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What People Are Writing About

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BOOKS

Conversational Computers by W. D. Orr (Editor), John Wiley & Sons, Inc., New York, 1968, 227 pages, $8.95.

Businessmen who are aware that time sharing is the wave of the future but don't quite grasp what it is all about may find their answer here.

"Conversational" interaction with computers is a major new phenomenon in its own right, not just another application of computers, the editor of this volume believes. It ranks with such generic concepts as data processing and automation as an element of technological revolution; it "will have an effect on all of us that is at least as profound as the effect of the personal passenger car."

This volume, says Mr. Orr, is an attempt to explain this phenomenon to "the intelligent, curious nonspecialist who, in one way or another, has come to suspect that something is up in the world of computing and would like to know what – if that is possible. It *is* possible."

The technique Mr. Orr has used is to assemble an anthology of "pivotal" writings in the field. All the selections are by specialists, but they lack – or have been "purged" of – technical details. To understand them the reader need not understand how or why a computer works.

The approach is comprehensive. Following some general conceptual selections, the articles describe applications of time sharing to problem solving (with some discussion of simple languages for direct communication with the computer), to computer-assisted instruction, and to information retrieval, with a section on the use of graphical languages.

A section on the computer utility

includes the Federal Communications Commission's Notice of Inquiry, an analysis of the regulatory and policy problems posed by the computer utility and the philosophy behind the FCC's current inquiry. The final selections deal with the psychological and social implications of time sharing and computer utilities, including the issue of invasion of privacy.

The contributors are distinguished. Among them are Dr. Vannevar Bush, former director of the Office of Scientific Research and Development; Charles W. Adams, whose KEYDATA Corporation is considered by some to be the first commercial computer utility; and a number of researchers from The RAND Corporation, System Development Corporation, and other organizations that have pioneered in this field. Nearly every major successful time sharing development is represented, from Dartmouth College to the Los Angeles police department.

No one has yet done a better job of putting the next computer era into perspective. Those who have not yet caught up with the present one would be well advised to read this book.

Time-Sharing Data Processing Systems by JAMES R. ZIEGLER, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1967, 299 pages, $10.50.

The nontechnician in data processing will have to wait a long time to find a more intelligible presentation of this difficult subject.

Time sharing, a "mass distribution" technique for data processing, seems to be the wave of the future in computer usage. It won't be long before everyone who is involved in any way with computers will have to be familiar with it. This book provides a relatively painless way to do it.

Mr. Ziegler, who is director of advanced programing research for National Cash Register Company, has sought to provide a primer for executives and other computer users who are thinking of joining an existing time sharing system or setting up their own.

In remarkably simple language he explains what time sharing is and what it can be used for, offering guide lines for economic feasibility. He reviews the hardware requirements and the software techniques applicable in time sharing implementation. Finally, he poses a realistic problem calling for time sharing; suggests a typical equipment configuration, based on available hardware; and develops the necessary concepts for control programs and an actual user application.

This book is aimed at the user, not the technician of electronic data processing. Its basic objective is breadth, not depth, and its emphasis is on implications and opportunities, not button pushing. For the accountant, consultant, or executive who attempts to keep up with EDP without getting bogged down in technicalities, it should be invaluable.

Management Controls for Professional Firms by REGINALD L. JONES, CPA, and H. GEORGE TRENTIN, CPA, American Management Association, New York, 1968, 206 pages, $9.

The practitioner in any profession —and his accounting advisor—can get a lot of help from this summary of the management procedures that are appropriate when the product is a service rather than a tangible.

In the professions—as in industry —the trend has been toward larger and larger firms. Serious problems of management often result, for the lawyer, doctor, or architect—unlike the industrial executive—is seldom trained or interested in administration.

How to ensure that even in a large firm professional services can be high-quality and profitable is the subject of this book. Actually, the task is much simpler than in an industrial enterprise, for there is only one resource to be managed efficiently, human effort. Simple though it is, these authors point out, this subject has been neglected sadly; this book may well be unique.

Organizational structure and the utilization of time are the key elements in management controls for the professional firm, and both are discussed in detail. Attention is also given to such significant but subsidiary topics as data processing and tax planning.

The authors, partners in the CPA firm of Arthur Andersen & Co., have had extensive consulting experience advising professional firms, and their understanding of the potential roadblocks to good management in these organizations shows in their vivid (though hypothetical) case histories, which are full of human interest.

