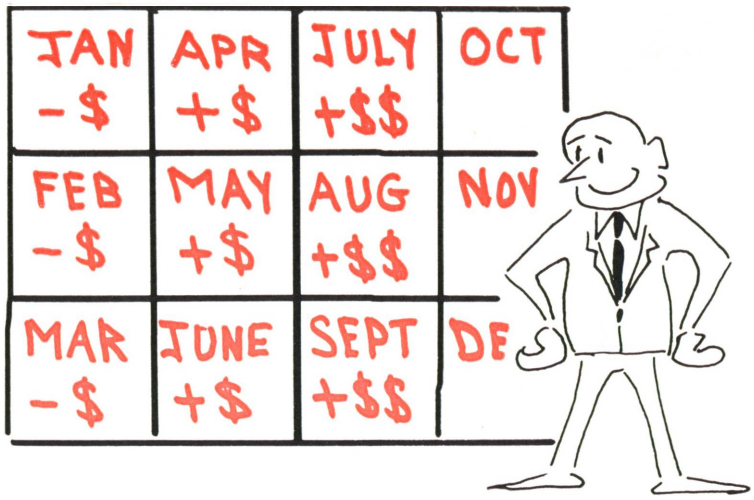

Financial interpretation of the plans indicated not only at what time expenditures would exceed cash resources and in what amounts but also at what point cash inflows would again exceed outflows.

to us not only at what time expenditures would exceed cash resources and in what amounts but also at what point cash inflows from operations would again begin to exceed outflows. With this information our treasurer was able to establish a combined program of long-term and short-term borrowing and to determine the ideal timing of the borrowing, subject to the availability of funds and trends of interest rates.

Performance reporting

Projections are also of prime importance in connection with performance reporting. The comparison to planned performance (both in terms of monetary achievement and operating objectives) has been the primary performance reporting measurement in our company for a number of years. Our executives seldom look at a complete monthly balance sheet or profit and loss statement. We attempt to highlight for them those factors on the traditional accounting statements that can have a significant effect on the soundness of the corporation and on its operating performance and to present these factors in such a manner as to emphasize those areas where the corporation has varied from its planned course —either favorably or unfavorably.

For example, let us look first at the balance sheet. Operating management cannot control on a month-to-month basis depreciation, most current liabilities, or long-term debt. It can, however, react and change trends in inventories, receivables, and the capital expenditure program. It must also be aware of its cash situation and any possible need for short-term borrowing. Therefore, we highlight these items in our monthly performance reporting, commenting briefly on the reasons for the variations.

On the earnings side, our management reporting system highlights variances from planned performances, not by the traditional categories shown on the profit and loss statement but rather in terms of responsibility areas. Our performance reporting can be likened somewhat to a pyramid. At the lowest level of supervision would be exception-type reports on sales branches, plants, research, and administrative departments. These are summarized into regional data and finally divisional and corporate data. The expressions of variances from plan in terms of monetary values are supplemented by brief comments on the reasons for the variations from plan, and our performance reports also include statistical data on operations. These comments are just as important as, and possibly more important than, the variances. Proper interpretative comments may trigger a manager's judgment that this is a permissible variance or that an operating division has already advised him that remedial action is being taken.

What decision then can the operating manager make from the performance report? He can decide that he either is satisfied with the situation or that some action on his part is required. In the latter case, he would, through discussions with the next level of operating management and/or through special analyses prepared by applicable members of his staff, attempt to ascertain whether the variance is a result of circumstances beyond control or whether some action can improve the operating results.

The relative importance of an accounting report in decision mak-

KENNETH E. TIGGES, CPA, is comptroller of Owens-Illinois, Inc., in Toledo, Ohio. He has also served as general manager, accounting, and assistant comptroller for that company. Prior to joining Owens-Illinois, he was an accountant at Konopak & Dalton (now Peat, Marwick, Mitchell & Co.). Mr. Tigges is a member of the board of directors of the Toledo chapter of the Financial Executives Institute, the Ohio Society of CPAs, and the American Institute of CPAs.

