HANDBOOK of BUSINESS FORMULAS and CONTROLS

Spencer A. Tucker

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The editors for this book were W. Hodson Mogan and Joseph Williams, the designer was Bill Frost (Dimensions), and the production supervisor was Thomas G. Kowalczyk. It was set in Palatino by Monotype Composition Company, Inc.

ABOUT THE AUTHOR

President of Martin & Tucker, Inc., Management Consultants, the author has in 36 years of professional practice served more than 460 companies in the United States, Canada, Mexico, Western Europe, and the Orient in profit planning, cost estimating and pricing, evaluation of the firm, production methods and work standards.

As Managing Director of the Profit Planning & Management Institute, he has personally conducted 97 workshop sessions for top and middle management. More than 4,700 executives have been trained in his profit-planning concepts, tools, and techniques.

To recognize profit planning as a profession, paralleling recognition of professional competence and integrity in other disciplines, in 1977 Dr. Tucker developed the Certification Program by which qualified candidates can receive the professional designation CPP (Certified Profit Planner). The written examination is administered by the Board of Certification of Profit Planning & Management Institute, composed of 28 outstanding business leaders in the United States and Canada, executives of major trade associations, professional consultants, and eminent people from academic life.

The author of seven books and more than 300 articles in

professional journals and trade magazines, Dr. Tucker is a Registered Professional Engineer in New York, thirteen other states, and two Canadian provinces. He is the only non-accountant to be awarded the Lybrand Gold Medal from the National Association of Accountants, the highest award of the accounting profession. A second singular honor is being the only U.S. recipient of a grant from the Ottawa government to improve profitability in Canadian converting industries. Dr. Tucker is also the first nominee for the first National Medal of Science (Management) to be awarded by the President on the recommendation of the National Academy of Sciences. His textbooks have been translated into five languages and adopted by many colleges and universities throughout the world.

Dr. Tucker, who holds graduate degrees in industrial engineering and business administration, was awarded an honorary Ph.D. to recognize the original contributions made through his professional practice.

FOREWORDS

Active participants and interested observers of today's business scene will quickly recognize the contributions made by Tucker in this book. More importantly, the businessman, whether his particular expertise is marketing, production, or finance, now has at his fingertrips a compilation of practical day-to-day illustrated business problems together with logical, easily understood solutions—if you will, both a reference source and a checklist.

For all of us confronted with cost/profit problems and opportunities, a considerable amount of valuable time is consumed determining the relevant data required and the manner in which they should be evaluated or pretested. The complex variables of the business world certainly increase the need for timely rational and concise data. Direct costing is the major building block which fulfills this requirement.

Beginning with Chapter One, where Tucker states that "In order to make any kind of economic decision, the direct or out-of-pocket costs must be known," through to the final chapter on Integrated Control Ratios, this book allows the businessman to make better use of the most critical of his assets, namely his own time and that of his key management. This work, once and for all, should bury the type of comput-

erized management information which misleads management by giving an aura of authenticity.

Professional business skills, whether applied by a full-time staff or by outside consultants, is usually beyond the economic means of the small businessman. This does not diminish the need for these skills. Therefore, this book becomes necessary as an effective aid to his decision making.

Loan officers of lending institutions will find the chapters on financial management and their control ratios an excellent checklist in assessing the meaningfulness of the financial indices that form a part of all loan instruments.

The significance of sales mix, production mix, asset mix, and the mix between liabilities and net worth, and how to measure and model the impact of these changes on the enterprise, is spelled out in clear, concise terms.

For members of Boards of Directors, who today play an increasingly important role in charting the well-being of the company, this book is mandatory.

F. S. K. WILLIAMS, CA, CPP
Financial Consultant
Toronto

Spencer Tucker has brought together an outstanding compilation of quantitatively expressed meaningful business relationships for the first time in a single text. He presents for each functional area of management a series of formulas and ratios, thereby providing a system of informational controls essential for the successful operation of a business in today's dynamic, complex, and competitive industrial environment.

Both managers and business academicians will find this text a source of invaluable techniques for decision making, management controls, and performance measurement for both the overall company or division, as well as the functional areas

of marketing, finance, managerial accounting, production, and purchasing.

With the advent and rapid growth of data-base management information systems, Spencer Tucker's basic and advanced control ratios (Chapters 7 to 17) could readily be programmed and integrated into management information and control software. Then sales, production, and other timely output data could be developed within the computer system with appropriate managerial reports generated. Using Tucker's ratios, these output reports could show current status, comparison of current to past performance or comparison to target.

The text also provides an excellent framework for the kinds of integrative material required for business policy courses at the senior and MBA levels in colleges of business and schools of management. Such courses could easily be designed to integrate the entire business curriculum by utilizing the text's formulas and control ratios as the basis for demonstrating managerial decision-making criteria at various levels of the organization.

