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What People Are Writing About

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BOOKS

Information Utilities by RICHARD E. SPRAGUE, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1969, 200 pages, $8.50.

A curious mixture of factual reporting and blue sky forecasting, this book nevertheless contains a good deal of information that will be valuable to anyone who is professionally interested in any aspect of electronic data processing. Its appeal to the general reader, to whom it is ostensibly addressed, is questionable.

The information utility—or on line-real time computer service bureau—is already much closer to reality than most people realize, Mr. Sprague claims, and he offers plenty of evidence in this book to back up his statement. By analyzing various existing, proposed, and possible examples of information utilities at work, he attempts to predict the sort of impact this development will have on businessmen and consumers.

The information utility, in the simplest definition offered by Mr. Sprague, is a type of on line-real time system "in which a large number of individual users from many different organizations will be sharing a central data processing and memory complex. Each user will be supplied with a data terminal, or input-output device, connected directly to the center at the time of use." It differs from a conventional data processing service bureau in that it supplies information directly at the subscriber's own location in a format that he normally uses and in that payment usually is on a per transaction basis.

No single organization (or small group of organizations) has yet emerged as *the* information utility (comparable to telephone or power utilities); perhaps none ever will. However, to the extent that any OLRT system available to be

shared by more than one organization may be considered an information utility, a surprising number of them have already developed. In an appendix Mr. Sprague reproduces a list (undated) of 35 commercially oriented time sharing systems and 29 research-oriented ones now in operation.

These and other organizations are now providing a wide variety of services, ranging from billing, tax service, and credit information to employment placement, criminal intelligence, and tickets to sporting and theatrical events. In another appendix Mr. Sprague lists 34 types of service that have been offered or proposed; nearly all are already available.

Services offered

Savings account processing is available to nearly every savings institution in the United States. Professional billing services operate in nearly every large city. Three national services offer stock brokerage information. Medical and/or accounting data processing is available to hospitals in several parts of the country. Complete travel service is not yet available, but most of the pieces of it exist, and their combination is not far away. Only a few information retrieval systems are operating so far, but many are under development.

Most of these services are highly specialized, directed to a particular group or industry such as airlines, libraries, and railroads. A number of organizations, however, are seeking to operate as general purpose information utilities, providing service to many different kinds of subscribers. Among them are Keydata (probably the first), Western Union, ITT, General Electric, and Service Bureau Corporation. In addition, some of the time sharing systems that provide engineering problem solving service will probably evolve into general purpose utilities; the time sharing services, says Mr. Sprague, are "really the general purpose utility in its infancy."

Mr. Sprague presents detailed descriptions of four types of information utility service. Only one of them seems to be actually in operation in the form he describes (ticketing service). One, Personal Data Services (PDS), is apparently the service to be provided by the firm of which Mr. Sprague is now president, Personal Data Services Corporation; he fails to specify the state of its development, but the chapter is written in the future tense. Another (SAVE, for System for Automatic Value Exchange) is a funds transfer system somewhat similar to that provided by the Bank of Delaware.

The most interesting of the four systems to the accountant is Mr. Sprague's proposal for a national tax service that would maintain all tax records for the Internal Revenue Service and state and local governments. Individuals and corporations would enter their tax data directly into its equipment. Any errors or discrepancies would be pointed out by the machine immediately; the taxpayer would not have to wait for the IRS to return a reply.

Such a system, Mr. Sprague suggests, could be operated by the IRS. However, the "prevalent" fear of Big Brother might make it preferable for some independent organization to own the system. Then the various governments—plus law and accounting firms and all corporate and individual taxpayers—would be subscribers.

After a "semitechnical" section on considerations in the design of an information utility and a chapter that briefly touches on such questions as who should be permitted to operate information utilities, whether they should be regulated and by whom, and who should audit them, Mr. Sprague takes off into the forecasting sky. His final chapters attempt to predict the effect the availability of information utilities will have on daily life and business.

Most of his forecasts follow the pattern already made familiar by popularizers in the data processing field, but some of his ideas are provocative. For example, he feels that the problem of invasion of privacy—which already exists, he points out, to a much greater degree than most people realize—would be solved, not intensified, by the establishment of a national information utility for individuals. The reason is that a law protecting the rights of individuals and regulating access to data would be much easier to enforce against a single national information supplier than against the multitude of credit bureaus and grantors, government agencies, and the like now collecting data.