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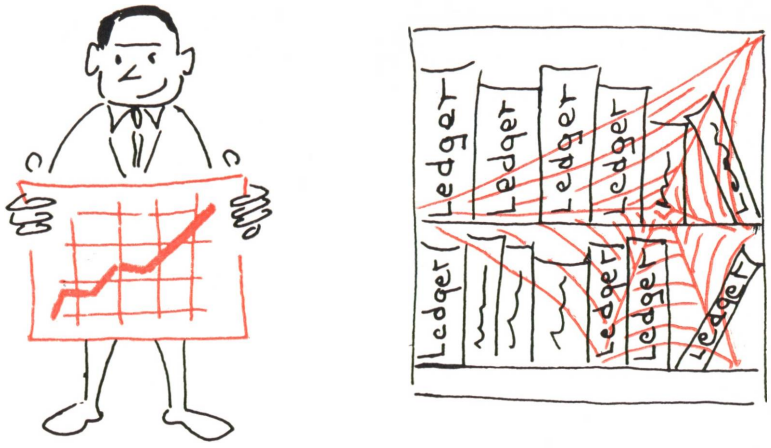
ing is governed, in part, by management's understanding of the data and its confidence in their accuracy. Management's confidence in the reasonable accuracy of the data can only be built up over a period of time. Management's understanding of the data is something that must be achieved both through the clarity of the individual report and through a continuing education program. The accountant, being an information specialist, must work with management to determine what information it needs and to structure this data in a useful form. Some managers can consume and assimilate great volumes of data while others would require and want only exception-type information supplemented by special analyses where desired.



The significant items should be highlighted in the management reporting system as well as variances from planned performance. Variances are reported not by traditional categories but rather by responsibility areas.

Emphasis can bring profits

A good example of the need for manager education and understanding is the use of the return on investment calculation. For a number of years we used not only the return on sales ratio but also the return on assets invested, and the procedure was generally well understood at top management levels—and quoted at lower levels. However, when we began to emphasize this tool and to report it in its components—return on sales and asset turnover—we found that some managers who previously had indicated no interest in the balance sheet began to ask questions: Safety stocks of inventories suddenly did not need to be quite as large. That deposit in the local bank that handled our payroll could somehow be reduced. Maybe we could sell this line of product without such extended terms on receivables. The accounting data, when properly explained, had resulted in decisions to reduce operating assets, freeing cash for use elsewhere.

Possibly the best example is standard cost information, which is intended to give a reasonable estimate for inventory purposes and for comparison with selling price to indicate the profitability of an item as well as a monetary measure of manufacturing performance against a standard. However, for any particular item in a multi-product plant, it may be necessary to do a more detailed analysis to determine the true contribution to corporate earnings.

A few years ago a manager asked why a certain long-run item was marginal when produced in a multi-product plant when, at the same time, he could see that a single-product plant producing this same item was showing a very nice profit and that operating efficiencies according to industrial engineering standards were comparable. Investigation disclosed that a portion of the variance was due to the manner of spreading supervisory overheads. Because of the variety of items produced in the multi-product plant, a greater amount of supervisory help was required. While the long-run item in question did not require a great deal of supervisory time, it was being allocated its share of the total based on an arbitrary formula

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rather than on actual experience.

This situation was corrected. It does, however, emphasize that we must make managers aware of the degree of accuracy a particular type of accounting data has if they are to utilize it properly. Nowadays, the ability of computers to process large volumes of data is allowing us to accumulate and manipulate much more information on actual cost performance, thus permitting more realistic preparation of standards as well as retrieval of actual cost information on jobs to determine the profitability of items.

Not only must we be sure that an operating manager understands what figures go into a report but we must also be sure he understands the purpose behind the report. Some time ago I asked one supervisor why a certain action had not been taken that would mean extra expense to his department but a saving to the company. His answer was simply that he couldn't do it because the expenditure was not in his budget.

