Hawkins, Charles E.

A COMPARATIVE STUDY OF THE MANAGEMENT ACCOUNTING PRACTICES OF INDUSTRIAL COMPANIES IN THE UNITED STATES AND JAPAN

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A COMPARATIVE STUDY OF THE MANAGEMENT ACCOUNTING PRACTICES OF INDUSTRIAL COMPANIES IN THE UNITED STATES AND JAPAN

by

Charles E. Hawkins

A DISSERTATION

Presented to the Faculty of

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In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Major: Interdepartmental Area of Business

Under the Supervision of Professor Robert H. Raymond

Lincoln, Nebraska

December, 1983

TITLE

A COMPARATIVE STUDY OF THE MANAGEMENT ACCOUNTING PRACTICES OF INDUSTRIAL COMPANIES IN THE UNITED STATES AND JAPAN

BY

CHARLES E. HAWKINS

APPROVED	DATE
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Blaine L. Blad	24 Octoher, 1983

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GRADUATE COLLEGE **UNIVERSITY OF NEBRASKA**

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Adviser: Robert H. Raymond

The objective of the study was to examine the development and current usage of selected management accounting concepts on a comparative basis using data from large manufacturing companies located in the United States and Japan.

A questionnaire was used to gather the data, and 106 and 147 responses were obtained from Japanese and United States firms respectively. Executives were asked to rate the importance of selected management accounting concepts to the planning and control function for their company; to indicate use or nonuse of selected quantitative techniques; to rank the purposes for which they use accounting data according to their degree of importance; to indicate use or nonuse of a formal statement of long range plans; to indicate the time span of long range plans if used; to indicate the positions within the company that participate in the preparation of the operating budget; and to indicate the length of time that selected management accounting concepts had been in use by their companies.

Statistically significant differences between United States and Japanese companies were noted in the responses concerning the degree

of importance assigned to the use of direct costing, transfer pricing, responsibility accounting, standard costing, and return on investment; in the extent of usage of long range plans; in the time span used for long range plans; in the number of positions within the firm that participate in budget preparation; and in the length of time that inventory models had been in use.

Differences noted were consistent with the export orientation of Japanese firms and the cooperative nature of Japanese labor management relations.

Statistical methods used to analyze the data were the analysis of variance, the chi-square test for independence, and the Spearman rank-order correlation test.

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CHAPTER I

INTRODUCTION

Information from an accounting system is useful for 1) external reporting, 2) internal reporting for planning and controlling operations, and 3) internal reporting for making special decisions and long-range plans.[1] The second and third purposes are management oriented in that information is provided to assist managers in making decisions. Concepts and techniques have been developed under the general heading of management accounting which have proven to be useful to some degree in meeting the needs of managers. Management accounting concepts and techniques and their relationships to the internal reporting function are the focus of this study. Further, these relationships will be explored within the environment of United States and Japanese manufacturing companies for the purpose of comparison and analysis as explained in the following paragraphs.

Need for the Study

Traditionally, the sharing of information concerning accounting methods and techniques has been beneficial to those engaged in the profession of accounting. Increasingly, this sharing process occurs

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[1] Charles T. Horngren, "Choosing Accounting Practices for Reporting to Management," NAA Bulletin, XLIV, No. 1, (September, 1962), pp. 3-15, as reprinted in Contemporary Issues in Cost and Managerial Accounting, ed. Hector R. Anton, Peter A. Firmin, and Hugh D. Grove (Boston: Houghton Mifflin Co., 1978), pp. 3-4.

within an international setting. This is a result of the dependence of nations on each other for resources and markets, the internationalization of business, and the general improvement in methods for communicating information rapidly and efficiently.

Recently, a tremendous amount of attention has been focused on the economic development of Japan since the end of World War II. It has been estimated that Japan lost one-fourth of its national wealth during World War II.[2] By 1953, the nation's economic output had reached its prewar level. The record of economic growth since that time exceeds that of any other country except Israel and some of the oil producing nations. When Japan's postwar growth rate for an eight year period is compared with the average growth rate of ten other industrialized nations, including the United States, Japan's rate exceeds the rate of the ten nations by 4.6 percentage points. More than half of this excess is attributed to factors related to the manufacturing environment as opposed to such other factors as reallocation of resources and lowering of trade barriers.[3]

The recognition that much of Japan's record of economic growth is due to factors related to the manufacturing environment has resulted in a large amount of research devoted to an analysis of those factors. Of these, management methods and production methods have been singled out as being highly significant in terms of their contribution to the

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[2]Edward F. Denison and William K. Chung, How Japan's Economy Grew So Fast. (Washington: The Brookings Institution, 1976), pp. 1-10.

[3]Ibid., p. 47.

Japanese success story. These factors were given in a recent report of the Japanese Labor Ministry as follows:

1. Automation and technological development

2. Successful application of Japanese type management techniques

3. Stable labor-management relations characterized by low absenteeism and a high degree of cooperation.[4]

It should be noted at this point that the management accounting concepts and techniques selected for use by managers and accountants are to some extent a function of management philosophy and of manufacturing methods used by firms. To date, much of the English language literature on Japanese industry has focused on the aforementioned items, but little information is available concerning management accounting methods and techniques used. Yet, the developments in Japan since World War II provide an unusual opportunity to study the application of management accounting methods and techniques in a unique and well-defined environment. Thus, in order to gain better insight into the relationships between management philosophy, manufacturing processes, and management accounting methods, these relationships will be studied on a comparative basis using data from manufacturing companies located in Japan and the United States. Specifically, this study is designed to explore the following items on a comparative basis in the two countries.

1. The relationship between the size of a company and the extent of usage of management accounting methods and techniques.

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[4]Leighton F. Smith, "Japanese Productivity - The Three-Pronged Attack," The Chronicle, Volume 40, No. 1, p. 1.

2. The objectives for which accounting data are used and the relative importance of those objectives.

3. The extent of usage and the time-frame of long-range plans.

4. The extent to which participative budgeting is used.

5. The rate at which management accounting thought and management accounting practice have developed in the two countries.

The hypotheses designed to explore these items are given in the following section.

Hypotheses of the Study

In the interest of simplicity and comparability, the hypotheses of this study are presented in null form. These are related to the objectives of the study as given in the previous section.

1. The stage of development of management accounting as indicated by the number of management accounting tools used and the importance attached to their use is not related to the size of the company using those tools.

2. The number of quantitative techniques used is not related to the size of the company using the techniques.

3. There is no difference in the number of management accounting tools used and the number of quantitative techniques used when comparing companies having an affiliation with a company in Japan/the United States and those not having such an affiliation.

4. There is no difference in the degree of importance attached to the purposes for which accounting data are used when comparing companies in the United States with companies in Japan.

5. There is no difference in the extent of usage of long range planning between companies in the United States and companies in Japan.

6. There is no difference in the extent of usage of participative budgeting between companies in the United States and companies in Japan.

7. There are no differences in the rates at which management accounting thought and practice have developed in the United States and Japan.

The hypotheses numbered four through seven are stated in such a way as to indicate that a comparative analysis will be performed between manufacturing companies located in the United States and Japan. The hypotheses numbered one and two will be tested separately on firms located in the United States and firms located in Japan. The results will then be compared to determine if there are differences between firms in the United States and firms in Japan concerning the factors mentioned in the two hypotheses.

Methodology for the Study

The primary research methods used in this study are a review of literature and a questionnaire survey. In addition, the personal interview is used, and answers to specific questions are obtained by letter.

The purpose of the review of literature is to provide an in-depth understanding of the topic in general and of some issues in particular for the author, and to provide background for the reader of the study

who has an interest in the topic. The purpose of the questionnaire survey is to obtain data which are analyzed for the purpose of validating the hypotheses of the study. Further details concerning the methodology for the study are provided in Chapter IV.

Preview of the Study

This study contains six chapters. This chapter provides the reasons for the study, the hypotheses to be tested and the methodology to be used in conducting the study.

Chapter II is entitled "Overview of Management Accounting in the United States and Japan." A review of the development of management accounting in the two countries is provided in order to gain a perspective from which to compare the state of management accounting in the two countries at the present time. Substantially more coverage is devoted to Japan than to the United States in recognition of the fact that information on management accounting in Japan is not readily available in the English language.

Chapter III is entitled "Review of the Literature." The purpose of the chapter is to provide background for the research design and analysis of the research findings. The chapter is organized according to management accounting concepts, and the basis for selecting the concepts is given. A brief history of the development of each concept is given as well as a summary of the research on the concept.

Chapter IV is entitled "Research Design and Methodology." The reasoning underlying the selection of firms in the sample is given and a chronological description of the conduct of the research is

provided. The statistical methods used in the study are also described.

Chapter V is entitled "Research Results." The results of the questionnaire survey are presented and analyzed, and the results of the tests of the hypotheses are also included. The conclusions drawn from the research are presented in Chapter VI. The limitations of the study and suggestions for further related research are included.

CHAPTER II

OVERVIEW OF MANAGEMENT ACCOUNTING IN THE UNITED STATES AND JAPAN

The purpose of this chapter is to provide a brief review of the development of management accounting in Japan and in the United States. This is done in order to obtain a perspective from which to compare the state of management accounting in the two countries at the present time.

The United States

A clear distinction is not always made in the literature between developments in cost accounting and in management accounting. Generally, cost accounting is concerned with product costing, whereas management accounting is broadened to include the use of accounting data for making numerous kinds of decisions. Early developments are most often given in connection with the term "cost accounting" and more recent developments are often given in connection with the term "management accounting". In this section, the topics of cost accounting and management accounting are reviewed from a broad perspective. A detailed review in terms of management accounting concepts is provided in Chapter III.

Development of Cost and Management Accounting

The most frequently cited source for the history of the early

developments in cost accounting is S. Paul Garner. The following paragraphs are to a large extent drawn from that source.[1] Other references are provided where appropriate.

Prior to the Industrial Revolution, developments in cost accounting were uncoordinated and not related to each other. Cost accounting practices were widely dispersed and were developed in response to specific needs. The early examples date back to the fourteenth century.

During the fourteenth century, the development of commerce in Italy, England, Germany, and the Flemish countries led to the establishment of small industrial enterprises organized along the lines of single proprietorships and partnerships. Cost accounting entries can be found in the records of that time, some of which were in the double entry format. Thus cost accounting developed right along with the double entry system in its earliest years. Some developments in specific countries are now reviewed.

In England, during the fifteenth century, groups of workshop owners began to systematically move to the countryside in order to escape the restrictions of the organized guilds. They soon found themselves in competition with each other as well as with the guilds. Under these conditions, control of costs became increasingly important; thus their records soon took on a cost accounting

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[1]For a concise summary of his major work in this area, see S. Paul Garner, "Highlights in the Development of Cost Accounting," The National Public Accountant, March 1950, as reprinted in Contemporary Studies in the Evolution of Accounting Thought, ed. Michael Chatfield. (Belmont, California: Dickinson Publishing Company, 1968), pp. 210-221.

orientation. Other examples during this period of records with a cost accounting orientation are those of the Fugger family of Central Europe, the Medici family of Italy, and a Flemish printer named Plantin. The Plantin records reveal a system very similar to that of a modern job order cost system. All of these records had a common orientation in that they were designed to assist in controlling the steps in the production process and to provide control over usage of materials and labor. Most of the information about the cost accounting practices of that period comes from an examination of the actual records. It was by design that very little was written at that time concerning these practices since companies considered their methods to be closely guarded secrets. It was not until the latter part of the nineteenth century that a significant amount of material on cost accounting was published.

The writings of the latter part of the nineteenth century reveal that many of the problems of cost accounting with which we are concerned today arose during the time of the industrial revolution. These include the allocation of overhead to jobs, accounting for scrap, assignment of joint costs, and the relationship between the cost accounting records and the financial accounting records. These writings also reveal that the period from approximately 1880 to 1915 was one in which cost accounting developed to the stage where it resembled closely cost accounting as it exists today. The writings of four persons are singled out as having contributed significantly to that development.

Henry Metcalfe, an American army ordnance officer, published his

Cost of Manufactures in 1885. In it, he described a detailed procedure for keeping track of raw materials and labor time for purposes of accumulation of costs by process or by job. A second edition of his book was published in the 1890s which proved to be more influential than the first edition.

Emile Garcke and J. M.Fells, both Englishmen, published their book entitled Factory Accounts in 1885.[2] This work probably influenced cost accounting development more than any other during this crucial period. Their contribution included a method for integrating the cost records and the financial records. Few improvements have been made in the system recommended by these two men, even after almost one hundred years.