Their book fills a real need. It should prove of great value to the professional faced with the problem of mushrooming staff and overhead and dwindling profit margins. The professional's CPA firm will find in it an opportunity to supply a much needed management service. And the CPA may even find it helpful in the management of his own practice.

(A chapter from this book appeared as an article in the March-April '68, issue of MANAGEMENT SERVICES.)

Managerial Budgeting for Profit Improvement by WALTER R. BUNGE, McGraw-Hill Book Company, New York, 1968, 236 pages, $9.95.

This guide plays down the accounting aspects of budgeting in favor of its managerial uses.

An effective budget, says Mr. Bunge, is more than merely a means of expressing objectives and mon-

itoring compliance. It is also an effective device for motivating human behavior—drawing out latent ideas, applying psychological incentives, encouraging the use of good management practices, and developing managerial skills.

All these aspects of budgeting are covered in this volume, along with developing budget estimates, cost analysis, flexible budgeting, capital budgeting, cash and asset control, and financial planning. The style is simple, with liberal use of hypothetical case studies ("What do you think is in the cards for next year, Paul?"), charts, and tables.

The author, a corporate director of accounting services and a past president of the Budget Executives Institute, is described in the foreword as a well known "missionary" for the concept of "managerial" budgeting. In this book he has done a good job of proselytizing, particularly for the accountant who may lean to a narrower view of the budgeting process.

Characteristics of an Effective Management Control System in an Industrial Organization by ROBERT H. DEMING, Division of Research, Graduate School of Business Administration, Harvard University, Boston, 1968, 222 pages, $5.

This novel little research study attempts to identify characteristics of effective management planning and control systems.

This book is more than a case study, although an exceptionally detailed case study occupies the bulk of its pages.

The author prepared a detailed description of the planning and control system in use at a multi-divisional manufacturing company carefully selected on the basis of a long list of criteria. Then this description was used by a committee of experts on management control systems to evaluate what they considered to be the strengths and weaknesses of the company's system. Their conclusions, in turn, were reviewed and commented upon by the company's management.

This research process, Defense Comptroller Robert N. Anthony suggests in the preface, is probably unique. "The literature contains a great many descriptions of management control systems, a great many personal observations by participants in the management control process, a number of sales tracts on the merits of proposed new techniques, a small amount of quantitative information on how many companies use this technique or that technique, and a number of textbooks recapitulating all the rest (and also recapitulating other textbooks). The literature does not contain, so far as I know, anything similar to the research reported in this book."

What makes this book different are the comments about management control of a small group of highly competent people – Marshall K. Evans, vice president—management services, Westinghouse Electric Corporation; R. Burt Gookin, vice president—finance, H. J. Heinz Company; Edmund W. Pugh, Jr., vice president—finance, Columbia Broadcasting System, Inc.; and Arjay R. Miller, vice president—staff group, Ford Motor Company—and the case company management's reactions to them. These opinions, and the author's conclusions based on them, have broad applicability in the design of management planning and control systems.

Effective Presentations by EDWARD HODNETT, Parker Publishing Company, West Nyack, New York, 1967, 225 pages, $7.95.

This adaptation of a corporate manual is a real how-to-do-it guide.

This book, subtitled How to Present Facts, Figures, and Ideas Successfully, is a rewrite of a manual originally prepared for executives, chemists, engineers, salesmen, and other professional employees of Dow Corning Corporation. As such, its stress is on the practical.

The first section tells how to develop a presentation tailored to the material and the audience, including how to plan strategy, organize material, and meet problem situations.

The second, and most useful, section adds up to a short course in the use of audio-visual materials – how to choose the right tools; how to make statistics interesting; and how to use charts, graphs, slides, filmstrips, overhead projectors, and motion pictures.

The concluding section takes up various ways of improving oral presentations – how to handle yourself on your feet, how to deal with small groups, how to improve writing style.

For the executive, consultant, accountant, or anyone who must make presentations to groups, this book would be a useful guide.

Office Operations Improvement: How to Cut Costs and Improve Morale by BRUCE PAYNE and DAVID D. SWETT, American Management Association, Inc., 1967, 143 pages, $9.

More a sales pitch than a manual for clerical work measurement, this little volume tells enough about the technique to enable the business man to decide whether he wants to employ it.

With operations improvement (basically work measurement) a company today should be able to reduce its office staff by at least 20 per cent. That is the claim of the authors of this relatively hard sell book on clerical time measurement.