Accounting and taxes

In tax planning, forecasts are frequently more important than historical information. For example, assume that a small company was acquired for cash at a cost in excess of its book value and that this company also had a loss carryforward for income tax purposes. With proper tax planning management would recognize that there were two potential areas of tax savings available and that a decision was required as to which would yield the greater profit. The first alternative would be this: If the company were dissolved within two years of acquisition, its assets could be written up from their net book values to the purchase price, thus allowing greater depreciation expense for tax purposes.

Critiques

Gordon Shillinglaw, Professor of Accounting, Columbia University: As I see it, information systems are going to continue the trend toward integration, and if accountants don't take the lead they are likely to be relegated to a very subordinate role. As Mr. Tigges says, "Accounting reports also are becoming more difficult to distinguish. . . . The ability to assimilate and manipulate masses of unlike data into one system . . . has tended to dissolve the lines of distinction between the various types of information. . . ."

Accountants also serve management in decision making by preparing reports that will direct attention to situations or conditions that need investigation. This is one purpose of the periodic performance reporting activities described by all five of our contributors and would probably be regarded as a primary accounting function by even the most jaundiced observer.

Accounting's role in this area seems likely to develop in two directions. First is the trend reported by Mr. Tigges, toward a greater selectivity in what is reported. Data will only be reported if they have information value, based on the exception principle. This practice could be carried too far, so that management would be encouraged to live in a dream world populated only by large cost variances in the maintenance department or sales variances in the New England states. To counteract this, certain broad summary data should be reported merely to provide a frame of reference and a sense of proportion. The selectivity movement is long overdue, however. The typical accounting report just contains too many numbers, even when some special effort is made to point out the most important ones.

The second likely development is for the information system to be called upon to report quantitatively on parameters that are now reported as outside the ken of accounting. Sales and inventories held by customers are perhaps obvious examples; measures of managerial leadership, creativity, and employee morale are less obvious but no less productive and far more challenging to the accountant. Many companies are not trying to pay more than lip service to the notion that performance has many dimensions, and it would be interesting to learn whether any of the companies represented here today have been successful in developing quantitative measures of aspects of performance that have traditionally been evaluated solely in qualitative terms.

William J. Vatter, Professor of Accounting, University of California, Berkeley: One last quotation brings us face to face with what I believe is a basic issue. I quote from Mr. Tigges of Owens-Illinois:

"At best, accounting data and reports are only tools to supplement a manager's judgment and other available data."

Later, this writer says:

"The days of accounting as the information system of a company are fast drawing to a close. It is becoming increasingly difficult to segregate accounting data and accounting reports as entities unto themselves. The movement is toward total information systems of which accounting is only one, although a vital, segment."

This last observation is of vital importance; it raises the question of what restricts the processes of accounting, to keep it from being more than a segment of the information system. It is true that a number of technological advances have been made with respect to computers and related software; but computers are not information systems, even though they make the processing of data easier and faster. There have been developments in model building and mathematical tools – but these do not make an information system, either.

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If this were done, however, the tax loss carry-forward would be lost. The second alternative would be to continue to operate the company as a separate corporation so as to utilize its tax loss carry-forward.

Obviously, the correct answer would depend on how fast the acquired corporation could be turned into a profit contributor. Projections of its markets and manufacturing performance by operating personnel would have to be translated into financial forecasts. The answer might even be a combination one if the corporation could be made profitable quickly, absorbing a portion or all of its loss carry-forward prior to the expiration of the two-year period. The loss carry-forward given up by its dissolution just prior to the end of the two-year period might then be worth less than the future benefit gained by writing up the assets.