G. P. Norton, also an Englishman, published his book entitled Textile Manufactures Bookkeeping in 1887.[3] He emphasized process costing for the textile industry. He described a system of separate accounting procedures for the manufacturing function so that the gross profit from manufacturing operations could be determined. His procedures were so popular that they were later adopted by many textile manufacturers in England and the United States.

After approximately 1900, developments in cost accounting centered around the problems related to overhead application. These included the familiar ones of what portion of fixed factory overhead,

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[2]M. Zafar Iqbal, "Historical Overview of Developments in Cost and Managerial Accounting," The Academy of Accounting Historians, Vol. II, 1979. p. 307.

[3]Ibid.

if any, should be applied to product, and the choice of capacity for calculating the fixed overhead rate. A. Hamilton Church is singled out by Garner as being the one individual most responsible for improvements in this area. He advocated the concept of production centers in connection with overhead application, and developed the concept of normal production for calculating an application rate. Improvements in practice during this time were such that Garner concluded that the basic structure of cost accounting was largely complete by 1915. Attention will now be directed to developments in management accounting.

It was not until after the beginning of the twentieth century that accounting data began to be used for managerial decision making in a systematic way.[4] As might be expected, the reason for this lateness was that managers were not sufficiently trained, and concepts were not sufficiently developed to require the use of accounting data for purposes of making decisions. Some isolated cases of the use of accounting data for decision making can be cited, but it was not until the mid-1920s that the idea took hold as a concept.[5] A major impetus for the use of, and improvements in, the concept resulted from an article written by Donaldson Brown in 1924 published in Management and Administration. In the article, Brown emphasized the concepts of relevant information and useful criteria for decision making. Over time, specific techniques and concepts were developed and were

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[4]Michael Chatfield, "The Origins of Cost Accounting," Management Accounting, June 1971, p. 14.

[5]Iqbal, op. cit., pp. 311-313.

included under the general heading of management accounting. These include cost-volume-profit analysis, direct costing, capital budgeting, discounted cash flow techniques, and a large group of quantitative techniques. The history of the development of these techniques is reviewed in Chapter III of this study. In conclusion, it should be noted that the term "managerial accounting" was first used in 1949, and that developments in this area have continued until the present time.

Current Status

Management accounting is at a stage in its development where attempts are being made to define it as a body of knowledge, and to provide it with a theoretical framework. In recent years, various topics have grown in popularity, some of which have made their imprint on management accounting, and some of which hold promise for the future. In some cases, these topics have little in common with each other, and some have drawn substantially from other disciplines. During this same period, traditional cost accounting with its emphasis on cost allocation for product costing was downgraded in favor of newer concepts which emphasized relevant costs for purposes of decision making.[6] Recent areas of interest include (1) the use of quantitative techniques in connection with decision models, and (2) the development of information economics from a theoretical perspective.

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[6]Robert N. Anthony, "The Rebirth of Cost Accounting," Management Accounting, October 1975, pp. 13-14.

The use of quantitative techniques for the purpose of managerial decision making has occupied much space in management accounting literature. This topic is covered in more detail in Chapter III of this study.

Information economics is a highly theoretical topic. Under the concept, information is regarded as a commodity in a market situation. Demski and Feltham have applied the concept to the question of a choice of model for management decisions as well as to other management accounting issues.[7] The concept is highly normative in nature, and problems associated with implementing the concept are substantial. Kaplan estimated in 1977 that useful results from research in this area were at least a decade in the future.[8]

The opening statement of this section indicated that attempts are currently being made to define management accounting as a body of knowledge and to provide it with a theoretical framework. Killough raised the question of a theoretical structure for management accounting in 1972.[9] He expressed concern about the expansion of management accounting in various directions with no central philosophy or force to guide its development. According to him, the essence of management accounting has to do with minimizing uncertainty in the

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[7]Joel S. Demski and Gerald A. Feltham, Cost Determination: A Conceptual Approach (Ames, Iowa: The Iowa State University Press, 1976). See pp. 1-13 for an introduction to the topic.

[8]Robert S. Kaplan, "Application of Quantitative Models in Managerial Accounting: A State of the Art Survey," The Accounting Journal, Winter 1977-78, p. 237.

[9]Larry N. Killough, "Does Management Accounting Have a Theoretical Structure?," Management Accounting, April 1972, pp. 21-23.

decision making process. He presents eight items as a proposed foundation for management accounting. These are in the nature of one word building blocks such as measurement, communications, and information. He uses these items and the concept of a theoretical foundation to develop a comprehensive outline of the body of knowledge that he considers appropriate for management accounting. This body of knowledge includes many of the topics normally covered in a two semester sequence devoted to cost and management accounting. His work is reminiscent of articles of the same type devoted to the financial accounting conceptual framework project.

Since the publication of Killough's article, two events have occurred which indicate some progress in better defining the body of knowledge belonging to management accounting. First, the National Association of Accountants (NAA) created the Certificate in Management Accounting program in 1972. This action resulted in the description of a body of knowledge, over which candidates for the certificate would be tested, that would collectively represent the management accounting area. Although one could argue that giving a name to something does not make it so, this process should serve to better define what constitutes management accounting. Second, the NAA has instituted a procedure whereby a series known as Statements on Management Accounting are intended to provide a framework for the general area known as management accounting.[10] The events preceding

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[10]See the first such statement entitled Definition of Management Accounting, National Association of Accountants, March 19, 1981, p. 1 for an explanation of this process.

the issuance of such a statement are similar in nature to those preceding the issuance of a statement by the Financial Accounting Standards Board (FASB). The first such statement indicated that the framework would consist of three levels known as principal categories, subcategories, and specific projects.[11] At the time of publication, only the elements comprising the highest level were resolved. They are (1) objectives, (2) terminology, (3) concepts, (4) practices and techniques, and (5) management of accounting activities. The first statement relates to the objectives category and it gives the definition of management accounting as follows:

> Management accounting is the process of identification, measurement, accumulation, analysis, preparation, interpretation, and communication of financial information used by management to plan, evaluate, and control within an organization and to assure appropriate use of and accountability for its resources. Management accounting also comprises the preparation of financial reports for nonmanagement groups such as shareholders, creditors, regulatory agencies, and tax authorities.[12]

An examination of the statement reveals that it is management-use oriented and that it contains the familiar words "plan" and "control". Thus the statement appears to be descriptive rather than prescriptive in nature. Yet, in an evolving service oriented discipline, perhaps this is as it must be.

The second Statement on Management Accounting (Number 1B) is dated June 17, 1982, and is entitled Objectives of Management Accounting. The objectives are given as (1) providing information,

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[11]Ibid., p. 2.

[12]Ibid., p. 4.

and (2) participating in the management process. Three categories provide a further breakdown of items necessary to fulfill the objectives. The categories are labelled (1) responsibilities, (2) principal activities, and (3) processes. These categories are arranged in an hierarchal fashion in the order given here.

Undoubtedly, management accounting in the United States will continue to develop as it has in the past, that is, in response to the needs of managers within the environment in which they operate, and in accordance with the capabilities of managers to use the tools developed by academicians and management accountants who anticipate those needs.

Japan

This section is wider in scope than the corresponding section on the United States. This is in recognition of the fact that English language material on management accounting in Japan is not as readily available as is similar material in the United States. First, an overview of financial accounting in Japan is presented in order that the relationship between financial accounting and management accounting can be better understood.

Japanese financial accounting is influenced primarily by three sources. They are (1) the Commercial Code, (2) tax law and

regulations, and (3) the Securities Exchange Law.[13]

The Commercial Code is somewhat analogous to state corporate laws in the United States, but it is a national statute in Japan. The Code does not require any official filing of financial statements; consequently, many small firms ignore its provisions. The Code dates back to the 1890s, although it has been amended since that time to bring its requirements more in line with the notion of good accounting.[14]

Of the three influences mentioned, the tax law and regulations have the greatest effect on financial accounting.[15] In Japan, as in the United States, companies may follow separate guidelines for purposes of tax accounting and financial accounting, and then reconcile the differences in the related documents. However, in Japan, any accounting requirement of the tax law is considered generally accepted for financial reporting purposes; thus most companies prefer to follow the tax requirements for both purposes.[16]

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[13]Thomas T. Yamakawa, Accounting and Auditing, (Tokyo: Price Waterhouse and Company, undated), pp. 13-14. This is an unpublished document apparently prepared primarily for in-house use of the Price Waterhouse offices in Japan. Mr. Yamakawa is a partner in the Tokyo office.

[14]Junichi Akiyama, "Characteristics of Accounting Practices of and Disclosures by Publicly Held Companies in Japan," June 28, 1974. This is an unpublished paper which is available from the American Institute of Certified Public Accountants library in New York. (Reference *117J).

[15]Yamakawa, loc. cit.

[16]Tax and Trade Guide-Japan, (United States: Arthur Andersen and Company, May 1978), p. 21.

The Securities Exchange Law of 1948 was enacted as part of the reorganization of the Japanese economy which took place under the postwar occupation forces headed by General Douglas MacArthur. The law is analogous to the acts passed in the 1930s to regulate the sale of securities in the United States. It applies to publicly owned companies, and it requires that certain filings be made with the Ministry of Finance. The accounting and disclosure requirements under this law differ from those of the tax law and the Commercial Code; therefore, publicly owned companies usually prepare a separate set of statements for filing under the Securities Exchange Law.[17]

Additional, but less significant, influence is exerted on the formulation of accounting principles by the Japanese Institute of Certified Public Accountants and the Business Accounting Deliberation Council. The nature of the first group is evident by its name. The second group is made up of government officials, academicians, certified public accountants, and businessmen; and has as its purpose the improvement of accounting practice in general.[18] It is somewhat analogous to the FASB of the United States except that its influence is secondary to that of the laws and regulations cited earlier.

It should be noted that there are substantial differences between financial statements of Japanese companies and companies in the United States. A detailed treatment of these differences is beyond the scope of this study. However, information concerning these differences is

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[17]Yamakawa, op. cit., p. 14.

[18]Tax and Trade Guide-Japan, op. cit., p. 19.

readily available for those who are interested. An article written specifically for security analysts appeared in the March-April 1974 issue of Financial Analysts Journal.[19] A complete book has been written on the topic,[20] and some of the international accounting firms include summaries of accounting requirements in booklets describing the business environment in Japan.[21] In addition, some of the multinational firms in Japan include a summary in their financial statements concerning differences in the treatment of specific items in those statements resulting from differences in accounting principles in the two countries.[22] With this summary of financial accounting as background, attention will now be directed to the management accounting area.

Development

Japanese accounting records from the sixteenth to the nineteenth century reveal that the double entry system was not used during this period, even though visitors to the country did provide information on

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[19]Edgar M. Barrett, Lee N. Price, and Judith Ann Gehrke, "Japan: Some Background for Security Analysts," Financial Analysts Journal, March-April 1974, pp. 60-67, 59.

[20]Robert J. Ballon, Iwao Tomita, and Hajime Usami, Financial Reporting in Japan, (Tokyo: Kodansha International Limited, 1976). Available through Harper and Row, New York.

[21]For example, see Doing Business in Japan, (Tokyo: Price Waterhouse and Company, 1975).

[22]For example, see the financial statements of Nissho-Iwai Company Limited dated January 12, 1976. This example was kindly provided to the writer by Mr. James R. Ladd of the Tokyo office of Deloitte Haskins and Sells.

the system.[23] The records were essentially single entry, and were apparently adequate for the needs of the period. Shortly after the middle of the nineteenth century, improved accounting methods, including double entry, were introduced and used through the influence of books and teachers imported from other countries. By 1865, a double entry system was in use in a factory in Yokosuka. Very little information in the English language is available concerning cost accounting during this period. Further, English language publications concerning cost and management accounting are generally scarce.[24] A search conducted by The National Diet Library for the writer revealed twelve sources concerning the development of management accounting in Japan. Only one of these is in the English language and it is summarized in the following paragraphs.

In Japan, as in the United States, the primary emphasis in accounting matters has been in the area of financial accounting for external reporting rather than management accounting for internal use.[25] Little attention was devoted to management accounting in Japan

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[23]K. Nishikawa, "The Early History of Double-entry Book-keeping in Japan" in Studies in the History of Accounting eds. A. C. Littleton and B. S. Yamey (Homewood, Illinois: Richard D. Irwin, 1956), pp. 380-382.

