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What People Are Writing About

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BOOKS

Databanks in a Free Society: Computers, Record-Keeping and Privacy by ALAN F. WESTIN and MICHAEL A. BAKER, Quadrangle Books, Inc. (A *New York Times* Company), New York, 1972, 522 pages, $12.50.

Every time a project has been announced for computerizing personal data about large numbers of individuals—and there have been many such announcements in recent years—it has provoked a spate of dire predictions of a nationwide surveillance network from which no citizen can escape. This study, the first comprehensive investigation of what is actually happening in the field of computer databanks, shows clearly that nothing of the sort is developing as yet—which doesn't mean to say that it couldn't happen here.

"[O]nce an organization purchases a giant computer, it inevitably begins to collect more information about its employees, clients, members, taxpayers, or other persons in the interest of the organization . . . [In addition, there is more] sharing of data among those who use the machines . . . [There is also] the growth of central data pools in many important fields from education and health to banking, civil defense, and social science analysis . . . [I]n return for putting its data into the central pool, an organization is able to draw on the total collection . . . [The] impact of computers on organizational life is to destroy practical boundaries of privacy in record giving which were once as meaningful in this area as walls and doors were to conversational privacy before the advent of new physical surveillance technology."

This analysis was written by Alan F. Westin, professor of public law and government at Columbia.

University, in a book called *Privacy and Freedom,* published by Atheneum in 1967. Five years and an extensive research project later, the same author cheerfully admits, "Our finding is that this analysis does not fit the computerized record systems in existence in 1970-72."

Such a willingness to eat crow in public is as rare among academic researchers as among the members of any other group. It certainly helps lend authenticity to this newer book.

This book is the product of a three-year study of how corporations, government agencies, nonprofit organizations, and other record keepers are using computers to process information about people. The study was commissioned by the National Academy of Sciences, directed by Professor Westin, a specialist in the law and politics of civil liberties and civil rights; and staffed by social scientists, computer specialists, lawyers, psychologists, and mathematicians.

Covers over 1,500 groups

More than 1,500 public and private organizations that use computers answered detailed questionnaires. The researchers made personal visits (they call them "site visits") to 55 of the most advanced users of computerized information; 14 of these, including the Social Security Administration, the Federal Bureau of Investigation's National Crime Information Center, and the Bank of America, are profiled in some detail.

The researchers found a few shared central databank systems. Computer systems linking groups of users or customers to a central file have been developed by the FBI (NCIC and its new Criminal History File); the Kansas City police department (ALERT, a regional criminal justice information system providing instantaneous response to inquiries about crimes, individuals, and vehicles); the New York State Identification and Intelligence System (motor vehicle registrations and violations); a computerized credit bureau operation; a medical information bureau shared by several insurance companies; and a wanted-and-warrant network serving an unidentified metropolitan region. Of several proposed (and in some cases highly publicized) central databanks supposed to operate on a jurisdiction-wide basis in local government, none is actually functioning. Local government central databank projects had been discarded or converted into "'subsystem development leading to the prospect of a unified databank in the future,' an embarrassed way of saying that things were going to take a lot longer than they had expected and there was no central databanking there yet."

Thus, the authors conclude, there are "no central computer databanks of the kinds which had raised civil liberties alarms among our advanced organizations."

Furthermore, the researchers found, the centralized files they studied, although they permitted faster retrieval and frequently contained more accurate information about a larger number of individuals than the manual files they replaced, usually did not contain any more data about these individuals than the manual files; often, in fact, because of cost and design problems, they contained less information. Typically, the data in the computerized files were shared with other organizations no more freely than when the files were manual; normally, the same access policies were carried over. And the security problems did not seem to have increased with computerization.

All this does not mean, of course, that there is no potential threat to civil liberties from computerized files of data about individuals. For one thing, classified government files were not included in the study, for obvious reasons, yet those files, it is again obvious, constitute the greatest threat. (Remember, for example, the excitement a few years ago about the revelations of extensive military intelligence record keeping about campus dissidents.)