They tell how to select a time measurement method, how to plan and staff the program, how to handle human relations problems, and how to use the resulting data in control. The approach is broad rather than deep; topics touched on

include selling the program to employees, selecting and training analysts, methods improvement, economics of measurement, design and use of performance reports, uses of standard costs, salary administration, and the role of the computer.

From this book, the authors say, the reader should learn enough about the background, details, and procedures of a "total operations improvement program" to develop his own program—but probably not without the help of a consultant.

The Practice of Planning by DAVID EWING, Harper & Row, New York, 1968, 149 pages, $5.95.

This description of planning at the highest corporate levels is interpretative rather than procedural; its emphasis is on overall strategy rather than day-to-day operations.

The Harvard Business School's rich mine of case material plus published case histories are the source for this account of the practice—as distinct from the theory—of strategic business planning, written by an editor of *The Harvard Business Review.*

The text is laced with capsule case histories. As with so many books of this type, the examples are more interesting than the generalizations they illustrate.

The book is deftly written and tightly organized. In clear 1, 2, 3 style the author lists the objectives of corporate planning and discusses two major bases for setting goals; the outside-in approach, that of sizing up potential markets and then organizing the corporation to supply them, and the inside-out approach, that of analyzing the company's unique strengths and resources and building on them.

He describes various methods of appraising the organization's talents and abilities and deciding how to use them — with numerous examples of success and failure from American corporate history. He also evaluates the role of budgeting in strategic planning and briefly explains the major new quantitative tools available, including decision trees and the critical path method.

The result is an interesting if not notably illuminating book, worth reading if only for the case material but not likely to be reread very often by those actually engaged in planning.

Briefly Listed

Information Retrieval: The User's Viewpoint — An Aid to Design by ALBERT B. TONIK (Editor), International Information Incorporated, 2101 Walnut Street, Philadelphia, Pennsylvania 19103, 1968, 311 pages, $12.

This volume, the proceedings of the fourth annual national colloquium on information retrieval, contains twenty monographs on topics related to computer-based information storage and retrieval systems.

Effective Maintenance Management by E. T. NEWBROUGH and the staff of Albert Ramond and Associates, Inc., McGraw-Hill Book Company, New York, 1967, 368 pages, $12.50.

This book, which covers maintenance organization, maintenance systems, preventive maintenance, cost control, planning, estimating, scheduling, evaluation, training, compensation, incentives, reporting, data processing, and just about every other aspect of maintenance, is, the publishers claim, the first to treat the subject in such scope and breadth.

The Uniform Coded Chart of Accounts by ALTON LEE, JR., Quintus Cyntania, P. O. Box 1727, Newport Beach, California 92663, 1967, 285 pages, $27.50.

This little manual, a comprehensive list of general ledger accounts, uniformly coded, is designed to be used as a coding "dictionary" in any organization. It includes an appendix that contains self-checking code numbers.

Progression Handbook by ELLIOTT JAQUES, Southern Illinois University Press, Carbondale, Illinois, 1968, 72 pages, $7.50.

The author of this book led the research team from the Tavistock Institute of Human Relations that started the famous study of the Glacier Metal Company that came to be known as the Glacier Project. Out of this research Professor Jaques developed a systematic, objective method of establishing a differential pay structure and of measuring levels of work. Together with the author's *Time-Span Handbook,* this book is a guide for companies that wish to apply the technique.

Incentives in Manufacturing: Individual and Plantwide by R. C. SCOTT, Volume 3, The Eddy-Rucker Nickels Company (4 Brattle Street, Harvard Square, Cambridge, Mass. 02138), 1968, 48 pages, $1.

This booklet completes the reprint of a series of articles first published in *Circuits Manufacturing* magazine (see M/S September-October '67, p. 59). The series seeks to promote the type of group incentive plan installed by Mr. Scott's company. This volume concentrates on some advantages of group incentives, on the relation between incentives and the guaranteed annual wage, and on incentive plans for salaried people.

MAGAZINES

When You Reach Your Level of Incompetence by LAWRENCE J. PETER, *Think,* March-April, 1968.

Dr. Peter has discovered a new Parkinson-type management principle, elucidated in this amusing article.

Like C. Northcote Parkinson, Dr. Peter (in real life an associate professor of education at the University of California) is interested in bureaucracies. For the study of hierarchies, a new science, he has coined the term hierarchiology. This article enunciates the first hierarchiological theorem, the Peter principle:

Peter principle

"In a hierarchy, each employee tends to rise to his level of incompetence. Every post tends to be occupied by an employee incompetent to execute its duties."