[24]Inquiries by the writer to large accounting firms in Japan for information concerning the development and current status of management accounting in Japan resulted in an abundance of information concerning financial accounting but little concerning management accounting.

[25]Developments in cost and management accounting through 1953 are summarized from Masao Matsumoto, "The Development of Managerial Accounting in Japan," The Annals of the Hitotsubashi Academy, October 1953, pp. 40-54.

until the late 1920s. Academically, it was treated as an element of economics until that time. The worldwide depression beginning in the late 1920s awakened Japanese businessmen and government officials to the need for better tools for use in managing Japanese industry.

In 1930, a commission of the Ministry of Commerce and Industry started work on a cost accounting guide. At that time, cost accounting was described as being in an infant stage of development. In 1933, a draft of a cost accounting guide was published. By 1937 this guide had been revised and was then published under the title of Manufacturing Cost Accounting Guide. The guide was devoted mainly to actual cost systems, although standard costing was included. Following this period, management accounting began to develop as a recognized area of accounting under that name.

In the mid to late 1930s, accounting professors began to define management accounting in their writings as an area separate from financial accounting. At first, cost accounting and budgetary control were considered to be the essence of management accounting. Although academicians remained interested in the topic during the 1930s, such was not the case in regard to persons in the industrial community. As a result of improved business conditions during the late 1930s and the chaotic conditions resulting from World War II, little improvement occurred in management accounting practice until about 1949. However, it should be noted that numerous rules concerning cost accounting were promulgated during the war. These were published by various military organizations for use in connection with cost-plus contracts and pricing procedures. So many guidelines were published that they were

largely ignored and thus were ineffective.

Interest in accounting matters in general revived after the war as Japan started its rebuilding effort. In the management accounting area, the limitations of actual cost systems were again recognized, and by 1949 academicians were urging the use of standard cost systems. However, the implementation of standard cost procedures in industry was hampered by provisions in the tax law and by the nature of Japanese production methods.

Japanese tax law required the use of actual cost in determining the valuation to be placed on manufactured goods for purposes of inventory valuation and the cost of goods sold. The adjustments required at year-end when standard costs were used were complex, and Japanese businessmen perceived that the results favored the government in regard to the resultant tax liability. Consequently, businessmen generally were reluctant to adopt standard costs.

Japan's industry after the war was oriented toward export trade. Consequently, it possessed a high degree of flexibility and was primarily job order oriented. Thus the production methods lacked standardization, and under such conditions it was difficult for industry in general to develop reliable standard costs for use in a standard cost system. Academicians continued to refine and define management accounting theory during this period.

An examination of the refinements introduced into the definition of management accounting in the early 1950s reveals that its nature became very similar to management accounting as understood and used in the United States. Management accounting was defined by one writer

during this period as being any accounting method useful to management. Another writer regarded it as consisting of budgetary control and standard cost accounting. And still another recommended inclusion of budgeting, bookkeeping, actual costing, standard costing, efficiency measurement, business analysis and business statistics.

During this period, the management functions of planning and control were delineated. Planning was subdivided into individual planning and general planning, while control was subdivided into divisional control and general control. The organizational aspects of managerial control (line, staff, etc.) were defined and the place of management accounting therein was described. The relationship between accounting for external purposes and internal purposes was more clearly defined, and management reports were ranked in importance at a level similar to that of external financial statements.

By 1953, management interest in cost accounting had increased as a result of growth in size of businesses and the related management complexities. The more youthful managers advancing to top management positions proved to be more willing to adopt new methods. Additionally, in 1953 the tax authorities approved a short cut procedure for making year-end adjustments in connection with standard cost systems. Previous cost systems established during the war with an orientation toward price determination were proving to be inadequate for the increasing complexity of Japanese business. Consequently, 1953 was regarded as a year in which Japanese business was ready to adopt many management accounting methods previously recommended by persons in the academic community.

A useful commentary on the state of cost and management accounting in the 1950s was provided by Kubota in 1957.[26] Generally, he argued for wider usage of cost data than had been the case in the past. According to him, developments in cost accounting were hindered by the dominant position of financial accounting in theory and practice. But cost accounting was beginning to emerge as an area separate from financial accounting. He urged wider adoption of standard costing; better use of costs for pricing purposes; more frequent use of costs under the direct costing concept; and wider usage of costs for managerial decision-making.

An additional useful source of information for the student of Japanese cost and management accountant is entitled Cost Accounting Standards.[27] It was first published in 1962 under the auspices of the Ministry of Finance and was later revised in 1976. The volume is oriented toward financial accounting in that guidelines are provided concerning accounting for manufacturing costs for purposes of financial statement presentation. The volume has legal status under the Securities Exchange Law of 1948 in that the Ministry of Finance prepared the guidelines contained therein for the guidance of manufacturing companies filing under the act.[28] Its significance for

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[26]Otojiro Kubota, "Basic Principle of Cost Accounting," The Annals of the School of Business Administration, Kobe University, 1957, pp. 29-37.

[27]Cost Accounting Standards, (Tokyo: Trade Bulletin Corporation, 1962).

[28]Otojiro Kubota, "The Basic Structure of the Cost Accounting Standards in Japan," The Annals of the School of Business Administration, Kobe University, 1964, pp. 19-20.

the purpose of this study is that it provides a basis for comparing Japanese and United States cost accounting terminology and practice. A brief review of the volume follows.

Cost Accounting Standards is eighty five pages long. Its contents could well be a condensed version of a traditional United States first semester cost accounting textbook. Actual cost and standard cost systems are described. Guidelines are given for the dispositon of variances under differing conditions. Different degrees of tightness and looseness in standards are described. Product costs and period costs are defined. Different flow assumptions regarding costs are recognized. Very little information is provided concerning direct costing, yet this should be expected since the volume is oriented toward absorption costing for external financial statements. The only area where significant differences exist, in comparing its provisions with traditional United States cost accounting textbooks, is in the description of process and job order cost systems. Provisions are made for four basic types of cost systems rather than the traditional process and job order dichotomy in United States texts. The four basic types are: (1) single-process, (2) class, (3) lot, and (4) job order cost systems. A single process system is one where goods of the same kind are manufactured continuously. A class cost system is one where goods of the same kind are manufactured continuously, but the goods are classified by shape, size, or grade. Under this type system, a procedure is described for allocating costs to the various subclassifications after the allocation between finished goods and goods in process. A lot cost system is one where

goods of different kinds are manufactured continuously by lot. Under a system of this type, costs are charged to lots in a similar manner as under a job order cost system. A job order system is one where goods of different types are manufactured separately. In summary, the chief significance of the Cost Accounting Standards for purposes of this study is that it reveals a body of cost accounting thought, including terminology, which is almost identical to that in the United States. This indicates the suitability of using the same survey instrument for acquiring data from both Japanese and United States companies.

Current Status

Evidence concerning the current status of management accounting in Japan is available in the form of an occasional article in the English language literature, titles of articles contained in English language bibliographies, and a collection of articles on the topic recently published by the International Section of the American Accounting Association(AAA). In addition, information can be obtained from the offices of the international accounting firms located in Japan.

Generally, the aforementioned sources indicate that cost and management accounting principles are at a stage of development which is very similar to that in the United States. In addition, these principles are applied much as they are in the United States. The following was received from the managing partner of the Tokyo office of an international accounting firm in response to a letter of inquiry

from the writer.

> Based on my experience so far, and on discussions with my Japanese partners, I do not think there are significant, measurable differences between U.S. and Japanese cost accounting systems and procedures. The differences we notice are of the type that occur between any two companies in the United States, based on specific circumstances and needs, rather than principles. There may be a tendency for Japanese companies to keep more meticulous and detailed records, but this is difficult to judge even subjectively. Each company is different, as in the U.S.[29]

Mr. Ladd made this observation from the perspective of two years in Japan in his present position and of seventeen years with his firm. The similarities mentioned are undoubtedly due in part to the internationalization of business, a fact which Mr. Ladd mentions in another part of his letter. Further evidence to this effect is provided by Mr. Hiromu Matsuda, controller of a Japanese firm which had ties to a United States firm.[30] He gives an account of the introduction of standard costing into the Japanese firm as a result of the recommendations of the U. S. affiliate. The system was used in the Japanese firm in essentially the same manner as in the U. S. firm.

An English language bibliography of Japanese accounting books contains titles very similar to those published in the United States.[31] Included are such traditional titles as "Cost Accounting"

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[29]Quoted from a letter from Mr. James R. Ladd, Managing Partner of Tokyo office of Deloitte Haskins and Sells to the writer dated August 18, 1981.

[30]Hiromu Matsuda, "Introduction of Standard Cost Accounting in Japan," Management Accounting, January 1976, pp. 25-27.

[31]Japanese Annual Bibliography of Economics (National Committee of Economic Sciences of Science Council of Japan, 1978), pp. 66-68.

along with "Information Accounting Theory", "Management Accounting for Multiple Goals and Hierarchal Organizations", "Theory of Measurement of Manufacturing Costs", "Introduction to Performance Management Accounting", "Accounting Information and Decision Making", "Studies in CVP Analysis", and "Inflation and Accounting". There are numerous others that could be cited but these make up a representative sample of the whole.

A very timely and useful source of information for purposes of this study was recently published by the International Accounting Section of the American Accounting Association.[32] The volume contains eight complete articles plus abstracts of three additional articles, all by Japanese authors. They range from those of a very practical nature such as might be found in Management Accounting to those very theoretical in nature such as might be found in The Accounting Review. The articles treat decision models, direct costing, flexible budgeting, transfer pricing, capital budgeting, the relationship between standard costing and budgeting, corporate planning, information economics, exception reporting, and process costing. Almost all of the references cited in the book are of U. S. authors. Some are of Japanese authors and a few are of authors from other countries.

The most useful article in the AAA publication for purposes of this study is entitled "Integration of the Budget and Standard Cost

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[32]Seiichi Sato and others, eds., A Compendium of Research on Information and Accounting for Managerial Decision and Control in Japan (Sarasota, Florida: American Accounting Association, 1982).

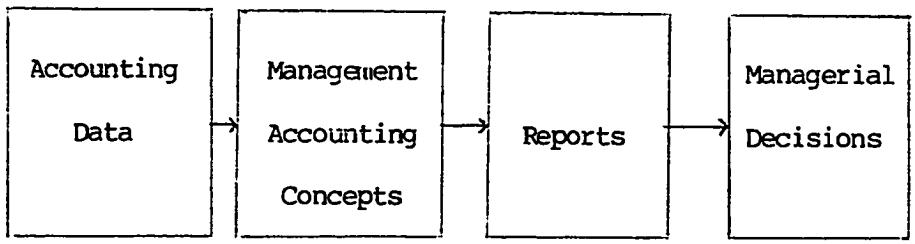
System in Management Accounting" by Kazao Mizoguchi (See pp. 101-110). The author indicates that the primary tool for cost control in Japanese companies is the budget. Indirect costs are evaluated on a broader basis than are direct costs (responsibility accounting). The labor cost variance has little meaning because of the lifetime nature of employment in Japan. The procedure for reconciling standard costs and budgeted costs is described. The author treats the topic in much detail and presents his ideas clearly.

In summary, Japanese and United States management accounting practices have much in common as revealed by persons familiar with both and as revealed in the literature of the two countries. This is so, even though developments in the United States generally preceded comparable developments in Japan. A primary purpose of this study is to explore the question of comparability in a more systematic fashion and in greater depth.

CHAPTER III

REVIEW OF THE LITERATURE

The purpose of this chapter is to provide background for the research design and the analysis of research findings. In searching for a framework for purposes of organizing the literature search, a number of alternatives were considered. The following diagram illustrates the relationship between accounting data and managerial decision making.



Management accounting concepts provide a means of organizing accounting data so that information in the form of reports can be provided for the purpose of making decisions. Thus management accounting concepts provide the link between accounting data and managerial decisions. The choice of concept and the type of accounting data used are a function of the type of decision being

made.

Management accounting concepts can be classified or viewed in more than one way. A committee of the American Accounting Association (AAA) classified them according to function.[1] The two broad functions enumerated were: (1)planning and (2)control. Planning was subdivided into project planning and period planning. Period planning included the management accounting concept of budgeting. The control classification emphasized current operations and included communication, motivation, and appraisal. The above approach emphasizes a broad functional classification. For purposes of organizing this chapter, it was decided to focus on narrower concepts such as budgeting and standard costs without regard to the broad classifications. This is also the approach used in the actual research. It is the most common approach used in textbooks and in the literature. Thus this chapter is organized as follows:

1. Background information is presented on the most commonly used management accounting concepts and techniques.

2. The relationships between commonly used management accounting concepts and other factors, such as the operating environment, are explored.