Personal computers coming

By the year 2000, Mr. Sprague predicts, information utility costs will have been reduced sufficiently and the market will have become large enough that a housewife should be able to have personal data service for no more than twice the amount of her telephone bill. By the early 1970's, he anticipates, the selling price of a cathode ray terminal should be down to well under $1,000, with rentals in the $10 to $25 a month range.

Fascinating though it is, this is a peculiar book in many ways. Its complete lack of any organization structure and the wide range of styles of writing employed suggest that it was assembled rather than written. It reads, in fact, as if Mr. Sprague had collected some writings of his own and some memoranda prepared by researchers (acknowledgment is given to the advanced business systems staff at Touche Ross & Co., where Mr. Sprague formerly was principal director in advanced business systems, for its research work) and combined them with some new material written to fill gaps and some transitional paragraphs to make a book.

One consequence for the reader is that he must read the entire book to find any specific information he may be looking for. A more serious consequence is that any reader,

depending on his level of sophistication, is certain to find sections of the book either irritatingly simple and "popular" or beyond his comprehension.

The jacket blurb, preface, and some section introductions state flatly the book is aimed at the "general reader." In certain sections the style is conversational and personal, with liberal use of the second person: "What is that you say? I have never done anything wrong and I have always paid my bills on time. OK, good for you, if it is true." Yet other sections read exactly like a consultant's report. More seriously, these sections frequently introduce terms unfamiliar to the general reader without any explanation of them: multiprocessor, communications buffer, executive program. And the chapter on the market for information utilities (which explains how to conduct a market study, among other things) contains little that would be of interest to the general reader. Indeed, it is explicitly introduced as being "of special interest to current or potential owners and operators of utilities."

On balance, the book is clearly for the specialist. For him it offers a good deal of reportorial-type information not readily available elsewhere and some provocative and stimulating ideas. Mr. Sprague is unquestionably one of the best informed men in the industry on information utilities, and those who are interested in this subject should not miss anything he writes.

Accounting and Its Behavioral Implications by William J. Bruns, Jr., and Don T. DeCoster, McGraw-Hill Book Company, New York, 1968, 441 pages, $7.95 (hard cover), $4.95 (soft cover).

This compilation of 40 articles on behavioral science and its relation to accounting is a sampling that stresses breadth rather than depth. It provides an excellent introduction to a relatively new field.

Accountants traditionally have been interested in numbers rather than people. This is probably the reason the relation between them, although obviously important, has been so little explored until recently. Most of the systematic research in this field has been conducted in the last decade, and most of it is at least touched upon in this anthology.

The articles go from the general (communication theory, work motivation, and work group relationships) to the particular (applications to accounting). The accounting-related chapters focus on two major areas, the effect of accounting on management decisions (the results of varying accounting methods, the motivational impact of performance measurement, the influence of responsibility reporting) and the problems of gaining employee acceptance of budgetary goals, controls, and systems changes.

This book is a useful guide for anyone engaged in the practice of accounting, financial management, or systems design, if only to show, as the editors point out, how "little is known and much remains to be done" in the way of research in this subject.

(Four of the articles originally appeared in this magazine.)

Briefly listed

Contemporary Accounting and the Computer by Leonard W. Hein, Dickenson Publishing Company, Belmont, California, 1969, 359 pages, $4.95 (paper bound).

This anthology of articles on EDP and the accountant covers such subjects as basic computer concepts, auditing by EDP, internal control, systems planning and design, feasibility studies, organization, EDP applications, service bureaus, and simulation. Although the book is intended primarily as a supplementary readings text for college students, its value to the practicing accountant is obvious. Seven of the articles originally appeared in Management Services.

Retirement Income in the United States: A Case for the Composite System by the Committee on Employee Benefits, Financial Executives Institute, New York, 1969, 47 pages, available without charge (paper bound).

The Financial Executives Institute continues its defense of the existing pattern of pension systems and its opposition to new regulation.

Foundations of Optimization by DOUGLAS J. WILDE and CHARLES S. BEIGHTLER, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1967, 480 pages, $12.50.

Billed as the first book to present a unified theory of optimization, this book combines such mathematical elements as unconstrained optimization; nonlinear, linear, geometric, and dynamic programing; Pontryagin's maximum principle; and block search procedure into a single theory of how to achieve the maximum gain or minimum loss in a rational manner. The authors say that the principal mathematics required is understanding of differential calculus. Even so, this book is not for the mathematically unsophisticated.

MAGAZINES

Corporate Models—The State of the Art by GEORGE W. GERSHEFSKI, *Managerial Planning*, November-December, 1969.