For another thing, the researchers occasionally seem to be a bit naive. They take at face value the computer operators' claims for their systems. For example, they extol the efficiency of the New York State Department of Motor Vehicles' automobile registration files—with no mention of the furor that arose recently when the state began mailing out traffic tickets to people who didn't even have cars!

Major point seems valid

Their main point, however, seems to be clearly valid. Computers, powerful though they are, are not as versatile as outsiders think they are. And they are incredibly inflexible. Computer systems that were not set up for the purpose of spying on individuals cannot easily be adapted for that purpose. And business systems are not set up for spying since there is no conceivable profit motive for doing so.

A fascinating example is the authors' description of the flap over American Airlines' SABRE reservation system. Originating with an article in *Look,* a widely repeated story had it that this system could track the movements of air passengers over a period of months and even supply the names of fellow passengers—and that law-enforcement personnel were using it for that purpose.

Actually, as these authors point out, data about a passenger's airline trip can be retrieved from the files only by inserting the date and flight number as well as his name; i.e., the output specified in the *Look* article is required as input.

"The SABRE system is programmed in this way because it serves business needs and fits technological constraints to have it so. The airline is not running a surveillance system and has no customer-service or business-information need to retrieve travel profiles for each passenger," reports Professor Westin.

There are, indeed, many threats to individual privacy and liberty

inherent in record keeping, and the authors have a number of suggestions to offer for countering them. The point clearly made in the book, however, is that these threats existed before computerization and have not been materially changed by it. It is noteworthy that the authors' proposals for protecting individual privacy—all worthy of serious attention—rarely mention computers as such; in fact, most of them could have been written before the invention of the computer.

The Watergate affair makes it abundantly clear that American civil liberties are always under attack on one front or the other and that eternal vigilance is required to ward off such threats. They come, however, from people, not from machines.

A Guide to Capital Expenditure Analysis by MOUSTAFA ABDELSAMAD, amacom, a division of American Management Association, New York, 1972, 334 pages, $21.95 ($18.75 to AMA members).

This report on capital expenditure analysis as actually practiced by major corporations is based on a survey. It also offers one of the simplest explanations available of the major evaluation techniques.

Is there a real need for yet another book on the methods used to evaluate proposals for capital investments? The author of this one, an associate professor of business administration at Virginia Commonwealth University, thinks there is:

". . . many of the most valuable writings on this subject are directed to the ideal manager—one who is an expert on management theory and practice, up to date in accounting and finance, an economics expert, and, above all, a mastermind in mathematics . . . This book will be different in that only a limited familiarity with mathematics will be required to understand and apply the material presented."

Helped by a clear, direct writing style, he has succeeded in coming up with easy-to-follow descriptions of the major capital expenditure analysis techniques: payback, accounting rate of return, discounted cash flow rate of return, net present value, and the MAPI method. He also explains, more briefly, such related quantitative techniques as sensitivity analysis, simulation, risk analysis, linear programing, and PERT and CPM; discusses problem areas; and reviews administrative techniques of capital expenditure evaluation.

Appeal to all groups

For the neophyte in the field his primerlike approach is ideal. For the sophisticate he has something else to offer—the results of a survey of practice in companies on the *Fortune* list of the 500 largest industrial corporations (conducted as part of the author's Ph.D. dissertation).

Unfortunately, from the point of view of the specialist in capital expenditure analysis, the report of the survey results is interwoven with the explanation of the techniques. It is worth digging out, however.

Payback, the survey showed, remains overwhelmingly the favorite technique of capital expenditure analysis. More than 80 per cent of the companies surveyed use it. Fewer than 5 per cent use it alone, however, reflecting the bad press it has had and general recognition that it does not measure the net profitability of a project.

In fact, few companies use any technique alone. The general practice is to use a combination of two or more techniques.

Payback is considered especially useful by the survey respondents in evaluating projects where the return must be realized quickly—in certain extractive industries where the raw material might stop flowing, in high-risk foreign investments, in highly competitive markets where competitors are expected to copy the product promptly. Its chief advantages, as seen by the survey respondents, are that it is easy to understand, simple to use, and well known.