3. Selected empirical studies that provide background for this study are summarized.

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[1]American Accounting Association Committee on Cost Concepts and Standards, "Concepts Underlying Reports for Management Purposes," Accounting Review, April 1956, pp. 182-193.

Management Accounting Concepts

The term "concepts" as used here includes concepts, methods, and techniques commonly identified with management accounting.

Budgeting

The budget process is the means by which firms express plans, goals, and objectives in monetary terms. In its formative stages, the process is part of the planning function; after implementation, its administration is part of the control function. During the planning stage, bargaining and arbitration may take place. Once formulated, a budget becomes a means of coordinating the activities of a firm and a means of allocating resources to attain the objectives of the firm. A master budget for a firm is a detailed document which reaches into all areas of a firm's activities. In this section, a review of the origin and development of the budgeting concept is presented; the budget process and its dimensions are reviewed; and the behavioral aspects of budgeting are explored.

Origin and Development. By 1937, it could be stated that budgeting occupied a permanent place in the business world.[2] The beginning of the use of the concept within a business environment occurred in the United States during a period following World War I. Prior to this time, budgeting was used primarily in governmental type

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[2]Edwin L. Theiss, "The Beginnings of Business Budgeting," Accounting Review, March 1937, pp. 43-55.

organizations.

The budgeting concept in government was well developed in England by 1760. At that time, both a report of past expenditures and estimated future expenditures was being presented to Parliament for annual periods. Its use in this fashion evolved from earlier attempts to curb excessive taxation imposed by England's monarchs, and attempts to hold public officials accountable for amounts spent in administering the affairs of government. By the early part of the nineteenth century, the budget process in English government was sufficiently perfected so as to be an effective means of holding public officials accountable for their fiscal responsibilities.

Budgeting was brought to the United States from England by immigrants. In this country, as in England, it was first used in government. However, the experience here differed from that in England in that it was first used in municipal governments. By 1895, large eastern and midwestern cities were using budgets; and by 1920, almost all cities in the United States were using budgets. Its use at the national level was first seriously encouraged during the Taft administration following his election in 1909. However, it was not until 1921 that legislation was passed which required that budgeting procedures be followed in administering the financial affairs of the Federal government.

During the period that budgeting procedures were being adopted by governmental type units, they were also being adopted by some of the larger business organizations. At first, budgets were used in

business firms in somewhat the same manner as in government. That is, they were regarded as a means of limiting expenditures. The limits were applied to those items generally regarded as luxuries, for example advertising, research, and new positions.

The use of budgeting in production applications developed from the work of Frederick W. Taylor relating to standardization of production methods, and from the work of cost accountants and industrial engineers relating to the development of standard costs. The years from 1895 to 1920 was the period during which budgeting thought developed, and the period from 1920 to 1935 saw its implementation on a wide scale in business applications.

The use of budgets in production operations led to the need for flexible budgets. A necessary prerequisite to the development of flexible budgets was the ability to separate costs into fixed and variable categories. The work of Garcke and Fells contributed significantly to the recognition of the nature of fixed and variable costs and to the resolution of the problem of their classification.[3] Particularly troublesome in this regard was the recognition of the nature of semivariable costs and development of procedures for separating these costs into fixed and variable elements. The first method for separating the two was presented by John H. Williams in

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[3]Robert H. Raymond, "History of the Flexible Budget," Management Accounting, August 1966, pp. 9-15.

1922.[4]

The flexible budget concept was developed and implemented during the period from 1920 to 1940.[5] National Association of Cost Accountants publications list only one reference to flexible budgeting prior to 1930 and only six prior to 1935. The economic conditions of the 1930s did much to stimulate the implementation of flexible budgets. Conversely, the coming of World War II, with its emphasis on production at any price, led to a decline in their use. At the close of World War II, flexible budgeting again became popular; and by the early 1950s, the concept was sufficiently developed so as to begin to appear in cost accounting textbooks.

In summary, business budgeting developed from governmental budgeting as first practiced in England and later in cities, states, and the Federal government of the United States. A specific type of budget called a flexible budget was developed during the decade of the 1930s. The concept of budgeting was sufficiently developed and implemented by the decade of the 1950s that other dimensions of the process began to be explored in the literature. The process and the human ramifications are explored in the following two sections.

The Process and its Dimensions. The budget process is a complex

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[4]Michael Chatfield, A History of Accounting Thought (Huntington, New York: Kreiger Publishing Company, 1977), p. 179.

[5]J. Hugh Jackson, "A Half-Century of Cost Accounting Progress," The National Association of Cost Accountants Bulletin, September 1952, pp. 3-17.

one which affects all areas of a firm's activities. The process generally follows certain well-defined steps. In this section, articles by Livingstone and LaRusso are reviewed in order to provide an overview of the process. Livingstone's views are given from the perspective of a researcher while LaRusso's are given from the perspective of a manager actually involved in the budget process. Following the overview of the steps in the budget process, the various dimensions of the process are explored in detail.

Livingstone saw the budget process as one involving complex interaction of numerous variables such as goal development, subgoal specification, resource allocation, and review of actual performance.[6] He examined the budget process in detail and saw it as a means of attaining managerial goals and subgoals, and as a tool for evaluating managerial performance. In his analysis, the budget process includes the single most important annual decision or set of decisions that are made. In its final form, usually arrived at through negotiation and revision, the budget ideally represents the most efficient means of allocating the resources of the firm in attaining its objectives.

The general goal statement of the firm is the starting point for the formulation of the budget. Usually, such a statement is sufficiently broad and general that agreement is easily reached on its

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[6]J. Leslie Livingstone, "Organization Goals and the Budget Process," Abacus (June 1975) as reprinted in Accounting for Managerial Decision Making, ed. Don T. DeCoster, Kavasseri V. Ramanathan, and Gary L. Sundem. (New York: John Wiley and Sons, 1978), pp. 306-317.

content. From the goal statement specific operational goals and subgoals are derived. An example of a specific operational goal is the overall profit plan for the year. The operational goals translate into a marketing plan which in turn is used as a basis for the details of departmental budgets. Departmental budgets are in the nature of production plans and administrative expense plans. In summary, the process is a complex one, and one that touches all phases of a firm's activities. In its final form, the budget serves as a stabilizing force in the firm by reducing a complex effort to manageable and understandable parts.

LaRusso provided some useful insights into the budget formulation process based on his experience as a manager.[7] According to him, the process usually follows certain well-defined steps which have not changed much during the last twenty years. These steps are:

1. The controller and assistant controller meet with a group from top management who have the responsibility for establishing the financial goals of the company.

2. The controller's staff transforms the general goals into specific goals needed for departmental budgets.

3. Middle managers are sent copies of the preliminary budget and are asked to propose changes.

4. Middle managers hold arranged meetings with subordinates in management to work out the proposed changes.

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[7]Anthony C. LaRusso, "The Budgeting Process: A Managerial Tool," Managerial Planning, January-February 1977, pp. 34-40.

5. Middle managers meet with the controller and his staff to work out the proposed budget for presentation to top management.

LaRusso notes that this sequence does not normally include participation by foremen and workers. Such a sequence is in accordance with the Theory X approach to management. In LaRusso's opinion, this approach is not the most effective one for accomplishing the goals represented by the budget. More will be said about this item in the next section of this chapter.

The various dimensions of the budget can be viewed in a number of ways. First, it is an integral part of a firm's management information system.[8] As such, the budget is a means of communicating management thinking concerning expected levels of performance. Thus it serves to reduce uncertainty and to clarify the structure of the organization. Horngren states that the budget is the best approximation of an actual model of the firm. A master budget in its final form consists of a large amount of detail. It is broadly divided into two parts, an operating budget and a financial budget.[9] As the terms imply, the classification of the various categories of the budget are made according to whether they are applicable to operating type decisions or financing type decisions. The operating budget is income statement oriented and contains subsections for

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[8]Joshua Ronen, "Budgets as Tools of Control and Motivation," as reprinted in Managerial Accounting: The Behavioral Foundations, ed. J. Leslie Livingstone (Columbus, Ohio: Grid, 1975), pp. 157-165.

[9]Charles T. Horngren, Cost Accounting: A Managerial Emphasis (Englewood Cliffs, New Jersey: Prentice-Hall, 1982), pp. 135-140.

sales, production, cost of goods sold, selling expenses, and administrative expenses. The financial budget is balance sheet oriented. Its key section is a cash budget showing the details of cash receipts and disbursements.

Second, depending on the nature of the organizational sub-unit, the budget may be viewed as a goal or as a constraint. For sales personnel, it may be viewed as a goal to be attained. Ideally, it will be a realistic goal arrived at after participation by the persons affected. For production personnel at the upper managerial levels, it may also represent a goal to be attained. For production personnel at lower managerial levels, it may be viewed as constraints on amounts that can be spent in attaining an assigned level of production. For administrative type personnel, whose workload volume is relatively independent of sales and production levels, it is viewed primarily as a constraint on amounts that can be spent in accomplishing the administrative functions of the organization.

Third, the budget process is viewed as part of the planning and control process. In terms of the planning process, there is a distinction between corporate planning and corporate budgeting.[10] The term "corporate planning" has acquired a distinctive meaning in the literature. It consists of decisions concerning the very nature of a firm's activities, the broad objectives related to those activities, and the allocation of resources to attain the objectives. It is

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[10]W. Thomas Lin, "Corporate Planning and Budgeting: An Integrated Approach," Managerial Planning, May-June 1979, pp. 29-33.

long-range and strategic in nature; thus the expression of such plans is not necessarily quantitative in nature. Budgeting is related to corporate planning in that it is a concept or technique used in carrying out the corporate plan. Budgeting is short-term in nature and usually is done for a period of one year. It is stated in quantitative terms, usually dollar amounts. It is related to the control process in that once formulated, it becomes a standard by which management measures results. As a result of the detail included in a budget, it is used to control the specifics of day-to-day operating and financing activities.

Fourth, the budget process is viewed as part of the planning and control function whereby the planning function is short-range in nature. In this regard, Morris argues for a greater degree of separation between the functions of planning and control within the framework of the budget process.[11] In his view, the use of one budgetary control system for the purposes of both planning and control results in less than optimal results for both functions. The frequent revision of budgets is cited as evidence that the planning function is often not done well. This results in a shifting target for the control function. He suggests that planning data would be more useful if revised less frequently. Under this approach, it appears that planning data would be in the nature of goals for managers to attain. He also suggests that the control function could be carried out more

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[11]R. D. F. Morris, "Budgetary Control Is Obselete," The Accountant (England), May 18, 1968, pp. 654-656.

effectively if the frequency of reports was tailored to each manager's needs. In addition, targets for control purposes should be very detailed and should not necessarily be stated in financial terms.

In this section, the budget process has been reviewed. Although easy to understand, the process is complex in practice. This is due in part to behavioral factors, some of which are reviewed in the next section.

Behavioral Aspects. Argyris was one of the first to call attention to human type problems associated with the use of budgets.[12] Since that time, a large volume of material has been written about this type of problem.

Tosi described the nature and dimensions of the human aspects of budgeting in 1975.[13] According to him, the negative factors associated with budgets result from the fact that a budget tells a manager what he or she can and cannot do. It is a formal part of the organizational structure, and it affects all areas of the organization's activities. It is often viewed as a constraint imposed from above. In the initial stages of budget formulation, managers experience anxiety because of a fear of being treated unfairly. This stems from the fact that budgets are used as a means of allocating

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[12]Chris Argyris, "Human Problems with Budgets," Harvard Business Review, January-February 1953, p. 97.

[13]Henry Tosi, "The Human Effects of Managerial Budgeting Systems," as reprinted in Managerial Accounting: The Behavioral Foundations, ed. J. Leslie Livingstone (Columbus, Ohio: Grid, 1975), pp. 139-156.

resources to the sub-units of the organization. The recommended solution to these and similar types of problems is to allow persons throughout the organization to have input into the budget process. This is known as participative budgeting.

It is difficult to group or categorize the participative budgeting research because the area is not well defined. Many studies have no relationship to others in the area; that is, they are not well connected. Furthermore, the volume of research in the area is large. Nevertheless, an excellent review of the most significant participative budgeting literature was provided by Levine in 1979.[14] Although there were some dissenting views, the majority of the researchers reviewed concluded that participation by lower level persons in the budget process produces beneficial results to the firm as a whole.