Escalation to incompetence levels has always been inevitable, Dr. Peter points out. An employee who does his job competently thereby becomes eligible for promotion. But "there is no guarantee that the employee who has faithfully done a few things will be competent to do many things. This is the essential weakness of the hierarchy and of the promotion process."

As a case example Dr. Peter cites the example of ten clerks who start as deputy-assistant junior paper processors at Hierarchy Paper Processors, Inc. Half prove incompetent and thus are not eligible for promotion. "They will stay in the positions they are incompetent to fill."

The others reach their levels of incompetence at various levels of the hierarchy. The one who attains the rank of senior paper processor is felled by two heart attacks and compelled to slow down.

Symptoms

Dr. Peter identifies several symptoms that indicate an employee has reached his level of incompetence: phonophilia (an abnormal craving for telephones, intercom devices, and voice recorders), papyromania (the accumulation of needless masses of papers and books); and the Auld Lang Syne complex (persistent complaining about the present as compared to the good old days). Certain physical ailments are also characteristic: high blood pressure, constipation, obesity, allergies, insomnia, peptic ulcers, cardiovascular complaints, and alcoholism; the presence of two or more of these ailments suggests the final placement syndrome.

Solutions are few. The main effect of pre-employment testing, according to Dr. Peter, is "to ensure the competence on initial placement; therefore promotion is hastened . . . to an area of less competence. In the end the employee arrives at his level of incompetence in less time."

The individual employee has two outs. One is substitution, in which he ignores the duties of his position that he is incompetent to perform and busies himself with something he can do. A better one is creative incompetence, by which the employee avoids promotion by creating the impression he has already reached his level of incompetence.

In his conclusion, Dr. Peter promises a book on the Peter principle. Let us hope that he means it.

Appraising Profit Center Managers by JOHN DEARDEN, *Harvard Business Review*, May-June, 1968.

A well known critic of traditional ways of measuring the performance of divisional managers tells what's wrong with the use of the profit budget as a standard — and offers some positive suggestions.

The practice of dividing a large company into small "businesses" and measuring each one's performance on a profit and loss basis has become common in recent years. Each profit center manager sets his own profit goal for the coming year; his bonus is based on how well he meets that objective; and top management's attention is focused only on deviations from the plan.

In theory, this system should be an excellent tool for management control. In practice, according to Professor Dearden, it is generally ineffective, misleading, and unreliable for these reasons:

An equitable profit goal for the coming year is almost impossible to determine, partly because there are too many complex performance variables within the typical profit center and partly because the conditions that will exist during the coming year (particularly the economic climate and the competitive situation) cannot be predicted accurately.

In measuring performance it is almost impossible to separate those causes of variance from budget that result from profit center action (and hence are controllable by the division manager) from those that result from external conditions beyond his control.

A single year is usually too short a time in which to measure a profit center manager's performance accurately. Over the long run profits can be a reasonable measure of performance; in the short run they can be misleading.

Cost control

These criticisms do not apply, Professor Dearden notes, to the manufacturing cost control systems on which the profit budget systems are based. Manufacturing cost control systems meet all the conditions necessary for a successful budgetary control system: It is possible to set reasonable standards of performance, to measure output precisely, and either to control performance variables or to measure the impact of changes in these variables. Profit budget systems, the author charges, do not meet even one of these conditions.

Therefore, Professor Dearden recommends, top management should stop using profit budgets for evaluation of profit center performance. This action in itself would be an improvement, he says, even without the substitution of an alternative performance evaluation system. However, he has another system to propose:

Profit budgets would still be prepared, but they would be used

only for planning—and particularly for changing plans—not for performance evaluation. Performance evaluation would be based only on what has actually been accomplished, not on a comparison with plan.

Shorter periods

The performance period covered would be one appropriate to the profit center, usually three to five years. Evaluations would be made whenever there is a change of division manager or whenever top management becomes concerned about the particular profit center. The evaluation would be conducted by the central finance staff with the assistance of other staff offices. In addition to profit performance, it would probably cover marketing and product positions and organizational and personnel development.

Actually, although Professor Dearden might not admit it, what he is proposing is a return to relatively subjective measures of performance. This may well be justified if, as he charges, today's spuriously objective techniques are doing more harm than good. Specifically, he thinks, they are harmful in these ways:

Dangers

They produce incorrect evaluations and hence inequitable compensation. They motivate profit center managers to maximize short-run divisional profits without regard for the entire corporation's long-range welfare. They encourage the setting of low-level easy-to-attain profit goals. They lull management into thinking that it knows what is happening.