Mathematical models of specialized functions such as inventory control are getting fairly routine by now, and some operations researchers are turning their attention to corporation-wide models. This article reports the result of a survey of progress in this field.

Sixty-three companies—out of 323 member companies of the Planning Executives Institute that replied to a questionnaire prepared by this author—have corporate operations research models in use or under development. Another 39 intend to begin development of such models within the next year.

This group, Mr. Gershefski notes in the article, includes nearly every company in the survey sample that has an operations research group. These companies vary widely in size, industry, and nature of business. Model building appears "to be a matter of individual initiative. Models appear to exist in those companies where someone has heard about them and has proceeded to 'sell' management."

The models are used primarily to project statements of net income, capital expenditures, source and use of funds, and balance sheet. Their most common application is to evaluate alternative operating or investment strategies. Other applications frequently mentioned by the respondents are to provide revised financial projections rapidly, assist in determining feasible corporate goals, and analyze the effect of interacting items.

Nearly all the models are simulations (five per cent are mathematical programing, or optimization, models), and nearly all are deterministic (twelve per cent use probability distributions). Virtually all are computerized.

About one-third of the models were developed from the bottom up; the researchers started with a detailed model of a part of the company with the idea of expanding it function by function to cover the entire company. The rest began as relatively undetailed models of the total corporation.

On the average, Mr. Gershefski reports, it took 3.5 man-years to develop the first working version of a corporate model. The range was from .5 to 23 man-years.

More than 90 per cent of the survey respondents felt that the benefits derived from the model justified the effort expended to develop it. Indeed, 50 per cent reported that their managements gave more weight to conclusions derived from the model than to results of other analytical studies.

The Measurement of Price Changes in Construction by JOHN MUSGRAVE, *Journal of the American Statistical Association*, September, 1969.

The Bureau of the Census has recently begun research aimed at developing a statistically adequate set of construction price indexes. This research is motivated by the inadequacy of the Department of Commerce's "composite" construction cost index, the closest substitute for a comprehensive construction price index currently available. In this article, Mr. Musgrave describes recent Bureau research on price indexes for new single-family houses. The problems encountered and the approach used, as well as the validity of the resulting index, warrant the attention of all accountants considering the merits of replacement cost financial reporting.

Currently compiled construction indexes are deficient, according to this author, because, among other reasons, they (1) depend entirely on secondary data, (2) assume no change in productivity over time, (3) often suffer from improper weighting of wages rates and building material prices, and (4) use wage rates and prices which "frequently do not represent actual prices but rather some type of quoted or 'normal' price." Furthermore, the present "composite" index, a Paasche index, measures not only the results of price changes but also changes over time in the relative importance of different types of construction. Consequently, Mr. Musgrave believes that a fixed-weight (Laspeyres) index would be more appropriate as an indicator of construction price movements.

Two major problems have impeded the derivation of a price index for new one-family houses: "(1) the separation of 'pure price' changes from changes in the 'quality' of houses and (2) the separation of value of site from the price of the house itself." The second

difficulty can be eliminated by collecting sufficient data on site values. However, the first problem is conceptual in nature and plagues the construction of every type of index, general or specific.

Characteristics chosen

A great many characteristics determine the price of a house. After careful examination, the Bureau selected eight of these characteristics which seemed to account for a significant amount of price variability. By use of regression analysis, an equation was developed which explained about 70 per cent of the variability in house prices, assuming a constant "mix" of the eight characteristics. Index numbers were computed using the regression coefficients from the equation plus information regarding the proportion of houses having each given characteristic. This index is of the Laspeyres (fixed-weight) type with 1963 as the base year and 1964-65 as the weighting period.

Accounting issues raised

From an accounting standpoint, this article raises several important issues. First, currently existing construction price indexes are defective and may not provide reasonable estimates of replacement cost for use in current cost financial statements. Whether this is true of available specific indexes in general is conjectural. Second, most indexes ignore changes in quality over time. Mr. Musgrave's regression approach provides a means of treating only one aspect of this problem, the importance of which varies depending on the commodity involved. Third, a specific type of index (e.g., Paasche, Laspeyres) must be chosen. Each has certain advantages and disadvantages. In addition, selection of the base year and weights will affect the resulting index numbers. All these factors must be evaluated in choosing the most appropriate index.

To summarize, the author describes the difficulties involved in developing an adequate price index for new single-family houses. Significantly, however, he demonstrates that a reasonably accurate index can be constructed if sufficient effort is expended. A careful reading of this article will give all accountants a better understanding of the practical and conceptual problems underlying the development of specific price indexes.