In contrast to studies that focus only on the individual, Merchant's study focused on individuals within an organizational context.[15] He explored the relationship between budgeting systems and company size, and the relationship of individual performance to these factors. He defined budgetary control systems within the context of one of two types of control strategies - administrative or interpersonal. An administrative control strategy is one that has the

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[14]Marc Levine, "Reviewing the Literature," Business, March-April 1979, pp. 49-52.

[15]Kenneth A. Merchant, "The Design of the Corporate Budgeting System: Influences on Managerial Behavior and Performance," Accounting Review, October 1981, pp. 813-829.

following characteristics:

1. Greater participation by middle and lower management in budget-related activities.

2. Greater importance placed on achieving budget plans.

3. More formal communications patterns.

4. Greater budgeting system sophistication.

An interpersonal control strategy was one that did not have these characteristics. He hypothesized that larger, more diverse, decentralized firms use the more formal administrative control strategy; that managers in firms utilizing such a strategy are more highly motivated; and that individual performance is higher when the control strategy used is in accordance with the nature of the firm. He gathered data via interviews and a questionnaire from managers in nineteen firms in the electronics industry. He found varying degrees of support for the hypothesis stated above. The results are of interest in terms of this study in that they indicate that the control strategy used and the performance of managers can be examined within a cultural context as well as within the context of firm size.

Numerous studies have examined the effects of budgetary participation on attitude and performance of managers. Kenis included this item as one of the independent variables in his study, but also examined the effects of budget goal clarity, budgetary feedback, budgetary evaluation, and budget goal difficulty on a variety of end

variables.[16] The end variables consisted of ten items related to attitude toward job, attitude toward budget, and job performance. The hypotheses formulated are somewhat complex in that the five budget goal characteristics enumerated were examined for their effect on eight end variables. The subjects used in the study were managers and supervisors of nineteen plants in the New Jersey - Philadelphia area. Data were gathered by use of a questionnaire which yielded 169 usable responses. The results indicated that budgetary participation and budget goal clarity have positive effects on those variables that were related to attitude toward job, attitude toward budgets, and budgeting performance. A high level of budget goal difficulty had a negative effect on these attitudes and the performance of managers. The characteristics of feedback and evaluation were not significant in terms of their effect on end variables. In summary, the findings of the study indicate that clear goals and budgetary participation are major factors in improving attitudes and performance of lower level managers. Three additional studies in this area are by Swieringa (1975), Collins (1978), and Brownell (1981).

First, Swieringa reached the same conclusion later reached by Merchant concerning the importance of the organizational context in which participative budgeting is used.[17] He stated it thusly:

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[16]Izzettin Kenis, "Effects of Budgetary Goal Characteristics on Managerial Attitudes and Performance," Accounting Review, October 1979, pp. 707-721.

[17]Robert J. Swieringa, "A Behavioral Approach to Participative Budgeting," Management Accounting, February 1975, pp. 35-39.

> The results of this analysis revealed that the structural properties of a company's use of participative budgeting and of the organizational context within which it is used were the most important predictors of the extent to which managers tend to engage in various budget-related behaviors . . .[18]

He also explained the effects of what he called mediating variables on manager's behavior in relation to budgeting. The variables given were sixteen in number and were in the nature of such items as management level, age, experience, leadership style, responsibility, emotional stability, and sociability. Emotional stability, ascendancy, and feelings concerning locus of control were found to be the most important variables relating to effectiveness of managers in working with others in a budgetary context. Again, he stressed the importance of the organizational context to the validity of his results.

Second, Collins' study examined the effect on budgeting response attitudes (dependent variables) of certain items of a personal nature (independent variables).[19] The independent variables were in three categories: (1) personal flexibility; (2) the perceived budget characteristics of accuracy, estimate certainty, controllability, and participation; and (3) age, tenure, and status in the organization. The dependent variables consisted of two positive items and two negative items. The positive items were positive budget response by the individual and the willingness of the individual to encourage a

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[18]Ibid., p. 38.

[19]Frank Collins, "The Interaction of Budget Characteristics and Personality Variables with Budgetary Response Attitudes," Accounting Review, April 1978, pp. 324-335.

positive response by others over whom he or she had influence. The negative items were a tendency on the part of the individual to create budgetary slack and a tendency to resist responding to budget related items. Data were gathered via a questionnaire from 101 managers in seven large industrial firms located in the Southwest. The first two groupings of independent variables were found to be important in terms of their correlation with budget attitudes. The items in the third grouping - age, tenure and status, were found to be unimportant in terms of attitudes toward budgets. Thus, Collins' research confirms Swieringa's concerning the importance of individual or personal characteristics.

Third, Brownell examined the relationship between budgetary participation and budgeting performance in terms of a personality variable which he called locus of control.[20] Locus of control has to do with the extent to which persons view what happens to them as being a result of their own actions. Stated differently, the concept concerns the degree to which persons accept responsibility for the things that happen to them. Persons who accept what happens to them as being a result of their own actions are classified as having an internal control perception, and those who view what happens to them as not being a result of their own actions are classified as having an external perception of events. It was expected that budgetary

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[20]Peter Brownell, "Participation in Budgeting, Locus of Control and Organizational Effectiveness," Accounting Review, October 1981, pp. 844-860.

participation and budgetary performance would be more positively correlated with individuals who were classified as being in the internal control category. The subjects for the study consisted of two groups: undergraduate accounting students and middle level managers from a manufacturing company. The subjects were first classified according to locus of control by use of a testing instrument of a psychological nature. They then participated in a computer type business game in order to determine the relationship between budgetary participation and budgetary performance. As expected, budgetary participation and budgetary performance were more positively linked for persons classified as having an internal control perception than for those who had an external perception of events. Significantly, it was also mentioned in the article that other researchers have discovered that the relationship between budgetary participation and budgetary performance is also affected by the cultural setting in which the subjects live and work.

In concluding this section on budgeting, four frequently quoted studies will be reviewed. As mentioned in a preceding paragraph, it is difficult to organize the participative budgeting literature within any framework; therefore, the articles are reviewed in chronological order. They are by Argyris (1953), Schiff and Lewin (1968), David Cherrington and Owen Cherrington (1974), and Milani (1975).

First, as indicated earlier, Argyris was one of the earliest writers to call attention to some of the human type problems

associated with budgets.[21] The article referred to is written in a style appropriate for its content. Comments from interviewees and case studies are included so as to contribute a human relations flavor to the article. Interviewees for the study were front line supervisors in three manufacturing plants. The effects of budgets on people are related to four areas as follows.

1. Budgets are used as pressure devices. As a result, foremen may form informal groups in order to deal with the pressure. Often, this leads to a climate of suspicion and tension in which the groups begin to cooperate in an organized way to resist the pressures of management. In the long run, the budget pressure tends to be counterproductive.

2. Budgets tend to make budget supervisors appear successful only when foremen are made to appear unsuccessful. It is the budget supervisor's job to find problems in the factory, using the budget as a tool. The reporting of such problems to his boss makes the budget supervisor look good. The reporting system is structured so that at a certain level, the problem is referred down through the foreman's boss to the foreman's level. This makes the foreman appear a failure in the eyes of his boss. Feelings of failure on the part of the foreman can often lead to undesirable consequences associated with a loss of confidence in himself. These are detrimental to the efforts of the firm in the long run.

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[21]Argyris, loc. cit.

3. Budgets tend to cause supervisors to take a narrow view of their responsibilities. The primary concern of a supervisor becomes the meeting of the budget goals for his department. From the perspective of the company as a whole, it is assumed that the budget results in goal congruence and the most effective use of company resources. This view overlooks the fact that much time is spent by foremen in attempting to shift the blame for problems brought to light by the budget system to some other department. In this process, frictions occur and bad feelings result which often lead to a lack of cooperation on a long-term basis.

4. Budgets are used as an outlet through which managers reflect their leadership style. Aggressive type managers use budgets in an aggressive manner. This leads to a situation where budgets, as such, are blamed for negative factors that in reality are a function of a manager's personality or leadership style. Since the budget is the means by which the negative aspect of a manager's leadership style is conveyed to foremen, it is not surprising that foremen develop bad feelings toward the budget process itself. This overlooks the fact that the budget, as such, is a neutral management tool.

Argyris suggests that the effects of the problems cited above can be lessened by providing opportunities for participation in the budget process by lower level personnel, and by providing training in human relations to financial and accounting type personnel who administer the budget.

Second, Schiff and Lewin conducted a study to determine the

extent to which slack is created in the budget process.[22] Their methodology consisted of interviews with persons in all types of positions participating in the budget process in three independent divisions of large companies. They conclude, without reservation, that slack is created in the budget process in both the cost and revenue sides. Some of the techniques discovered for creating slack were as follows:

1. Sales objectives were formalized based on decision rules which resulted in amounts most likely to be attained.

2. Estimates of contribution from sales were based on average estimates from the low end of a range of such estimates.

3. Cost estimates were based on standard costs which allowed for known inefficiencies; that is, the standards should have been revised but were not.

4. Budgets were padded by including items for which no plans had been made to fund.

Schiff and Lewin conclude that slack may account for 20 to 25 percent of budgeted expenses for a division. By inference, they conclude that the creation of slack is a widespread practice engaged in by those who participate in the budget process.

Third, David Cherrington and Owen Cherrington conducted a study to examine the relationship between what they called appropriate

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[22]Michael Schiff and Arie Y. Lewin, "Where Traditional Budgeting Fails," Financial Executive, May 1968, pp. 51-52.

reinforcement and budget performance.[23] The term "appropriate reinforcement" is from psychology and is defined for purposes of this study as follows: "Appropriately reinforced individuals are the rewarded high performers and the nonrewarded low performers."[24] This definition appears to be somewhat circular, but it is further defined operationally as follows:

> Essentially, we postulate that, when budgets are used, appropriate reinforcement is provided when an individual's reward is contingent upon some combination of estimated or actual results, depending on his ability to control each.[25]

Their study was in the nature of a laboratory experiment using 230 undergraduates as subjects. They found that the highest performance and satisfaction scores were obtained by those students who had been given freedom to set "production" estimates and those who were not penalized when their estimates were not reached. In addition, they found that students who were allowed to submit low estimates (budgets) scored low on performance and satisfaction. They conclude that their experiment has to do primarily with the personal values of the individual; that is, individuals make contributions to an organization based on the levels of compensation received.

Fourth, Milani conducted a study with the objective of determining the effect of varying degrees of budgetary participation

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[23]David J. Cherrington and J. Owen Cherrington, "Participation, Performance, and Appraisal," Business Horizons, December 1974, pp. 35-44.

[24]Ibid., p. 37.

[25]Ibid.

on job performance, attitude toward job, and attitude toward firm.[26] The subjects for the study were foremen in one company who normally participated in the budget process to some degree. The measure of job performance used was the same as that of the company; that is, company records were used to determine a job performance measure for the subjects. Attitude towards job and towards company were measured by a questionnaire. The relationship between budgetary participation and job performance was positive, although the relationship was weak. The relationship between budgetary participation and both attitude toward job and attitude toward firm was positive and strong.

Summary. Budgeting is a widely used managerial tool. It was first used in governmental applications and became firmly established in business applications in this country by 1935. The budget concept, once adopted by a business firm, affects all areas of the firm's activities. It is a means of allocating the resources of a firm to attain its goals. The behaviorally oriented research has been primarily devoted to the relationship between budgetary participation and job performance. The effect of other variables on job related factors has also been explored. Although some contradictory evidence exists, the consensus is that budgetary participation leads to improved job performance by those affected by the budget process.

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[26]Ken Milani, "The Relationship of Participation in Budget-Setting to Industrial Supervisor Performance and Attitudes: A Field Study," Accounting Review, April 1975, pp. 274-284.

Standard Costing and Variance Analysis

A form of standard costing originated in the "putting-out" system of domestic production used in England during the seventeenth and eighteenth centuries.[27] Under this system, entrepreneurs would furnish raw materials to domestic households, usually on a weekly basis, for conversion into some type of finished product. One of the problems with the system was the practice of householders shorting the entrepreneur on delivery of the goods. Thus the entrepreneur learned to develop estimates of the volume of finished goods that should be produced from a given amount of raw materials. Householders were rewarded for output in excess of the estimates and were penalized for deficiencies in the amount of output.[28] This practice was in fact a form of cost estimation, crude though it may have been at the time.