This is a significant article for any businessman, accountant, or consultant concerned with budgeting and performance evaluation. Professor Dearden has done a better job of calling attention to the problem than he has done of solving it, but he has something genuinely important to say.

Managerial Problem-Solving Patterns: An Action Research Program by RAGHU NATH, *Pittsburgh Business Review*, February, 1968.

This article describes a decision making exercise for executives developed at the University of Pittsburgh and some of its results.

Exercise Problem Analysis, a managerial problem solving exercise, was developed for the twin purposes of training and research.

The participant is asked to identify and describe the most important problem he currently faces in his work situation and then to analyze it in terms of force field analysis. That is, the problem is analyzed in terms of two sets of forces—increasing (those forces that are trying to help in the solution of the problem) and restraining (those forces that are working against the solution). He identifies the operative forces in each category, tells which he would manipulate to solve the problem, and why.

The exercise has been administered to graduate students of business administration and to junior and senior executives. On the basis of the comparative results Mr. Nath outlines a few tentative research findings:

The higher the level of the executive the greater the importance of human (as distinct from technical) factors in the problems he faces (as analyzed by the executive). The importance of human factors is least for the students. Thus, Mr. Nath concludes, more emphasis should be placed on behavioral sciences in training at the executive level than at the graduate student level.

In the exercise the primary problem solving strategy selected by the students was that of manipulating the restraining forces only, while the executives chose the strategy of manipulating both increasing and restraining forces. This, Mr. Nath feels, reflects the executives' greater experience with real life organizational situations, where these forces almost always interlock.

Among both students and executives, few seek the "optimal" outcome in their problem solving. Some nine-tenths are content to seek a "satisficing" solution.

Clarifying Responsibility Relationships by T. M. HAMILTON, *California Management Review*, Spring, 1968.

A McDonnell-Douglas Corporation analyst describes the Management Responsibility Matrix, a new analytical tool for spelling out just who is responsible for what.

At Douglas Aircraft a new technique of organizational analysis, the Management Responsibility Matrix, has become a useful supplement to such conventional tools as organization charts, position guides, and detailed procedures.

The MRM is a grid pattern with people, grouped by organizational element, listed across the top and tasks listed at the side. When the appropriate symbols have been plotted in the grid area, reading across any task row will show what degree of responsibility, if any, each organizational element has for the accomplishment of that task. Reading down any individual's column will identify all his responsibilities.

The symbols used provide more refinement of responsibility descriptions than is possible on an organization chart. W performs the work; s provides direct supervision; S provides general supervision; M monitors the work activities; N must be notified; C may be consulted; c must be consulted; R establishes requirements; and A must give approval.

Preparation of the grid, which is a cooperative effort in which all those listed on it participate, immediately spotlights unassigned functions, overlaps of responsibility, and other organizational problems. The discipline of forcing a detailed "think-through" in itself produces some 90 per cent of the grid's bene-

fits, according to the author. However, the finished grid has other applications. It may be used to develop highly accurate position guides, to help in the preparation of detailed procedures, to revise organizational relationships, to sort out interactions in complex management processes, and as an educational device.

This article describes the technique—the development of the grid and its applications—in enough detail for the reader to be able to use it. Anyone involved in organizational planning will find this article interesting, and possibly useful.

An Application of Input-Output Analysis to Some Problems in Cost Accounting, by YUJI IJIRI, *Management Accounting*, April, 1968.

This paper illustrates the techniques of input-output analysis applied to some interdependent cost accounting problems. Those who understand matrix algebra will find this article of interest.

Input-output analysis was originally developed to find relationships among the basic inputs of industries, the transactions among industries, and the final outputs of these industries. This author applies input-output analysis to these same activities within a single firm. The example used is a situation found in petroleum refineries, chemical manufacturing, etc., where part of the final output produced is combined with raw materials to produce more of the same output.

The first problem is to find unit costs of the products. Once this is done internal transaction entries can be prepared using dollar amounts. The second problem is cost analysis of the inputs of raw material, labor, and overhead contained in the final products. This analysis yields an easy way of computing the effects on the final product costs of a change in the cost of any of the inputs. This cost analysis works equally well where all costs are variable or where part of the costs are fixed and part are variable. The variable unit costs derived by the cost analysis may be used as a criterion in make or buy decisions for the various products.