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Profit Potential in Small and Growing Businesses by DOUGLAS K. YOUNG, *The Price Waterhouse Review*, Summer, 1969.

Many of the problems faced by the rapidly growing small business are symptoms of inadequate administrative systems. This article describes how such a company can proceed in improving these systems.

The imaginary Do-Right Manufacturing Company is presented in this article as a rapidly growing company with typical growing pains. Production delays, poor inventory control, and a tight cash position are among the problems that the directors now seek to alleviate. After months of discussion, the board has decided to seek the aid of an outside consultant.

Mr. Young believes that many of the problems afflicting Do-Right are symptoms of inadequate administrative systems. He presents a list of sample questions that can be used to identify such symptoms. The proper course of action for the Do-Right Manufacturing Company, he says, is to undertake a thorough review and analysis of the company's administrative systems.

Such a review can be performed by management and supervisory personnel from within the organization, by outside consulting firms, or by a combination of both. The review may be limited in scope, or it may be extensive. The scope and the personnel used will generally depend on the financial and personnel resources available to the firm.

The process of improving systems can be divided into five stages: (1) fact-finding, (2) analysis, (3) definition of alternative and recommended solutions, (4) decision, and (5) implementation. Mr. Young describes each of these steps in the article.

Fact-finding consists of the collection of data relevant to the scope of the review. Analysis involves the orderly arranging of facts and data so that the nature of the existing problems and potential solutions to them can be discerned. The definition of alternative and recommended solutions involves the determination and comparison of: (1) immediate and long-range systems benefits in terms of increased efficiency, control, and quality of information, (2) relative costs, and (3) achievement of other goals.

Upon receipt of the consultant's report, Do-Right enters the decision stage. Management must decide on the degree to which it will accept and implement the consultant's proposals. The consultant recommends that the company hire a chief financial executive and a data processing manager, install a small computer, start preparing condensed and comparative reports of operations for management, and design a computer-based cost and inventory control system.

New systems and procedures can be implemented by a cutover process or a parallel process. In the cutover method, a cutoff date is established and all transactions subsequent to that date are processed under the new system. Under the parallel method, both old and new systems are operated for whatever period of time is necessary to assure that the new systems are functioning properly. Each approach has advantages and disadvantages, and these are discussed by the author. He concludes that in practice a combina-

tion of the management principles methods of systems installation is usually most effective.

The author classifies administrative systems in which improvements can be made into four categories: (1) clerical, hand posted, and one-write systems, (2) auxiliary office equipment, (3) bookkeeping and accounting machines, and (4) in-house or service bureau computers. Illustrations of system improvement situations in each category are presented in the article. For example, microfilm is presented as a means for improving clerical efficiency by making it possible to locate and obtain copies of necessary documents rapidly and for substantially reducing the space costs of document storage.

Benefits listed

The general benefits of system redesign and procedural revisions are said by Mr. Young to include cost savings through personnel efficiency, cost savings through management control, profit growth through improved management decision making, and achievement of other company goals. The happy aftermath of the system improvements by Do-Right Manufacturing Company, as envisioned by the author, was the disappearance of many of the growing pains noted previously. The company had adequate working capital to pay suppliers on time; control of inventory and accounts receivable had been substantially improved; plant operations were more efficient; and the organization was more effective.

In the conclusion Mr. Young warns that many companies solicit advice only after it is too late to save the organization. The time for management to improve administrative systems, according to this author, is when the company's growing operations are basically sound and profitable. Systems improvement at this point in a company's growth will enable it to realize its true profit potential.

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Another Look at Depreciation Policies

by E. L. SUMMERS and C. H. GRIFFIN, *Cost and Management*, September-October, 1969.

The recording and reporting of depreciation of fixed assets has long been a topic of controversy, both inside and outside the accounting profession. This article provides a new perspective.

Historical-cost depreciation concepts are usually not adequate to describe the relationships among asset depletion, earning power preservation, and income measurement, the authors believe. They therefore propose a depreciation accounting system intended to measure the asset service potential used or expired in a period, measured as the amount of capital expressed in current dollars to produce the cash flow associated with use of all fixed assets during the period for which income is measured.