More heartening is the author's finding that the use of DCFR is growing rapidly. It now is employed by 69 per cent of the respondent companies for major projects and 54 per cent for lesser projects. Its advantages, in the eyes of the survey respondents, are that it takes the time value of money into account, that it can be used for evaluating different types of investment proposals, that it analyzes future not historical data, and that it is accurate. Its disadvantages are that it makes heavy demands on the analysis staff personnel, that it is difficult to sell to operating personnel, that its results are difficult to compare with accounting data, that it is complicated and that it is difficult to sell to top management.

Accounting rate of return (percentage return on investment) is used by about half the companies. It is not a very clear-cut concept. (The author is able to show that there are at least 864 different ways of calculating it.) However, it is easy to reconcile with accounting data. The survey respondents see the same advantages in it as in payback; its weaknesses, they say, are that it ignores the time value of money and depends exclusively on accounting concepts.

Use of net present value

Net present value, considered by many authorities to be the best of the capital evaluation methods, is used by about 25 per cent of the respondents for major projects and by about 20 per cent for minor ones. They see in it the same advantages and the same weaknesses as for DCFR.

MAPI, a more sophisticated rate of return method, is still relatively unknown, used by fewer than 10 per cent of the respondent companies. They attribute to it the same weaknesses as for DCFR and net present value, plus the disad-

vantage that it places too much emphasis on estimates. Its advantages are also much the same.

More than half the companies surveyed use computers in evaluating capital expenditure proposals. Between 40 and 55 per cent use sensitivity analysis, simulation, risk analysis, and PERT or CPM; 29 per cent use linear programing.

Another interesting part of the survey identifies the major problems that these relatively sophisticated companies have in capital expenditures analysis. A separate survey, of whether and how large companies calculate their cost of capital, also is reported.

Despite its high price, this book's double-barreled appeal—to the beginner in capital expenditure analysis and to the specialist who wants to keep up with trends in corporate practice—probably makes it a must for any consultant's library.

The Computer Survival Handbook: How to Talk Back to Your Computer by SUSAN WOOLRIDGE and KEITH LONDON, GAMBIT, Incorporated, 53 Beacon Street, Boston, Mass. 02108, 1973, 224 pages, $6.95.

This book is described in its jacket blurb as "an unorthodox guide for the perplexed and harassed manager that tells not only what should happen when a computer is introduced into a business organization but also what unfortunate things all too often do happen, how to prevent them, and how to clean up the mess if they have happened anyway." Unlike most other manuals on data processing for the nondata processing executive, it tries to be funny, and often succeeds.

This book, by two young consultants who, according to the publisher, "are in charge of their own computer instruction school," is yet another guide to the mysteries of the computer for the noncomputerized executive. Its basic subject is "how to cope with the computer and manage the computer managers."

Humor is genuine

There is a difference, however, as the authors' own statement of their purpose makes clear: "It is intended as a working brief for those are convinced that it is possible to make the computer work for them, profitably, but don't know how. It's a way out of the trap for those who want to stop throwing away money on computer processing. It's a handbook for those shock troops of business who have been bent, torn or multilated by the company's computer, or who are afraid they might be." It is meant to be—and sometimes is—funny.

The content is conventional, although the chapter headings ("You and Them," "Lies, Damned Lies and Feasibility Studies," "Everything Takes Longer and Costs More," "A Dozen Embarrassing Questions to Ask the Computer Manager") are not.

The authors explain basic computer terminology, when and when not to acquire a computer, exploratory studies and cost/benefit analysis of computerization, feasibility studies, system design, testing, programing, installation, maintenance, evaluation, how to deal with systems analysts and programers, security, and fraud.

Their approach throughout is flippant and sometimes genuinely amusing. For example, these definitions:

"Systems analyst: The person whose job it is to define a data-processing problem, design a computer system to solve it, and hold your hand while it's implemented. Almost immediately he has to work on changing the system to improve it, make it do what you really want, or get it to conform to a new tax law just passed.

"Programmer: A person whose job it is to design, write, and test programs, the instructions which get the computer to do a specific job. Experts theorize that, through evolution and in-breeding, programmers may become a distinct sub-species of the human race.