These problems are analyzed on the basis of output coefficients. The author then goes on to show that the same problems can also be analyzed on the basis of input coefficients. He illustrates the use both of dollar input coefficients and of physical coefficients, based upon quantities, where dollar amounts are not available or necessary. The quantities used need not be homogeneous; they may be in any mixture of units such as pounds, gallons, ounces, pints, etc.

Assumptions

Input-output analysis is based on two assumptions. The first is that the products produced by any process are all homogeneous. The analysis cannot be applied to processes which produce joint products or by-products unless the process can be divided into a process for each joint product or by-product. This is necessary because each cell in a matrix represents a single input or output.

The second assumption is that the input and output coefficients are constant. That is, there must be a linear and proportional relationship between the inputs and outputs regardless of the volume involved. For example, if it takes one quart of product X and 1 pound of product Y to produce 1 gallon of product X, then it must take 1,000 quarts of product X and 1,000 pounds of product Y to produce 1,000 gallons of product X. If the relationship between the inputs and outputs is linear and nonproportional, the technique may be applied but with care.

Other difficulties mentioned in the article include these: Predetermined costs cannot be used if opportunity costs are desired; self-consumption costs cannot be netted if cost data are to be analyzed dynamically; and endogenous sectors cannot be manipulated during analysis.

Input-output analysis as a tool can be very useful in solving interdependent cost accounting problems. Anyone working in this area would do well to read this article as well as the references cited.

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The EMSI Story by GURDON W. LEETE, *The Lamp* (Standard Oil Company of New Jersey), Winter, 1967.

This description of how Jersey Standard and its affiliates are using operations research techniques is sketchy but provocative.

Esso Mathematics & Systems Inc. (known as EMSI or Esso Math) was established in 1966 to coordinate the application of mathematics, computers, and business systems throughout the Standard Oil Company of New Jersey system.

Computerizing of accounting and statistical operations, now nearly completed, has produced annual savings of about $30 million. But Jersey's use of operations research techniques is more interesting and potentially still more profitable.

This article describes only a few of these applications and those briefly. One is a model to schedule supplies of crude oil from all over the world to twenty-two European refineries and the distribution of finished products to thirty or forty major European terminals. (There were ten to the five hundredth power theoretical combinations from which the computer had to choose the optimal.)

Another is a model for designing a system for moving natural gas from the interior of Libya to a port, liquefying it, and then shipping it to Spain and Italy. A key problem was the impact of winter storms in the area of the port. The model had to determine how much storage

capacity was required at the port to allow for failure to ship in bad weather, how many ships would be needed, and how much storage capacity to build in Europe. Other examples are touched on briefly.

Although this is far from a how to do it article, it provides an interesting glimpse into OR in a major company.

The Real Low-Down on Materials Management by GREGORY V. SCHULTZ, *Factory*, December, 1967.

On the basis of an opinion-gathering field study, it is concluded that the forecasted "magic" technique of materials management, as practiced today, has not achieved total systems cost reduction.

The materials management (MM) concept was developed from the central idea that there are only four key manufacturing control areas—men, machines, money, and materials. The MM position is that all of the materials-related functions, i.e., purchasing, production and inventory control, materials handling, packaging, traffic, and distribution, should report to a single manager. Under this organizational structure, the natural conflicts between these departments can be resolved at a central point, with the solutions taking account of the companywide, or total systems, impact of each decision.

To evaluate the effectiveness of the MM theory in actual practice, a senior editor of *Factory* traveled 9,000 miles gathering opinions from managers who had tried the concept. In this article, the author presents his conclusions and follows with excerpts from seventeen of the interviews.

The author defines total systems cost reduction as "a significant systems change that affects sales, production, and distribution simultaneously." He reports that none of the managers he talked with initiated MM for the specific purpose of accomplishing total systems cost reduction. Only two companies had, in fact, realized such a result after several years of experience with MM, and in one of these cases it was by accident.

Objectives

The reasons given for instituting MM were these: (1) conversion from centralized to decentralized management, with MM being established as a basic profit center (nine companies), (2) a need in a corporate acquisition for a plant or division materials manager who could uncover problems in critical areas of the acquired plant (five companies), (3) a need for a skilled materials manager who could carry the load for inexperienced or technically obsolete subordinates (three companies), and (4) a need for putting the materials acquisition and flow system in order prior to computerization (three companies).