Principal objectives

The authors begin their analysis of depreciation policies by presenting seven objectives that have been suggested at one time or another for depreciation accounting:

1. To provide for the replacement in kind of worn-out assets
2. To provide for the replacement of original invested capital
3. To provide for maintenance of asset ability to produce cash flow
4. To provide for the recovery of the original (historical) cost of assets
5. To produce a taxable income figure that harmonizes with federal tax legislation
6. To "protect" cash flow sufficient in amount to cover the cost of financing assets
7. To provide for the replacement of asset service potential used or expired.

One or a combination of these objectives may be attained through various depreciation policies. According to the authors, a "depreciation policy is determined by specifying the total amount of capital to be recovered and by the allocation of total recovery to an asset's service life." They provide four alternatives for each of the two elements of depreciation policy:

(A) Total Recovery
   1. Dollar price paid (or equivalent) at time of acquisition
   2. Dollar price paid at time of acquisition, expressed in dollars of the most recent balance sheet date
   3. Replacement cost of asset services at the most recent balance sheet date
   4. Capitalized decrement in earnings expectations resulting from holding and using an asset in the most recent time interval of account.

(B) Allocation
   1. Uniformly to each operating period of the asset's useful life
   2. Primarily to some fraction (segment) of the asset's useful life (such as the first part, etc.)
   3. To a specified point in time, such as the time of acquisition or disposal
   4. As a function of other variables, such as the financing schedule for the asset or entity-system parameters which are not necessarily related to specific assets.

Thirteen of the sixteen possible combinations of these elements, which form the set of plausible depreciation policies, are assigned to at least one of the previously suggested objectives for depreciation policies. The excluded combinations, namely, A4B1, A4B2, and A4B3, are rejected because they are logically inconsistent.

Preferred goals

As previously implied, a depreciation policy is always selected with some particular objective or objec-

tives in mind. The authors say they have observed that business managements often select Objectives 1, 2, 3, 5, and 6 as preferred objectives for depreciation policies. However, none of the feasible depreciation policies can satisfy more than one of these "preferred objectives." There are several groups, for example, taxing authorities, the public, and internal management, that require information of which a depreciation policy is an inherent part. The depreciation policy selected for reporting to each of these groups may vary, formally or informally. "Obviously, historical cost depreciation concepts (those beginning A1) [while being potentially acceptable for tax purposes] fail to accomplish any of the first three objectives. Indeed the propriety of listing these first three objectives might be considered suspect since many accountants would be chary about recognizing them as legitimate," the authors say.

Replacement objective

Thus rejecting further consideration of historical cost policies, the authors turn their attention to Objective 7, the provision for the replacement of asset service potential used or expired. They admit that Objective 7 is the most complex objective listed. They point out that "in an economy where general and specific prices are stable, Objective 3 (maintenance of cash flow) [which is a 'preferred objective'] would be in all respects equivalent to Objective 7. When prices are unstable, however, a given number of dollars will not, from period to period, represent the same ability to engage in exchange activity." The depreciation policy that fulfills both Objective 3 and Objective 7 is the one classified as type A4B4.

Example described

Summers and Griffin now proceed to describe an example of an A4B4-type depreciation policy. Their example groups assets of varying ages, lifetimes, and functions into "operational entities." A firm would consist of at least one entity. Once the operational entity is defined, a measure of the change in "capital," the depreciation charge, with respect to that particular operational entity may be determined. "*Capital* is an attribute of a scarce resource, namely, the present service benefit that is equivalent to all future service benefits from the resource." As a surrogate for change in capital, the authors choose net cash flow attributable to a particular operational entity multiplied by a factor "F," which is a measure of "how many dollars of capital investment are currently necessary to purchase one dollar of cash flow—as a function of industry, asset, and functional utilization."

Policies compared

Statements prepared using a straight line historical cost depreciation policy are compared with statements prepared using the Summers-Griffin proposed depreciation policy over an eight-year period for a property with an original cost of one million dollars. The comparison indicates that "if the United States adopted a measurement of depreciation based on diminished ability to produce cash flow, the payments to government and equity holders under present public policy would be drastically reduced."

Management use

In summary, it appears that the grouping of assets into operational entities and the analysis of their decrements in earning potential can provide useful information to management for resource allocation decisions. The Summers-Griffin system could easily be adapted to include increases in asset value resulting from conditions other than general price level changes. Such adaptation is accomplished via a negative "F," which, when multiplied by cash flow, produces an amount to be considered as income. There are difficult problems in determining meaningful values for the "F" factor, as well as for cash flow related to specific operational entities. "Yet the hope persists that if the concept of service potential measurement has superior merit, they [the authors], as well as others, will in the future be able to attack the problems of implementation with more directness."

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