"You shouldn't have too much trouble differentiating between the last two; look at their appearance and their apparent contact with reality and you can see the difference. However, if you really are stuck, then try asking the analyst or programmer how he would tell the sex of a parrot. The true programmer will reply, with impeccable logic, that he would teach it to talk and then ask it. The analyst, of course, will learn its language and then ask it."

Or take this provocative story of a computer fraud gone wrong:

The new army game

"The army programmer who set up an entire imaginary base, with 200 men on it. He opened 200 bank accounts for their pay checks. Only after he had the whole thing working well did the awful truth dawn: he would never be caught as long as he kept it up. The army never questions an extra 200 men, but there certainly would be questions if they all suddenly disappeared. He considered having them desert en masse, dropping an imaginary bomb on the base, having them wiped out by an imaginary case of food poisoning, and finally gave himself up in despair."

For the most part, however, the tone is light rather than really humorous, and the underlying intent is completely serious. The authors, who seem to know what they are talking about, have a lot of eminently sound advice to offer. Some of it is familiar:

"Knowing the jargon is your secret weapon; the computer people won't be able to dazzle you. For day-to-day work insist that they speak plain English when talking to you. The discipline is good for them; and it establishes them as servants of business, not masters—an important psychological point."

"The battle is half won if you

realize that everything does take longer and cost more. You can then view the over-optimistic plans of the computer people in the proper light, carry out the necessary changes, and make your own plans for what to do when things go wrong."

"If you have doubts about computerizing in your company, remember the First Law: Computerization is doomed if it is to be used by bad management. It's useless to spend money on sophisticated management reports if management isn't capable of using them."

Some of it is less familiar, i.e., the stress on setting objectives for the computer program and measuring accomplishment against them, the interesting discussion of computer fads that are dead and not so dead, the analysis of the basic causes of failure of computerization, and the questions to ask the computer manager.

If there is anyone who still needs an introduction to computer systems, this is certainly the most painless candidate to appear.

Management by Objectives: Applications and Research by STEPHEN J. CARROLL, JR., and HENRY L. TOSI, JR., The Macmillan Company, New York, 1973, 216 pages, $8.95 (clothbound), $4.95 (paperbound).

Unlike most books on the subject, this is neither a how-to-do-it manual nor a sales pitch. Firmly anchored in research, it is an objective—and much needed—evaluation of actual experience with management by objectives.

Management by objectives, as defined by these authors, is an approach to management that "involves the establishment and communication of organizational goals, the setting of individual objectives pursuant to the organizational goals, and the periodic and then final review of performance as it relates to the objectives. In addition, agreement would be likely on the following elements as necessary to an effective MBO program: effective goal setting and planning by top levels of the management hierarchy, organizational commitment to this approach, mutual goal setting, frequent performance review, and some degree of freedom in developing means for the achievement of objectives."

It was first publicized by Peter Drucker in his *Practice of Management* in 1954 and later endorsed by Douglas McGregor in *The Human Side of Enterprise*. Drucker emphasized the planning and control aspects of MBO while McGregor, more oriented toward personnel relations, stressed its performance appraisal function.

Since then a number of companies, particularly in Great Britain, have tried it. The authors wisely do not attempt to guess how many, nor do they devote much time to reporting subjective reactions to the technique. Their emphasis in evaluating its results is on hard research—if social science research can ever be said to be hard.

There is, the authors say, "a considerable body of basic research that does support the core of MBO concepts, but to date the research has tended to deal with only a few aspects of the MBO approach: the setting of goals, feedback or knowledge of results, and subordinate participation in decision making. . . . This research supports the idea that MBO should result in higher levels of performance than those of management approaches that do not involve the establishment of performance goals, the provision of feedback relevant to performance as it relates to such goals, and subordinate participation in the setting of such goals. The evidence would seem to indicate that the goal-setting process itself would be especially critical to the success of an MBO program, and key factors in setting goals would be their difficulty and specificity or clarity."

The authors, both professors of business administration, conducted a rather extensive study of the MBO program at the Black & Decker Manufacturing Company. They collected data by means of interviews, questionnaires, and study of personnel files. Later they participated in a program designed to improve the existing Black & Decker MBO program and then evaluated the results of this change effort.