During the eighteenth and nineteenth centuries, the domestic system gave way to the factory system in England and other European countries. The accounting records used in such factories have been preserved in many cases, and they provide a clear picture of the developments in cost accounting at that time. In addition, writers began to describe the practices of companies and to advocate changes and improvements in those practices. One of the earliest records of the treatment of what would later come to be known as cost variances

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[27]Ellis Mast Sowell, The Evolution of the Theories and Techniques of Standard Costs (University of Alabama Press, 1973), pp. 12-15.

[28]Ibid., p. 101.

comes to us from the writing of Garcke and Fells.[29] They discuss the problem of residual balances in accounts after transferring product costs therefrom, and suggest a number of alternative treatments to dispose of such balances.

Preceding paragraphs describe a form of standard costing based on rough cost estimates. More precise estimates or standards grew out of the scientific management developments of Frederick W. Taylor and others. In fact, much of the credit for the development of more precise methods of setting cost standards is attributed to industrial engineers of the late nineteenth and early twentieth centuries. Epstein documents this effort extensively in his book.[30] As more factories adopted standard costing, the concept was treated in the literature. Some of the early writers were Longmuir (1902), Garry (1903), Whitmore (1906), Emerson (1909), and Harrison (1911).[31] About half of these men were engineers and about half were accountants. The design of the first complete standard cost system was completed by Harrison in 1911. By 1920, he had developed a set of relationships for the analysis of cost variances. During the decade of the 1920s, most of the details of the application of standard costing in practice were worked out, and standard costing developed to the point where it

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[29]Ibid., p. 102.

[30]Marc Jay Epstein, The Effect of Scientific Management on the Development of the Standard Cost System (New York: Arno Press, 1978), pp. 90-120 and 155-163.

[31]Chatfield, op. cit., pp. 169-173.

was very similar to the concept as we know it today. More recent developments are discussed by Seaton in terms of three areas. They are: (1) quantitative techniques, (2) behavioral implications, and (3) extensions of application to other than manufacturing applications.[32] In addition, as has been noted in this study, standard costing is related to budgeting. It is also related to direct costing and cost-volume-profit analysis, which will be the subject of a later section of this chapter.

Description and Uses of Standard Costs. Standard costs can be used in connection with either a process cost system or a job order cost system. The most common application of standard costs is in production type operations, but they may also be used in connection with other company functions as well. They may also be used in nonprofit type organizations.

Standard cost records are often integrated with the general accounting records. Standard costs are acceptable in the United States for both external financial reports and for income tax purposes if standards are reasonable and attainable. The use of standard costing tends to pull together a number of company functions including production, engineering, purchasing and accounting.[33] Standard costs are often the basis for budgeted costs. In addition, they can be

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[32]Lloyd Seaton, Jr., "Standard Costing Developments and Applications," Management Accounting, July 1970, pp. 65-67.

[33]Ronald J. Jordan, "Standard Cost Accounting Systems - An Overview," Connecticutt CPA, June 1977, pp. 22-23.

useful for forecasting; for preparing pro forma statements; for pricing of products in general and special orders; and for special decisions such as make or buy and capital budgeting.[34] They are widely used for performance evaluation. It has been suggested that they could be useful for productivity measurement.[35] For this purpose, a productivity ratio would be calculated by dividing standard hours allowed for production by actual hours taken for a given time period, such as a month. Such a ratio would then become a base, which would be used for comparison of productivity ratios calculated in later months. As with any such ratio, this procedure would facilitate the detection of trends, thus allowing corrective action to be taken when needed. Such ratios would serve as a standard of comparison over long periods of time, even though the standards themselves might be revised periodically. Some of the problems associated with standard costs, including the setting and revising of standards, will now be considered.

Much has been written concerning the tightness of the standards to be used with standard costs. The degree of tightness is affected by motivational and other behavioral considerations. It is also related to the suitability of the resultant costs for purposes of external financial reporting and tax reporting. Most current

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[34]Joseph H. Ericson, Jr., "Standard Cost in Action," Management Accounting, August 1978, pp. 25-32.

[35]Timothy L. Ross and R. J. Bullock, "Integrating Measurement of Productivity into a Standard Cost System," Financial Executive, October 1980, pp. 34-40.

textbooks suggest that currently attainable standards are those which will best serve the aforementioned purposes. The actual setting of standards is a process involving persons from numerous departments in a firm. Theoretically, standard costs are derived from engineering standards or specifications, but even this process is not as precise as might be expected.[36] In addition, the participation of numerous persons with different interests suggests that the process involves negotiations and the reaching of a consensus based on numerous considerations.

Another problem associated with the use of standard costs is that of acceptance by the people affected by their use.[37] This is a problem that is associated with the installation of any new system. Persons may expect too much from the use of standard costs, or they may see any change as threatening, and thus find ways to work around the system.

One writer has gone so far as to suggest that both standard costing and budgetary control are concepts that have outlived their usefulness.[38] According to him, the problems and costs associated with standard costing and variance analysis outweigh the benefits

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[36]For a detailed discussion of the process of setting standards and of the related problems associated therewith, See Roswell M. Piper, "Engineering Standards and Standard Costs," Management Accounting, September 1976, pp. 44-46, 52.

[37]Christopher A. Conroy, "Implementing the Standard Cost System," CPA Journal, September 1976, pp. 83-86.

[38]Mark Lee Inman, "Doing Without Standard Costing and Budgetary Control," Management Accounting (England), April 1981, pp. 36-37.

derived therefrom. The use of standard costs in interim reports sometimes results in misleading information because of the variances that are held off the reports until year-end. The year-end adjustments are often cited as being complex and it is noted that a variety of acceptable methods exists for making such adjustments. An inflationary economy is cited as another problem that makes standard costing and budgeting a less useful managerial tool. The problem is more troublesome when standard costs are used in connection with external reports. Since standard cost comparisons are made with historical costs, the resulting analysis often turns into a blame fixing exercise rather than a constructive forward looking effort. The feelings following such incidents often result in long-range human relations type problems that hamper the effectiveness of managers in the firm. The author suggests that standard costs be replaced by ratio analysis. The ratios would be used as a means of spotting trends, enabling managers to take corrective action.

The extent of usage of standard costs is not well documented. Imhoff found that sixty percent of public companies responding to a survey had a standard cost system.[39] No information is provided concerning the size or type of companies using standard costs. Information of this nature resulting from this study will be included in a subsequent chapter.

Variance Analysis. A detailed treatment of variance analysis is

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[39]Eugene A. Imhoff, Jr., "Management Accounting Techniques: A (Footnote continued)

beyond the scope of this study. A brief summary is offered here because of the relationship between variance analysis and standard costing.

The literature on variance analysis is extensive in volume, theoretical in nature, and is difficult to summarize. Perhaps the best summaries are those by Kaplan (1975 and 1977).[40] While the articles summarized by Kaplan treat theoretical issues related to the use of probabilistic models, which were found to have limited application, the practical issues related to the topic have to do with allocation and disposition of variances after they have been isolated. In short, a significant gap between theory and practice exists in this area.

Summary. Standard costing, as the term is understood today, developed from a form of cost estimating used in England in connection with the practice of "putting out" raw materials to households for production into finished goods. The development of precise standards in a factory environment was related to the scientific methods of Frederick W. Taylor. Indeed, industrial engineers contributed significantly to the development of the standard costing concept and

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[39] (continued)
Survey," Management Accounting, November 1978, pp. 41-45.

[40] See Robert S. Kaplan, "The Significance and Investigation of Cost Variances: Survey and Extensions," Journal Of Accounting Research, Autumn 1975, pp. 311-337 and "Application of Quantitative Models in Managerial Accounting: A State of the Art Survey," The Accounting Journal, Winter 1977-78, pp. 224-228.

its implementation. The standard cost concept is used primarily in production type activities, but it is also used in retailing, service type industries, and nonprofit type activities. Numerous theoretical proposals have been advanced through the literature to facilitate the analysis of variances from standard costs. But little has been accomplished in implementing such proposals in practice. Standard costs are widely used and are a useful management accounting tool.

Direct Costing

The term "direct costing" is associated primarily with the income statement format using the term. The statement is also referred to as a marginal costing income statement and a variable costing income statement. Textbook topics related to the concept usually are entitled cost-volume-profit analysis or break-even analysis. It is often contrasted with absorption costing. The central point at issue between the two methods concerns the treatment of fixed manufacturing costs. Numerous articles have been written by proponents of both methods justifying why each is more theoretically correct.[41] As with many theoretical issues in accounting, the premise on which the argument is built logically leads to the desired conclusion. Perhaps the pertinent question is not which is the most theoretically correct, but rather which method is most suitable for the desired purpose.

Development. The development of direct costing as a concept was

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[41]For an example of such an article, see M. Ali Fekrat, "The Conceptual Foundations of Absorption Costing," Accounting Review,
(Footnote continued)

preceded by efforts toward understanding the nature of fixed and variable costs and development of procedures for separating the two. Although early references can be found that indicate an understanding of the nature of fixed and variable costs, it was in the early 1900s that serious efforts were made to develop systematic procedures for separating the two.[42] And although evidence exists that some companies used direct costing as early as 1908, the concept was first described as such in an often cited article written by Jonathan Harris in 1936.[43]

The chief significance of Harris' article was that it identified direct costing as a concept, and stimulated much debate concerning the "correct" costing method for income determination. In addition, it should be noted that Harris was the first to advocate a specific format emphasizing the contribution margin approach for the income statement.[44]

Following World War II, further improvements occurred in techniques for providing a better separation of fixed and variable costs. The debate in the literature centered around the issues of the

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[41] (continued)
April 1972, pp. 351-355.

[42] Charles Weber, The Evolution of Direct Costing (Urbana: Center for International Education and Research in Accounting, 1966), pp. 16-22.

[43] For an example of such a citation, see Gyan Chandra and Jacob B. Paperman, "Direct Costing vs. Absorption Costing: A Historical Review," The Accounting Historian, Winter 1976, p. 9.

[44] Weber, op. cit., pp. 38-47.

nature of asset and expense insofar as these definitions could be applied to fixed manufacturing costs. Further, proposals were advanced for improving the format of the income statement.[45] The use of direct costing for various purposes is treated in the next section.

Applications. A study conducted by the National Association of Accountants (NAA) in 1961 investigated the use of direct costing in connection with six areas as follows: (1) profit planning, (2) pricing decisions, (3) cost control, (4) internal reports, (5) external reports, and (6) tax reports. The study involved fifty companies, and data were obtained primarily through interviews. A brief summary of the findings in relation to each of the aforementioned items follows.

The advantages of using direct costing for profit planning was perceived by companies participating in the study as being most useful for the short run.[46] Companies with unused capacity could easily determine the contribution to profit from an increase in volume. In contrast, under absorption costing, unit costs are valid for only one volume of production. Direct costing also provides useful information for purposes of making decisions concerning the product mix under conditions of scarce resources.[47]

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[45]Ibid., pp. 48-65.

[46]National Association of Accountants, Current Applications of Direct Costing (New York: NAA, 1961), pp. 22-40.

[47]In this regard, see Kaplan, op. cit. 1977-78, p. 221. The point is made that linear programming is useful in a multiple product situation when more than one constraint applies.

Many of the characteristics of direct costing that make it useful for profit planning are equally useful in the area of pricing decisions.[48] Other factors such as competition and demand enter into pricing decisions. Nevertheless, direct costing is useful in pricing decisions in that costs which do not change in relation to production volume are excluded from the analysis.

The separation of costs into fixed and variable categories provides valuable insight into the nature of costs in terms of their controllability.[49] Executives participating in the NAA study often expressed surprise at the large amount of fixed cost revealed by the direct costing format. Improved insight into the nature of costs also facilitates the preparation of standards for standard costing, the preparation of budgets, and the use of costs under the concept of responsibility accounting.

The section in the NAA report on internal reports overlaps considerably the sections on profit planning, pricing decisions, and cost control; therefore, it is not summarized separately here.

The use of direct costing in external financial reports has generated considerable discussion and debate.[50] Ordinarily, the concept is not considered appropriate for use in external reports under generally accepted accounting principles. This is based on an

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[48] NAA, op. cit. pp. 41-57.

[49] Ibid., p. 58-66.