In evaluating MM's claim of "forced" coordination among departments, all of the managers surveyed agreed that MM resulted in reduced lead time for purchased materials and parts, fewer parts shortages, more realistic buying policies, and better finished product delivery performance. However, it was felt that the value of the materials manager was diminished once this coordination had been established, policies formalized, and the whole put on the computer.

Inventory reduction

The other big advantage claimed by the managers for MM was inventory reduction with lower materials prices. Companies with "true" MM agreed almost unanimously that it cut inventory 20 to 40 per cent and increased inventory turnover by two turns per year. Significant inventory cuts were reported even by companies that had only recently adopted MM. These reductions were achieved through coordination on all fronts, including sales and marketing, along with the discipline which was forced on production managers and design engineers.

One-fourth of the surveyed companies indicated that 50 to 80 per cent of all MM savings came from the purchasing function through such routes as annual purchase contracts, material substitution, and value analysis.

In the author's opinion, the failure of MM to move aggressively into total systems cost reduction is the reason why MM's savings (other than inventory) are purchasing-oriented. Furthermore, he feels that unless MM breaks through its self-imposed barrier, such savings can be gained just as well by upgrading the purchasing function. Support was given for this view by the two surveyed companies that had abondoned MM.

Mr. Schultz predicts that the increased use of sophisticated computer systems, which have real time interfaces with all parts of the business organization, will make MM unnecessary.

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A Descriptive Model of the Intra-Firm Innovation Process, by KENNETH E. KNIGHT, *The Journal of Business*, October, 1967.

Professor Knight describes innovation as the adoption of a change that is new to an organization and to the relevant environment. The process of innovation is considered as a special case of the process of change in an organization. In his theoretical analysis of innovation, Professor Knight offers hypotheses about the innovative process and discusses situations that are likely to produce innovations.

The fundamental thought in the teaching of the Greek philosopher Heraclitus (535-475 B.C.) was that the universe was in a state of ceaseless change and that "one could not step twice into the same river, for other and yet other waters are ever

flowing on." Processes of change and adaptation have long perplexed students of human behavior. In more recent years researchers have given considerable attention to organizational adaptation, change, and innovation. Professor Knight's article is one of seven articles in this issue of *The Journal of Business* focusing on the process of organization innovation.

Definition

Professor Knight characterizes innovation as the "adoption of a change which is new to an organization and to the relevant environment." The process of organization innovation, considered a distinct subset of organization change or adaptation, is discussed in terms of two major phases: the creation of the idea and its development and the introduction and adoption of the idea.

The creation and development of an idea is discussed in terms of certain characteristics of creative individuals and the characteristics of organizations that foster creativity. Most of the research that has been done on innovation has been directed toward this phase. Professor Knight's concept of organization innovation, however, includes not only the conditions for creativity but also the process by which new ideas are introduced into an organization. His classification of organization innovation includes four types: product or service innovation, production-process innovation, organizational structure innovation, and people innovation. These four types of innovation are considered to be highly interrelated so that an innovation of one type is likely to create or be met in return by changes in one or more of the other three categories. Equally important, each of these four types of innovation can have either a positive or negative impact on the goal achievement of an organization.

Professor Knight also considers the extent to which an innovation differs from existing alternatives by describing two types of "radicalism." First, performance radicalism is defined as the amount of change in output that results from the introduction of a new idea. Second, structural radicalism defines the extent to which the structural arrangement differs from existing ones. Together these two measures of radicalism provide a framework for describing the extent to which different innovations are adopted. Organization innovation is conceived of as an ongoing process through which organizations attempt to adapt to pressures for new products, new production processes, modifications in organizational structure, new people, or continued education for current personnel. Professor Knight hypothesizes that organizations differ in their recognition of the need for change, in their search patterns, and in their search procedures to find satisfactory solutions. He presents a general model of organization search for innovation which consists of three categories. First, routine or programed innovation includes minor product or service changes, production-process changes, and the normal movement of people within an organization. Programed innovation may include all of the types of innovation described earlier but is identified by a low degree of radicalism as compared to present alternatives.

Non-routine innovation

Second, slack innovation, a situation in which the organization perceives itself as successful, is a form of non-routine innovation. Slack innovation includes wide search activities external to the organization and emphasizes product, service, and production-process innovation. It is hypothesized that in a situation reflecting slack innovation there is very little disruption of the internal organizational structure.