At Black & Decker, they found, managers felt that MBO resulted in better and fairer appraisals of performance and that the MBO program did contribute to better planning, motivation, and communication. However, they also found a feeling that the approach required too much time and paper work and that the system was not always completely fair (because the goals assigned to different individuals differ in complexity and difficulty).

Research, the authors conclude, "indicates that the adoption of this approach can improve managerial performance, managerial attitudes, and organizational planning. The research also indicates that MBO programs require considerable time and effort expenditures for successful adoption, and unless they are given adequate support and attention and are well integrated into the organization, they will fail or not live up to expectations."

The rest of the book consists of advice, based on behavioral research and the authors' own experience, on how to make sure that MBO actually does live up to its potential.

This is a sensible book on a subject that has elicited a lot of fluff.

Briefly listed

Man in Motion: A Winning Game Plan for Executives by PHILIP MARVIN, Dow Jones-Irwin, Inc., Homewood, Illinois, 1972, 219 pages, $7.95.

This is yet another self-help book for the executive on the rise, written in stocatto style with plenty of personalization. It is full of sound advice that somehow is obscured

rather than illuminated by the author's gift for coining a phrase.

Computers and You: Their Application to Society by KURT STEHLING, World Publishing, New York, 1972, 308 pages, $8.95.

This is another popularization, for the general reader. After a short history of the computer and a simplified description of its workings, he reviews the major areas of computer application: education, transportation, medicine, weather, defense and space, business and commerce, and government.

MAGAZINES

Earnings Estimates and the Accuracy of Expectational Data by EDWIN J. ELTON and MARTIN I. GRUBER, *Management Science*, April, 1972.

Point estimates of future earnings per share are made by mechanical or mathematical extrapolating techniques and then compared to the estimates of a group of analysts. The purpose is to rank major extrapolating procedures in terms of their accuracy and to compare the results of the best techniques with those of a group of analysts.

In view of the multiplicity of earnings per share numbers existing at the present time, it is somewhat unfortunate the authors chose not to define the number they were testing. Given the tests were conducted during the period 1962 to 1967 one could suppose that problems of dilutions were not included in the e.p.s. numbers.

The authors tested nine techniques: four exponential weighted average, two regression formulas, two simple moving averages, and a naive model. As indicated, this by no means exhausts the possible list that could have been tested. No formalized "a priori" selection process is given; the authors selected those methods their reading indicated had been useful in other research projects. This selection process, of course, does not exclude the possibility that a method can be found that betters their best.

Evaluation criteria are presented solely in terms of the closeness of the estimate to the actual. The sum of the squares of the difference between actual and estimated earnings for each of the forecast years divided by the sum of the squares of the actual e.p.s. is their measure of accuracy. This measure of goodness of estimates does not account for specific payoff losses resulting from inaccuracy or the cost of various procedures. The authors claim the mechanical methods are less costly than those made by analysts but no cost information is given. It should also be remembered that the estimates are point estimates with no consideration given to probability estimates and the resulting variances.

Standard and Poor's compustate tape provides the data for the sample selection; 180 industrial firms that had earnings for the period 1962 to 1967. The authors admit this selection is biased in favor of large stable industrial firms which restrict the generality of their results. One-, two-, and three-year forecasts are made with the nine forecasting methods. Analysts from these institutions, two of which were the only ones that responded to the authors' request, had their forecasts compared to the best mechanical estimator for the one-year forecast. The authors claim their sample selection of analysts was biased in favor of the analysts because of the lack of willingness on the part of poorer institutions to participate but the arguments are far from conclusive. Unwillingness to participate does not always arise from fear of being shown to be inferior or incorrect. No reasons were given for not testing the analysts' forecasts for the two- or three-year periods.

The results of the tests showed that there was not a statistically significant difference between the analysts' forecasts and those of the additive exponential method with no built-in trend in the growth rate, the best of the one-year forecasting techniques. The naive model was next best after the exponential models in the one-year test. The exponential models clearly dominated the two- and three-year cases with the multiplicative exponential models without trend in growth built in proving to be the superior forecaster.