[50] Ibid., pp. 86-96.

interpretation of Accounting Research Bulletin Number 43, Chapter 4. However, the NAA report states that seventeen of the fifty companies participating in the study used direct costing in external reports. Lere found that the same condition existed in companies participating in his study, although the percentage was smaller (twenty of one hundred fifty nine companies).[51] No mention is made of any of the companies receiving a qualified audit opinion as a result of the use of direct costing in external reports. In fact, the NAA report specifically states that no qualified opinions were given in this connection. Therefore, since industry usage is one appropriate method by which accounting practices became generally accepted, it appears that the widely accepted view that direct costing is not proper for external reporting rests primarily on tradition rather than an interpretation of applicable accounting pronouncements.[52]

In summary, although direct costing is a relatively recent development, it has found usage in a wide variety of applications, and is used by a majority of firms in some applications.

Responsibility Accounting

Articles on responsibility accounting as a concept began to appear in the literature in the early 1960s, and have continued to

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[51]John Covey Lere, "Firm Characteristics Associated with Use of Variable and Absorption Costing in Periodic Reporting," (Unpublished PhD Dissertation, The University of Wisconsin-Madison, 1976), p. 68.

[52]American Institute of Certified Public Accountants, AICPA Professional Standards, Volume I (Chicago: Commerce Clearing House, 1982), Section AU 411.06.

appear through the 1970s to the present time. Under the concept, costs and other information are classified according to the level of management responsible for them.[53] The emphasis is on the assignment of only those costs and/or revenues that are controllable at a given management level. Therefore, costs which are allocated to departments for the purpose of inventory valuation for external reporting are not useful for purposes of control under responsibility accounting. This means that the accounting system used under responsibility accounting can be detailed and complex. However, the concept requires the use of no new techniques or methods not normally used by companies in the course of planning and controlling operations. Stated differently, responsibility accounting is applied in connection with other commonly used management accounting concepts such as budgeting, standard costing, and transfer pricing.

Responsibility accounting is often defined in terms of three levels or classes of responsibility centers. These are the cost center, the profit center, and the investment center.[54]

First, under the cost center approach, costs incurred are compared with some predetermined level of cost. The predetermined cost is likely to be in the form of a budgeted or a standard cost.

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[53]E. W. Netten, "Responsibility Accounting for Better Management," CA Magazine, as reprinted in Contemporary Issues in Cost and Managerial Accounting, ed. Hector R. Anton, Peter A. Firmin, and Hugh D. Grove (Boston: Houghton Mifflin, 1978), pp. 156-164.

[54]Roland L. Madison, "Responsibility Accounting and Transfer Pricing: Approach with Caution," Management Accounting, January 1979, pp. 25-29.

Second, under the profit center approach, both controllable costs and revenues are assigned to the center. Under this approach, the center may be a major division of a company, and transfers between divisions necessitate the choosing of an acceptable transfer pricing scheme.[55] Third, under the investment center approach, the profit of a center is related to its investment base. The technique of return on investment is applicable in this situation. The problem of asset valuation, and other difficulties, makes this the most complex approach of the three.

The responsibility accounting concept has developed sufficiently in theory and practice so that the problems associated with its use have become a subject of articles in the literature.[56] First, the concept assumes strict, well-defined organizational structures that seldom exist in actual firms. In actual firms, responsibilities overlap, and some parts of the organization do not fit well into the organizational chart. This is true of staff type functions and of persons who act in an advisory capacity. Second, the concept is not well developed in terms of applicability to participatory management. Stated differently, its rationale rests on Theory X rather than Theory Y type management. This is not to say that the concept cannot be made applicable to firms that use participatory management, but thus far

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[55]Transfer pricing is reviewed in the next section of this chapter.

[56]John Pick, "Is Responsibility Accounting Irresponsible?," The New York Certified Public Accountant, (July 1971), pp. 487-494 as reprinted in Accounting for Managerial Decision Making, ed. Don T. DeCoster, Kavasseri V. Ramanathan, and Gary L. Sundem (New York: John Wiley and Sons, 1978), pp. 370-381.

the emphasis has been on top-down type management. Third, the emphasis under responsibility accounting on costs and profits, and the accountability for such, raises concerns about behavioral type problems discussed previously in this study under the heading of budgeting. Foremost among these type problems is one whereby managers and supervisors are encouraged to take a very narrow view of the activities of the firm.[57] Stated differently, there are powerful incentives under the concept for managers and supervisors to be concerned about their own area of responsibility without regard for the welfare of the company as a whole. The concept assumes that goal congruence can be accomplished through a formal control system, but numerous cases can be cited where the actions of a manager under such a system have been detrimental to the firm as a whole while making the manager's own department look good. In reality, an actual firm is more than the sum of its individual cost centers, departments, and divisions. The wise manager who recognizes this can effectively utilize the concept for his or her area of responsibility while advancing the welfare of the firm as a whole. In summary, it can be a useful concept when applied with wisdom and when applied from the perspective of the long-range welfare of the firm.

Transfer Pricing

The transfer pricing literature is quite extensive. Three

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[57]Donald K. Clancy, "The Management Control Problems of Responsibility Accounting," Management Accounting, March 1978, pp. 35-38.

summary type articles are the primary sources for this review. They are by Abdel-Khalik and Lusk (1974), Sharav (1974), and Benke and Edwards (1980).

Transfer pricing methods developed in connection with the growth and decentralization of firms which took place in the 1930s and 1940s.[58] Articles on the topic began to appear during the 1950s. The basic objective of transfer pricing is to develop a method for setting prices for goods transferred between divisions that will cause managers to act in the interest of their respective divisions and yet cause the actions of such managers to be congruent in terms of the objectives of the firm as a whole. The topic is sufficiently developed so as to be included in cost accounting textbooks commonly used in university level courses.

Summary of Methods. Transfer pricing methods may be grouped for purposes of classification in a number of different ways. In this section, they are grouped and summarized under two different classification schemes.

First, Abdel-Khalik and Lusk grouped the methods as belonging to one of three categories as follows: (1) theory of the firm approach, (2) mathematical programming approach, or (3) other analytical approaches.[59]

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[58]Itshak Sharan, "Transfer Pricing - Diversity of Goals and Practices," Journal of Accountancy, April 1974, pp. 56-62.

[59]A. Rashad Abdel-Khalik and Edward J. Lusk, "Transfer Pricing - A Synthesis," Accounting Review, January 1974, pp. 8-23.

Under the theory of the firm approach, divisions or departments of a company are viewed as if they were autonomous and separate companies. Classical economic theory is then applied in this situation to explain how the proper transfer price will evolve. Under this approach, it is assumed that managers have a high degree of autonomy and that many of the simplifying assumptions of classical economic theory do in fact exist; for example, competitive markets and independent demand. The proposals of Hirschleifer, and Ronen and McKinney are included under this approach.

Under the mathematical programming approach, an attempt is made to overcome the practical difficulties associated with implementing methods based on classical economic theory by using mathematical techniques such as linear programming to arrive at the correct transfer price. These techniques allow transfer pricing theory to be applied to more than two divisions of a company at a time, and to a multi-product situation. The proposals of Dopuch and Drake, Onsi, Bernhard, Jennergren, Baumol and Fabian, Charnes, Clower and Kortanek, and Hass are grouped under this classification.

Under other analytical approaches are the more practical transfer pricing methods encountered in practice. The transfer price under these methods usually includes an element of cost and an element of profit which are based on concepts encountered in the management accounting literature. The element of cost may be full absorption cost, variable cost, standard cost, or some other version of cost; and the element of profit is often based on cost or it is arrived at

subjectively. The advantages and disadvantages of these differing approaches will be presented later is this section.

Second, Benke and Edwards, in a study conducted for the NAA, grouped transfer pricing methods as belonging to one of two categories: either a profit center orientation or a cost center orientation.[60]

Those methods having a profit center orientation are based on either a market based price or a nonmarket based price. The market based price methods, as the name implies, consist of some version of market price such as actual, adjusted, or negotiated. The nonmarket based methods include the versions based on opportunity cost, marginal cost, and cost-plus techniques. Those methods having a cost center orientation are based on either actual cost or standard cost. Cost, in both cases, may be either variable or full cost.

With a variety of methods from which to choose, it is expected that a number of factors enter into such a choice. These factors, along with advantages and disadvantages of the methods, are presented in the next section.

Factors Influencing Choice of Method. The choice of a transfer pricing method is influenced by numerous factors. However, there are general advantages that should be considered in choosing between cost oriented methods and profit oriented methods.

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[60]Ralph L. Benke, Jr. and James Don Edwards, "Transfer Pricing: Techniques and Uses," Management Accounting, June 1980, pp. 44-46.

The advantages of cost oriented methods are the disadvantages of profit oriented methods and vice versa. The advantages are given first. First, a cost oriented method is useful when no competitive markets exist. Under these conditions, time may be saved under a cost based method in that negotiation of a transfer price can be avoided. Second, such a method may be more suitable for a small company and/or a highly centralized company. Third, a cost based method may be more simple to administer than would be a profit based method. Fourth, the transfer of goods at some version of cost results in a product valuation that is suitable for external financial statements. Fifth, if the cost based method is based on standard cost, the manipulation of cost figures and the transfer of the cost of inefficiencies can be avoided.

The disadvantages of cost oriented methods are as follows. First, the advantages associated with the profit center concept and decentralization are lost. Stated differently, transfer pricing as a concept implies a profit center orientation. Cost based approaches may negate the advantages associated with the use of transfer pricing. Second, if transferring divisions are allowed to sell to intermediate external markets, they may be induced to do so under a cost based approach. Such actions may be detrimental to the fulfillment of the overall plans of the organization. Again, in this situation, an advantage of transfer pricing in general is negated.

In addition to the general advantages and disadvantages above, additional factors need to be considered in choosing a transfer

pricing method.[61] Chief among these are tax considerations. It is desirable from a tax perspective to have as much of the profit of goods sold or transferred as possible accrue to the companies which are taxed at lower rates. In addition, the equity of minority interests in an enterprise is a factor in the choice of method. The valuation of assets transferred between divisions affects the profits and therefore the equity of such divisions. Legal considerations are a factor in the valuation placed on such assets. In such situations, and in relation to tax considerations, the arms length criterion is perhaps the single most important factor to be considered. Other considerations include the purpose for which the transfer price is to be used and the behavioral considerations associated with any concept where performance evaluation is a factor.

Extent of Use. Tang found that transfer pricing is widely used by large corporations for both international and domestic purposes. He provides both an excellent review of the literature and a summary of the studies of transfer pricing practices.[62] The findings of his study are presented in his dissertation, and are also presented in a more condensed form in an article appearing in Management Accounting

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[61] Sharav, loc. cit.

[62] Roger Y. W. Tang, "An Empirical Investigation of the Transfer Pricing Practices of Large Industrial Corporations in the United States and Japan," (Unpublished PhD dissertation, University of Nebraska, 1977), pp. 11-47.

in January 1979.[63] Some details of his research are presented later in this chapter.

Summary. Transfer pricing methods and the related literature first developed during the 1930s, 1940s, and 1950s. Articles continue to appear in the literature to the present time. Methods in use are either cost oriented or profit oriented in nature. Some of the more formal methods proposed in the literature are difficult to implement in practice. Some companies may use more than one method. Surveys of practice reveal that transfer pricing is widely used for a variety of purposes. The chief consideration in a choice of method is overall profit to the company.

Quantitative Techniques

The term "quantitative techniques" encompasses a wide variety of mathematically oriented methods that are useful in business applications. The term generally includes some or all of the following: linear programming, sensitivity analysis, inventory models, simulation, game theory, regression analysis, queueing theory, network analysis, statistical analysis, correlation analysis, factor analysis, analysis of variance, discriminant analysis, canonical analysis, statistical sampling, and heuristic programming. The techniques are also referred to as quantitative methods or tools, or operations

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[63]Roger Y. W. Tang, C. K. Walter, and Robert H. Raymond, "Transfer Pricing - Japanese vs. American Style," Management Accounting, January 1979, pp. 12-16.

research methods, tools, or techniques. In practice, they may be used by persons in a single operations research department within a company and/or by persons dispersed throughout a company in applicable areas such as accounting, production, and engineering.

Operations research techniques were first used as such by the British in military applications in World War II.[64] After the war, the experience gained in military applications was transferred to the business and university environments by persons leaving military service. The technological developments of the 1950s and 1960s served to facilitate the expansion of the use of the techniques. Along with this expansion came a growing body of literature related to the techniques in general and to the use of specific techniques in connection with applications in business and industry. A number of surveys have been conducted over the years from 1967 to 1978 concerning the extent of their usage in practice.