Accounting systems have been strained by the changes in tax law relating to property and equipment over the past several years. As a result of the 1954 act, many companies adopted one of the accelerated methods for financial reporting to preclude the need for two sets of records. The guideline procedures utilized averaging techniques that were not completely adequate for financial reporting, and, as a result, many companies decided to separate depreciation for financial reporting from that for tax purposes. Accurate predictions of depreciation for book purposes are a necessity if management is to be informed of future earnings potential. Accurate predictions of depreciation for tax purposes are equally important in attempting to predict cash flows from operations. Thus, two depreciation forecasts were required.

The investment credit had an impact on forecasting. Since it was allowed only at the time the equip-

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There must be some other element or condition to explain the position of accounting in the overall information system. I suggest that this factor is merely the attitude taken by accountants in dealing with their material. Accountants too often appear to consider themselves mere collectors and reporters of financial data. Discussions of current practice show this. The accounting function is overly concerned with tabulating financial data or preparing financial counterparts of business operations, even when it deals with standard costs and budget variances, subclassifications of sales revenues or operating charges. Accounting is too much concerned with following out changes in assets or equities to present more or less stereotyped summaries supposed to reflect what has happened. These are data, but they are not information. Data become information only when they convey a message which has some specific relevance to a problem or situation — a relevance which may be expected to capture attention and to precipitate action. Without those attributes data are likely to be ignored, if they are perceived at all. Reporting only what has happened in terms of tabulated financial details expects too much of those to whom the reports are sent — the mere delivery of data does not contribute much to management decision making. Unless the accountant is willing to do more than this, he cannot expect to hold a place in the decision process, or to be considered an essential part of the information system.

Abraham Charnes, Professor of Mathematics, Economics, and Engineering Science, Northwestern University, and William W. Cooper, Professor of Economics and Industrial Management, Carnegie Institute of Technology: Turning next to the paper by Mr. Tigges of Owens-Illinois we should note that we prefer a slight rephrasing of his statement that "the days of accounting as 'the information system' of a company are fast drawing to a close." We prefer to interpret this as meaning that the advent of total information-instantaneous display systems (e.g., of the kind Mr. Tigges describes) carries with it, rather, the need for viewing accounting in a much broader light. Conversely, we should say that the concepts associated with such systems carry in their train the opportunity for securing a still broader view of the accounting function in that the latter should no longer be regarded as confined only to the treatment of data that have first been accorded a uni-dimensional (e.g., dollar) scale. From the broadened standpoint that such an interpretation admits we may then judge and evaluate the methods of accounting relative to their ability to deal with *all* aspects of business information. That is, from this point of view all such "information" must be regarded as a part of accounting whenever such data (intangible or not) are relevant. To state the issue even more sharply, we should say that it is now becoming necessary, increasingly, to distinguish between "information" and "evidence" where, once again, the latter is to be interpreted as information that has been processed in a way that will, by and large, produce correct actions by management. With this rephrasing and change in emphasis, then, we are wholly in agreement.

Note that this then carries with it certain important connotations and implications relative to the way businesses are (or should be) organized. This, too, is mentioned by Mr. Tigges as he implicitly notes the need for varying the time and content of the reports (or displays) by reference to the levels of management involved. But we doubt that even this will be enough and it may well be the case that system design will also have to be extended to take account of . . . managerial capabilities as well as potential interaction patterns. . . .