This study presents a clearly written presentation of an empirical test of various extrapolating techniques. Subsequent studies could be extended to other firms, long-term comparisons of analysts with models, and cost comparisons. More rigor in stating how to determine model parameters would improve the general application of the study. Criteria for determining which forecasting methods to select for testing could be improved so that the results would have a wider range of applicability. It would be interesting to see if the best methods would still be ranked in the same order if the data had been selected from the early 1970s. This reviewer would like to see a follow-up study.

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Management Accounting for the Future by ROBERT N. ANTHONY, *Sloan Management Review*, Spring, 1972.

An attempt to make predictions on future trends in management accounting is the ambitious task undertaken by the author. This article speculates about promising directions for research in management accounting in the 1970s. It identifies those topics for research which, the author believes, seem to have a good chance of bearing results that are of practical use for managers in the decade ahead.

In choosing the topics to be included in this article the author applied two criteria. Research in management accounting is likely to

be productive if the current state of the art about a topic is unsatisfactory, *and also* if a way of making improvements is discernible.

The diverse topics discussed by the author are grouped, somewhat arbitrarily, under three headings: first, those related to the content of information; then, those related to analytical techniques; and, finally, those related to control systems and the control process. Each of these groups is discussed independently. A concluding section then summarizes problems suggested by the analyses and the steps that can be taken to correct them.

Information content

Under this heading are grouped topics that relate to the most useful way of defining various costs and of defining output information. The topics considered include capitalizing other current expenditures, cost of capital, transfer pricing, social costs and benefits, and cost accounting standards.

Capitalizing Human Resources—Management control systems are usually designed to focus on earnings on capital as the primary measurable objective of a business. This is because capital is regarded as the principal scarce resource. People with various types of skills are also a scarce resource. Earnings on capital is thus an inadequate control concept in most firms. Research is needed not only on the measurement of human resources, but also on the best way of reflecting the periodic write-off of this asset.

Capitalizing Other Current Expenditures — Current expenditures for research and development, advertising, and similar activities should be capitalized because the central purpose of capitalization is to hold on the balance sheet expenditures which are made to benefit future periods. It is difficult, but not impossible, to devise a practical way of deciding on what amounts should be capitalized and how they should be written off to the appropriate future periods. This is an area in which research should be exciting and of potentially great significance to management.

Cost of Capital—No one has yet demonstrated a practical way of finding the discount rate that is appropriate for analyzing a proposed capital expenditure except in the simplest situation. There is general agreement on the proper concept: one seeks a weighted average of the cost of debt and the cost of equity, adjusted for risk and uncertainty. In 1958 the Modigliani-Miller paper started researchers on the wrong track by asserting that the debt/equity ratio was irrelevant. Although the right answer still is not known, there *is* an answer.

Transfer Pricing—In 1955 Joel Dean laid down the general principles for transfer pricing. Shortly thereafter, Jack Hirshleifer suggested a fundamentally different approach. Unfortunately, his approach is applicable only to the profit maximization situation that occurs relatively rarely in the real world. David Solomons, however, has helped to bring the subject back on the right track.

Social Costs and Benefits—A traditional assumption of accounting is that costs are incurred for economic reasons. Some researchers argue that this assumption is too narrow; costs also are incurred for social reasons, that is, for the benefit of society, rather than for the economic objectives of the company. The development of concepts and techniques for measuring these social costs is just beginning. It is important research that should be encouraged.

Cost Accounting Standards — There are important, difficult, and challenging jobs to be done in devising good cost standards. The creation of the Cost Accounting Standards Board (CASB) has reawakened interest in research relating to the measurement of costs. Although the CASB is primarily concerned with cost-type defense contracts, cost standards are also needed for hospitals, schools, universities, governments, and other nonprofit organizations. Such standards probably are similar to, but not quite identical with, those that are being developed by the CASB.

Analytical tools

The topics listed in this section relate to tools that are useful in the analysis of information. In general, they stem from applied mathematics. The topics considered include probabilistic estimates, linear programing in budgeting, analysis of variances, and common data on discretionary costs.

Probabilistic Estimates—The idea of expressing estimates of future events in stochastic terms rather than as single numbers is not new. Recommended techniques include the calculation of an expected value, the decision tree, the Monte Carlo approach, and sensitivity analysis. If there are worthwhile opportunities for research in this area, they are in the area of practical application, rather than in the refinement of techniques.