Third, distress innovation, a situation characterized by the unsuccessful corporation, is another type of non-routine innovation. Distress innovation is conceived of as a continuum of change from rather mild internal changes to wide and random search for radical organizational change.

Requirements

Within this general model of organizational search, the innovator represents the interface between the creative idea and the organization. An innovator must first have an idea and the desire to introduce it. Innovation is a conscious effort to create change. Involved in such a change are problem recognition, search processes, and problem solution. The problem-solving process is tempered by the innovator's role in the organization, his beliefs about himself, and his relationships with other people. Problem solving is a process of cognition, and emotional and social factors are likely to play an important part in the behavior of the innovator.

Second, the innovator must have the means by which he can successfully bring about change. He must have the power to innovate. He must have control over those aspects of the environment that will be altered. Organization power can be viewed as accruing to the position an individual occupies in the formal organization hierarchy or formal decision making and task activity structures. Organization power can also be viewed as accruing to individuals through informal networks of interpersonal relations and cohort groups. Together, informal and formal sources of organization power provide a broad spectrum of means by which the innovator can successfully introduce new ideas.

Limitations

Professor Knight explicitly recognizes that his analysis represents only a limited description of intrafirm innovation. He acknowledges, for example, that a manager could not take his model and use it to determine the optimal way to bring about specific innovation in an organization. His analysis of innovation, however, can provide inter-

ested practitioners with an awareness of the complexity and interrelatedness of the elements of organization innovation. Professor Knight's article will be of additional interest to managers and accountants through its excellent presentation of recent developments in the description and analysis of organization innovation. The article also contains an extensive list of references.

ROBERT J. SWIERINGA
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The Instant Executives, *Forbes,* November 15, 1967.

Using Booz, Allen & Hamilton as a case, a business magazine looks at the management consulting field.

As everyone knows by now, management consulting is a booming field. This article takes a look at its current state and particularly at the largest of the conventional management consultants (excluding CPA firms), Booz, Allen & Hamilton.

Little is said about the accounting firms. A Booz, Allen executive is quoted as charging them with conflict of interest, and their built-in advantages in terms of prior knowledge of the company and training in quantitative thinking are noted.

The article's conclusions are not very startling. The pros and cons of consulting – and of large versus small firms – are fairly familiar by now.

But some of the information provided may be useful to someone interested in doing consulting, for example, Booz, Allen's billing rates ($25 an hour for a junior consultant, $75 to $200 an hour for a senior officer) and its formula for success ("You don't break even unless you are keeping your people at least 90 per cent utilized . . . The real secret is to get 105 per cent utilization."). *Forbes* has dug up a number of critics of consultants' methods, too, and their comments provide a handy list of don'ts.

The Browsing Era by RICHARD E. SPRAGUE, *Business Automation,* June, 1967.

Long a fan of on line-real time systems, Mr. Sprague seeks to refute the claim of skeptics that management doesn't really need them.

A new, as yet not definitely named, era in the use of computers is dawning, Mr. Sprague says. In the past he himself has referred to this era as that of on line-real time systems (see "On Line-Real Time Systems – 1964" by Richard E. Sprague, M/S May-June '64, p. 40). In this article, adding the concept of time sharing, he calls it the era of the computer conversational or "browsing" mode.

Already, he points out, more than fifty time sharing computer centers all over the country are letting scientists, engineers, professors, and students solve problems by trial and error conversation with a computer in their own language. Time sharing is also having a revolutionary impact on education and on library and medical research.

The most significant effect, in Mr. Sprague's view, will be on management. He takes issue with the skeptical view of Harvard Business School Prof. John Dearden that "A real time management control system . . . would not help to solve any of the critical problems even if it could be implemented."

The conflict stems, according to Mr. Sprague, from differences in the definition of real time. Professor Dearden uses the term to mean that information in the system is up to date within seconds from the time an event occurs that generates the information. That kind of real time system may well have limited application.

Mr. Sprague's real time is related to the time required to obtain information from the system, not to its currency. For this kind of real time system there is a genuine and nearly universal need. "The important consideration is that when the manager needs information for whatever reason he needs it now."

Mr. Sprague goes on to describe a real time (in his sense) "browsing" system based not on a "total" management information system blanketing the entire organization but on a group of tailor made systems in which each executive has his own personal data base (including his own appointment calendar, schedule, telephone number listings, etc.).

Such a system, Mr. Sprague concedes, will be unstructured and wasteful from a system designer's point of view. But he finds it highly probable.