SAMUEL S. STEPHENSON, DR. ENG. SC.
Professor and Director of MBA Program
College of Business & Public Administration
Florida Atlantic University
Boca Raton, Florida

As one of Spencer Tucker's disciples it is no hardship to write a foreword to this his latest and probably his most important work to date. It used to be said that management is the art of making irrevocable decisions on the basis of inadequate information. Today, with emphasis on a total systems approach, management is less an art than a science; and Spencer Tucker leaves no room for inadequacy in the determination of data required to assess correctly the financial impact of various courses of action that may be taken by operating managers.

What Spence recognized a long time ago was essentially that fixed or period costs, whether pure, or present as a component of mixed costs, were being treated quite arbitrarily in the cost recovery process by many accounting practitioners and that cost information, produced "in accordance with generally accepted accounting principles," more often than not obscured the rational behavior of direct cost components and contributed to faulty decision making (sometimes with catastrophic effect) when such data were used by decision makers to determine the correctness of one course of action over another.

The human side of enterprise and the impact of corporate decisions on the quality of life are attracting more and more attention, but profits are still the measure of business well-being and their optimization the major raison d'etre of corporate existence.

While this work may not add to the plethora of descriptive literature on management theory, it represents a *real breakthrough* for the normative prescriber who needs to choose between alternatives. The choice between maximizing the return on total capital employed or the percentage return on stockholders' equity may involve non-economic variables to be sure, but the financial effects of either decision may be determined quickly and with validity by judicious use of this handbook. Similarly, the rationalization of product lines, ranking of multi-product profitability, determination of facility hourly contribution to period cost recovery, make or buy decisions, and a host of other questions at the heart of the management process are grappled with by managers daily. What has been needed is a reference work that would enable managers to get at the answers quickly and with the assurance that the cost data involved in the equations being used behave rationally and consistently throughout their solution.

For the practicing manager who understands the dynamics of cost behavior and real profit, and for the business student groping with the concept of direct, period and mixed costs, contribution pools and accelerated period cost recovery, the intelligent use of the "tools" supplied by Spencer Tucker in *Handbook of Business Formulas and Controls* can be of incalculable importance to his or her decision-making capability.

During my years as Dean of Business, working with stu-

dents and faculty in the development of curriculum for business courses involving financial analyses, the availability of such a work as this would have added significantly to the teaching/learning process.

This book, while long overdue, must be hailed as the super nova in the firmament of current publications written for the business constituency.

GAVIN CLARK
Consultant, Center for
Executive Management,
Seneca College, Toronto

Dr. Tucker's handbook will certainly be put to good use by our corporate staff to improve their management expertise. It is my intention to see that all of our management decision makers keep a copy in their office for ready reference. Besides looking up specific formulas and particular examples for problems at hand, I know the handbook will also be extremely useful in stimulating rational decision making.

There are many many occasions in our business problem-solving activities when we do not realize an analytical technique for our particular problem has been developed. I know from my own personal experience, in leafing through the prepublication draft, that I saw a number of techniques of which I was not previously aware.

Certainly, since the end of World War II, the managing of a business enterprise has become much more of a science and less of an art. Although I personally feel that management will always contain some degree of art, it is also true that in today's competitive environment scientific tools and rational decision making are essential to the success of every business. In fact, I know of no business today which can operate successfully within an environment of a totally subjective decision-making process.

For many years now there have been numerous handbooks of engineering formulas. As every engineer knows, these books are highly useful because they have summarized under one cover a number of disciplines which are normally found in separate texts. This is also true of Dr. Tucker's handbook. Here, under one cover, are numerous formulas, along with techniques and applications, that would only be available if we had a number of separate texts. It is also equally true that Dr. Tucker, in his own inimitable style, has developed *many useful formulas that are not found in any existing text.* In fact, my own association with Dr. Tucker has shown him to be a very insightful person who has developed a number of formulas and approaches to solving business problems that cut through the maze of folklore and get to the very heart of the problem. He is the sort of man who studies the problem exhaustively and is not comfortable in putting down the solution until he has thoroughly explored all of its ramifications.

Another advantage of the book, and a very important point, is the illustrative applications. A formula by itself is of absolutely no use unless it can be applied. The illustrations and applications show how to do this. Many handbooks of engineering formulas and other scientific information miss this point completely and such a handbook is only of use to those who are thoroughly familiar with the subject. Dr. Tucker understands this point extremely well and has not made the same error in his book.

I am sure that our company and others who use this handbook will want to refer from time to time to some of the more comprehensive texts on the particular application. But I can think of no better place to start than referring to this handbook first.

RALPH JINDRICH
President
Chicago Rivet & Machine Co.
Bellwood, Ill.

Dr. Tucker's latest book is a handbook of formulas covering a wide area of controls. The reader will find numerous formulas in three basic areas, including *manufacturing, financial, and sales management*. In addition, the handbook contains both simple and complex formulas within each area, and terms for the formulas are well-defined. One can find many uses for these formulas. For example, there are formulas for capital investment decisions, both of a simple nature and those involving exceeding manufacturing capacity.