Linear Programing in Budgeting —It has been suggested that linear programing techniques should be used in formulating both operating budgets and capital budgets. It seems unlikely that in the near future these techniques will be used in the process of preparing operating budgets, since the work required to develop and manipulate the linear programing model is apt to collide with the more important task of negotiating the budget that is going on at the same time. Nevertheless, it seems quite possible to use these techniques to study the overall economics of an organization and to spot areas for improvement. For the capital budget, linear programing cannot be used unless all proposed capital projects can be brought together at one moment in time, and it is unlikely that this can be done.

Analysis of Variances—The proper approach to analyzing a difference between expected and actual performance has been described in general terms in many texts. Essentially, it involves breaking the total variance into mix, price, volume, efficiency, and perhaps other components. A great deal remains

to be done, however, in applying this general idea to specific areas in real world companies.

Common Data on Discretionary Costs—Discretionary costs are those for which *no* optimum amount of costs required for a given output can be stated with reasonable accuracy. By definition, therefore, a company cannot determine what the optimum amount of spending is for a discretionary cost element. A useful way of guiding individual judgments on the amounts to spend is to find out what other companies spend on similar functions. This inter-industry information collection would be an expensive undertaking, but one that should pay big dividends.

Control systems

In this section, topics related to control systems and to the management control process are listed. The topics considered include management control system fundamentals, behavioral considerations, programing, integrated information systems, non-profit organizations, and controllership.

Management Control System Fundamentals—Control systems include information about inputs and outputs. The idea of feedback must obviously be added. From this elemental structure, it should be possible to go quite far in describing both conceptually and realistically what the management control process actually is. To date not much progress has been made. Additional research in this area based upon the use of models may make important contributions.

Behavioral Considerations — Although the author states that no thorough attempt to treat the behavioral aspects of management accounting is made in this article, he believes that some mention of the topic is essential. For the behavioral aspect of management accounting, according to Anthony, is at least as important as the economic aspect.

Programing—Programing is much less well known than budgeting. Programing and budgeting are two types of planning. According to Anthony, programing can be defined as the process of formulating the product marketing programs, the production programs, and other programs that the company plans to undertake. The programing process has become a fruitful field for study.

Integrated Information Systems—Integrated information systems are feasible. Most of the job of designing an integrated system will be done by the individual company. University researchers, however, can observe and report what systems designers are doing. Perhaps they can also generalize from individual experience in a way that will benefit others.

Non-Profit Organizations—There are a great many opportunities to apply to non-profit organizations techniques that have developed in profit-oriented companies. In general, management control in these organizations lags behind that of profit-oriented organizations. The task is much more complicated than simply transferring existing techniques to the new environment. The techniques must be adapted to the special circumstances in non-profit organizations.

Controllership—The current question is whether the controller should broaden his role so as to encompass information of all types, or whether part of the information management function should become the responsibility of a new breed, the information manager. In the universities, a corresponding struggle is going on regarding which department should be responsible for the broad field of "Information Systems." There are opportunities for researchers to explore this power struggle.

Conclusions

It is not easy to think of developments of great social significance that have emerged from accounting research, states Anthony. This article considered diverse areas of management accounting wherein such opportunities exist. The article suggests some reasons for this situation and perhaps some steps that can be taken to correct the picture:

1. There is a great disparity between the topics on which researchers concentrate and the topics which seem likely to be most fruitful.
2. The mechanistic approaches suggested by economists and their hidebound economic models have rendered a serious disservice to the development of management accounting.
3. A good information system has not been devised and, until recently, an acceptable unifying conceptual scheme for management accounting has not been found.
4. Many researchers reject the idea that accounting is a practical art and that research should have a practical orientation.
5. The professional accounting firms do not publish the results of their research in a form that is comparable to that common in other professions.
6. Not enough money is spent on accounting research and the research performed is part-time and fragmented.
7. Accountants are reluctant to recognize their changing role. This must occur if accounting research is to proceed along new and productive lines to meet the challenges and demands of managers in the future.

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