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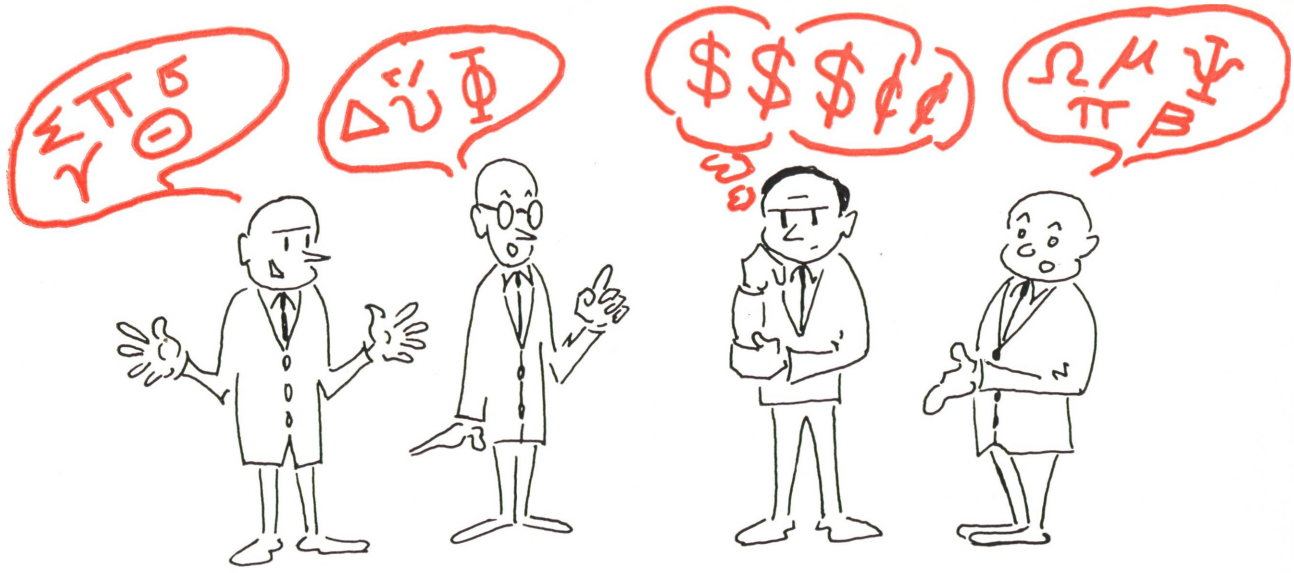

In research and development budgeting, the judgments of the various operating managers are translated into financial form, both as to investment and income.

ment was actually placed in operation, it required supplementary data. We found it necessary to develop a computer-oriented property system, which both provided better control in forecasting of capital expenditures and allowed faster processing of asset records in order to compute and predict depreciation for book and tax purposes.

Better data for pricing

One of the areas where accounting has made some of its greatest advances over the past few years has been in providing information for pricing decisions. The computer permits the manipulation of greater amounts of detail, facilitating more frequent revision of cost data as well as the accumulation of more actual performance information, which, in turn, permits substantially more analysis for justification of price differentials based on cost/price relationships. The computer also provides the opportunity to compare each prospective order with an estimated standard cost, thus allowing us to be selective during periods of extremely high-capacity operation and to determine what orders will be accepted under a marginal contribution theory when excess capacity is available. As a sidelight, of course, good cost information allows us to be selective as to where we will meet competition.

How much for R&D?

Managers continually ask "How much should we spend on research and development?" Historically, we have given them little help. As a result, the research and development budget has often competed for funds with other activities on the basis of the manager's selling ability, or sometimes a certain significant breakthrough in research and development has attracted more funds to that effort when the funds could be better spent elsewhere.

One of the most useful developments recently has been the use of some of the new mathematical techniques. For each major development project the judgments of the various operating managers are translated into financial form, in terms of both investment and income. Originally these analyses were made either on the best guess of each manager as to what would happen or on a minimum, most likely, and maximum basis. More recently, through the development of a computer program, we have been able to incorporate risk analysis to a much greater extent, since the computer allows us to enter a number of assumptions as to quantities, prices, operating efficiencies, etc., together with the various managers' best judgments as to the probabilities that each of these levels will occur.

This procedure has been limited primarily to developmental projects rather than true research, and it does not identify what the total research and development budget should be. Nevertheless, it certainly is an aid to management in screening out projects that, even if successful, would have a relatively nominal impact on the business. Through post-audits of these project analyses we are attempting to sharpen the abilities of both the engineering staff and operating units in their analyses of future programs.

These are only a few examples to illustrate my point: If we are innovative in integrating the product of other disciplines with accounting, the future for the use of accounting data in decision making is bright.

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