Other formulas in the handbook would be particularly helpful for computer solution work in the areas of operational research. In the marketing area there are formulas for pricing involving incremental costing and profit calculations. I particularly like the variety of formulas and parameters that allow a composite evaluation of salesmen, sales territories, etc.

While not all of the formulas may be applicable or useful in a particular situation, the handbook contains a variety of such extent that many will be useful to the typical manager or executive.

Dr. Tucker's latest book is another step forward in controlling business results in ways other than by the traditional income statement and balance sheets.

JAMES M. BAKER
President
Albert Ramond and Associates, Inc.
Management Consultants

One of the greatest disappointments of the accounting student on entering the professional world is the discovery that there is no cost accounting system that looks like anything he studied from the textbooks. The following pages are a textbook that will bridge that credibility gap and, indeed, will have continuing value.

Assuming the reader has more than a passing acquaintance

with the fundamentals of cost of management accounting, and is a businessman, here at last is a compendium, even a manual, of the formulas and ratios that can be used by the business manager without an interpreter, by the financial managers as a handbook, and by the student to polish off his understanding of financial controls. Given that there is a system of cost accounting and reporting, management will benefit from emphasis on the control information that the system can make available. Here is the source of widest range of those control questions that have wanted to be asked and here are the references to provide these simple control indicators.

Business can be very complicated, and notwithstanding that mathematical techniques have been hailed in many quarters as a simple solution to a number of management problems, control data is as important to the business manager as the instruments are to an airplane pilot. Managing a business without the proper control information is flying blind. The simplest accounting records have the ingredients for a broadened function of analysis, interpretation and planning. This book, properly called a handbook, has the formulas and ratios to broaden that basic information.

K. W. SIMPSON, C.A.
Partner
Price Waterhouse & Co.
Montreal

A prime responsibility of all managers is improved performance of activities. When projecting and developing improvements, a manager needs two kinds of data: One set tells how effective performance was yesterday compared to a base; the other projects what would occur tomorrow under varying given conditions. In planning actions, a manager usually can choose from several possibilities to optimize and gain the greatest advantage in given circumstances.

Managers often make spot decisions by hunch or with

meager data. Many times superficially arrived at decisions appear valid on the surface, yet when examined by sharp criteria pertinent to the situation, these decisions may be faulty. Managers should use measurements appropriate to the situation which will clearly demonstrate the advantage of one approach over another.

In this unique volume, Spencer Tucker has put together logical and rational means to breathe life and meaning into simple raw data and to provide measures which can support practically every decision a manager must make, whether in sales, production, purchasing, utilization of capital and resources, and many other areas. Some managers may want to develop their own special indices for specific situations that require sharp analysis. For example, company managers usually accept the supposition that increased sales volume is a desired goal. However, the questions raised are: At what price? What does the product mix do to the plant's capacity? What are the effects of tight delivery schedules on plant productivity and costs? Can engineering and purchasing support the increased sales? Does the company have the resources to finance the increased volume? Can the plant facilities economically produce the volume? There are numerous others. Summing up these questions is the underlying and ever important question: What is the overall effect on bottom line profits?

Critically important in decision making is the ability to discern trends, up and down, good and bad. Spotted early enough, a trend can signal the need for changes to head off a catastrophe or reap a windfall. Historical data in reports almost always tells too little of what is occurring because each piece of data is not shown related to others in a way that clearly shows trends. More pertinent to decisions regarding tomorrow, yesterday's data may not reflect tomorrow's conditions. With increased use of computers, even small companies have ample data on various aspects of company operations.

Tucker's unique approaches recognize that examining individual operations or aspects of a business may show that the activity is getting better. However, when several of the data are integrated, it may well happen that the composite shows a worsening trend which could cause serious difficulties if not recognized sufficiently early. Tucker shows managers how to integrate several controls by his tertiary ratios.

Tucker's approach to creating live ratios and indices will greatly reduce a manager's need to pour through mountains of computer print-outs. A handful of well designed ratios plotted with past events and along a projected future path will clearly indicate areas and functions that require remedial attention. This approach to decision making is the essence of simplicity, yet solidly based on sound logic and reasoning.

MITCHELL FEIN
Professional Engineer

ACKNOWLEDGMENTS

The creative task of writing a handbook requires intense concentration—and the author must be concerned about perspective, emphasis, and clarity. He needs a professional individual who can objectively aid him in the continuous process of self questioning.

Fortunately, my valued associate and good friend, Tom Lennon—who has extensive management consulting experience—somehow found the time and motivation to review the manuscript.

His analytical, disciplined mind provided many suggestions which have improved the quality of the finished book—and for that I am sincerely appreciative.

I thank also my number one son, Michael M. Tucker, for his talents and conscientiousness, and for finding and correcting critical errors in logic, formula constructions, and computations.

SPENCER A. TUCKER
Little Neck, N.Y.

EXHIBITS