Surveys of Literature and Practice. An article written by Kaplan in 1977 provides a thorough review of the literature concerning the quantitative techniques associated with management accounting. A number of other surveys of practice have been published concerning the extent of use of the techniques, some from a management accounting perspective and some from an operations research perspective. A summary of these articles follows.

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[64]Norman Gaither, "The Adoption of Operations Research Techniques by Manufacturing Organizations," Decision Sciences, October 1975, pp. 797-813.

Kaplan's survey provides a review of the literature organized in terms of topics to which various quantitative techniques have been proposed as being applicable.[65] The topics and the related techniques are depicted in Table III-1.

TABLE III-1

SUMMARY OF TOPICS TREATED AND ASSOCIATED QUANTITATIVE TECHNIQUES

Subject	Associated Technique
Cost-volume-profit analysis	Mathematical programming Probability theory
Performance & variance analysis	Linear Algebra
Variance investigations	Statistical analysis
Cost behavior	Statistical analysis
Cost allocations	Mathematical programming
Transfer pricing	Mathematical programming

The literature applicable to each topic is reviewed and analyzed in detail. Parts of the article have been referred to where appropriate in previous sections of this study. Kaplan's general conclusions concerning these techniques are as follows.

1. Writers of cost accounting textbooks should incorporate material on the techniques into the chapters to which they apply rather than include them in a single chapter, as has been done by some

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[65]Kaplan, 1977-1978, loc. cit.

authors in the past.

2. More evidence is needed on the costs and related benefits of using the techniques in practice. Without such evidence, it is difficult to justify research advocating extensions of the models to other applications.

3. More interaction is needed between academic researchers and those who use the models in actual practice.

Kaplan concludes that the techniques advocated for use in the literature leads what is being done in practice and that a period of consolidation is needed to determine in which direction researchers should proceed.

As mentioned previously in this section, some of the surveys of practice were done from a management accounting perspective and some from an operations research perspective. Stated differently, the title and the journal in which the article appears are indicative of the perspective from which the article was written. There is an overlap among the two areas with the operations research perspective being more comprehensive. Articles written from an operations research perspective usually cover a wider range of techniques than do those written from a management accounting perspective. In the following paragraph, some of the more significant surveys of practice are reviewed in order to provide an overview of developments over time in terms of implementation of the techniques.

The surveys reviewed in this section are summarized in Table III-2. All of the surveys utilized a questionnaire to gather the

TABLE III-2

SUMMARY OF SURVEYS CONDUCTED ON EXTENT OF USAGE
OF QUANTITATIVE TECHNIQUES

Author and Date	Population	Techniques Surveyed
Vatter, 1967	Financial Executives Institute Membership	Mathematical programming, PERT, queueing theory, inventory models, simulation, factor analysis, regression analysis, statistical sampling.
Turban, 1972	Directors of Operations Research, Fortune 500	PERT/CPM, dynamic programming, nonlinear programming, statistical analysis, simulation, linear programming, inventory models, queueing theory, heuristic programming.
Coppinger and Epley, 1972	New York Chapter of Planning Executives Institute Membership	Present value concepts, linear programming, game theory, Monte Carlo method, regression analysis, queueing theory, simulation
Gaither, 1975	Manufacturing Firms in the Midwest	PERT/CPM, linear programming, regression analysis, simulation, queueing theory, nonlinear programming, integer programming, 01 programming, stochastic programming, dynamic programming, direct search methods, heuristic programming, game theory.
Green, Newsom, and Jones, 1977	Vice Presidents for Production, Fortune 500	Simulation, queueing theory, Bayesian statistics, game theory, time series analysis, network analysis, Markov chains, linear and nonlinear programming, inventory models, regression and correlation analysis, goal programming, factor analysis, chi-square analysis, analysis of variance, discriminant analysis, canonical analysis, experimental design, statistical sampling.
Kiani-Aslani, 1977-1978	Controllers of Fortune 500	Present value concepts, linear programming, sensitivity analysis, forecasting, statistical methods, network analysis, inventory models, simulation.

data. Because of the diversity of the techniques examined and the difference in emphasis of the questionnaires, it is difficult to compare the findings directly. Nevertheless, the conclusions reached by the authors are useful; therefore, these are summarized below.

Vatter's study focused on the uses of quantitative techniques in terms of the traditional functions of a firm such as accounting, production and engineering, and also on the extent of usage of the techniques.[66] He found that the techniques were used in all the aforementioned functions, and he characterized the extent of usage as comprising an "established nucleus of interest."

Turban's study was concerned with whether companies surveyed had an operations research department as such; the place of such a department if one existed in the organization; the background of the persons in such a department; and the extent of usage of the techniques.[67] His findings indicated that operations research activities were increasing in terms of frequency of use; that persons involved in such activities had widely diversified backgrounds; that such activities were closely related to the use of computers; that the projects in which the techniques were used were widely diversified; and that operations research projects were performed primarily at the corporate and division levels and only occasionally at the plant

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[66]William J. Vatter, "The Use of Operations Research in American Companies," Accounting Review, October 1967, pp. 721-730.

[67]Efraim Turban, "A Sample Survey of Operations-Research Activities at the Corporate Level," Operations Research, May-June 1972, pp. 708-721.

level.

Coppinger and Epley were primarily concerned with the extent of usage of quantitative techniques.[68] The term "non-use" in the title of their article is indicative of their findings. However, it should be noted that they acknowledged a number of limitations in their study, primarily among these the limited population that they sampled. Consequently, their results should not be considered representative of firms in the United States in general.

Gaither's study explored the extent of usage of operations research techniques, the types of problems to which they were applied, and the nature of the problems encountered in their use.[69] He concluded that the techniques were widely used and that they were applied to functions throughout the firms surveyed. The primary areas of use were in production planning and control, project planning and control, and inventory analysis and control. The problems encountered had to do primarily with inadequately trained personnel.

Green, Newsom, and Jones' study focused on the extent of usage of quantitative techniques and the perceived barriers to expansion of their use.[70] The responses to their survey reflected a pessimistic

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[68]Richard J. Coppinger and E. Stewart Epley, "The Non-use of Advanced Mathematical Techniques," Managerial Planning, May-June 1972, pp. 12-15.

[69]Gaither, loc. cit.

[70]Thad B. Green, Walter B. Newsom, and S. Roland Jones, "A Survey of the Application of Quantitative Techniques to Production/Operations Management in Large Corporations," Academy of Management Journal, December 1977, pp. 669-676.

view concerning the extent of usage. The perceived barriers to their expanded use were related to the lack of knowledge or training concerning use of the techniques. In this regard, their results are similar to Gaither's.

Kiani-Aslani's study explored the extent of usage of quantitative techniques and some of the educational issues related to the use of such techniques.[71] He found that more than 85 percent of the respondents used one or more of the techniques and that usage was positively correlated with the size of the firm. Usage was also positively correlated with educational level; thus he concluded that it is important that such techniques continue to be taught in university level courses.

Summary. Quantitative techniques identified with management accounting and operations research developed from the experience of the British in World War II. From that beginning, an extensive body of literature has developed related to their application in business firms. They are used in varying degrees in business firms, depending on a number of factors. Surveys related to their use are difficult to compare because of an emphasis on different aspects of their use. The findings from surveys and the theoretical literature reflect a need to integrate the teaching of the techniques into the subject to which they are applicable.

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[71]Rajabali Kiani-Aslani, "Do Corporate Controllers Use Quantitative Tools Currently Taught in Managerial Accounting?," The Accounting Journal, Winter 1977-78, pp. 278-294.

Summary

This concludes the section on review of the literature related to the more commonly used management accounting concepts. Because of the broad nature of the topic, survey articles were used in the review where possible. In addition, articles treating specific topics related to the concepts were reviewed when no recent survey article was appropriate and/or where the management accounting concept had numerous dimensions. The relationship between the concepts and the environment in which they are used is explored in the next major section of this study.

Relationship Between Management Accounting Concepts and Environment in Which Used

Management accounting systems are unique to the firm in which they are installed. In a similar manner, the management accounting concepts used in a firm are a function of the characteristics of the firm and the environment in which the firm operates. Management accounting information has been defined in terms of answering three types of questions. These are "score-card" questions, "attention-directing" questions, and "problem-solving" questions.[72] In providing information to answer these questions, the chief

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[72]Charles T. Horngren, "Choosing Accounting Practices for Reporting to Management," NAA Bulletin, September 1962, as reprinted in Contemporary Issues in Cost and Managerial Accounting, ed. Hector R. Anton, Peter A. Firmin, and Hugh D. Grove (Boston: Houghton Mifflin, 1978), pp. 3-20.

criterion is that the information be relevant for the needs of the manager in making decisions that will assist the firm in attaining its goals. The purpose of this section is to examine the relationship between management accounting concepts, the firm, and the operating environment.

Characteristics of the Firm

First, the degree of sophistication of the accounting system is a factor in the selection of management accounting concepts to be used in a firm. Stated differently, the accounting system must be designed so as to provide the information required in connection with the management accounting concepts that are to be used. The size and development stage of a business affect the management accounting concepts selected for use. In a small business, a manager or owner may observe operations informally and make decisions somewhat intuitively based on such observations. As financial data are accumulated for tax reporting and other essential purposes, the manager or owner may begin to analyze such data in an effort to predict costs. If it is assumed that the same business grows in size, the manager may find it necessary to develop a budget for all or part of the business operation. If the business is production oriented and the manager has the ability, the budget may be in the nature of a flexible type. If the business grows in size and complexity, it may become necessary to introduce standard costs and/or transfer pricing in connection with cost and/or profit centers. At some point, an operations research staff may be added for purposes of analyzing

special projects, or alternatively, operations research techniques may simply be utilized where appropriate by management accountants and/or operations research specialists. The growth of a company through the stages where the various concepts are appropriate involves numerous other changes as well. There is interaction involving these changes and the management accounting concepts selected for use. For example, if a company reaches a stage where it is appropriate to bring in professional managers who are trained in a wide variety of management accounting concepts and techniques, then it is more likely that such concepts and techniques will be used where appropriate. An interesting case study involving the transition from an owner managed business to team management is provided by Connolly.[73] This transition was accompanied by numerous changes in the accounting system and the way in which the data from the system were used. In this case, proper planning resulted in a generally smooth transition.

Next, individual characteristics of managers will affect the selection of management accounting concepts for use within a firm and also the manner in which the concepts are used. Educational background and professional experience are two obvious characteristics affecting selection and use of management accounting concepts. Management philosophy is another such individual characteristic. A manager with a philosophy of strict accountability would be more likely to utilize budgeting and/or standard costing, perhaps in

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[73]H. Andrew Connolly, "Planning a New Cost System: The 'Unfreezing' Stage," Management Accounting, November 1979, pp. 19-24.

connection with responsibility accounting, than would one without such a philosophy. In a similar vein, a manager who is familiar with the behavioral management accounting literature would perhaps apply management accounting concepts differently than one who is not.

In summary, numerous factors associated with individual firms influence the selection and use of management accounting concepts. These factors include the nature of the accounting system, the size of the company, and the individual characteristics of persons working in the company.

Nature of the Operating Environment

Since accounting is a service type activity, it develops in response to needs and other influences within the environment in which it is used. This is true of accounting in general, and of management accounting in particular because of its flexibility when compared to financial accounting. Parker divided environmental factors affecting management accounting practice into two categories: those that are of a national and international type, and those that are of a market or industry type.[74] Among the national and international type are cultural and political factors. Cultural factors include managerial style, work attitudes, and individual aspirations. Political factors include matters related to taxation and matters related to regulation.

Among market and industry type factors are those related to type

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[74]L. D. Parker, "Management Accounting and the Corporate Environment," Management Accounting, February 1978, pp. 15-20, 26.

of production process, those related to the state of technology, and those related to the type of market in which the firm operates. A case study related to the latter category is provided by Killick.[75] The company of which he writes was engaged in the manufacture of electrical generating equipment in 1980. At that time, the market for such equipment became much more competitive as a result of a loss of customers located in countries undergoing some type of internal turmoil. The company under study, previous to this time, had utilized a job order cost system geared toward providing the cost of finished jobs. Under these conditions, a breakdown of costs by department or type of inventory was not generally available. As a result of increased competition, the company changed its accounting procedures so as to be able to obtain relevant costs in a more timely manner. As a result of the changes, the company developed the ability to locate inefficiencies in its operations four months earlier than had previously been the case. Consequently, the company was able to increase its profitability significantly and thus adapt to the increasingly competitive environment in which it operated.

In the next section, specific studies are cited which provide empirical evidence concerning relationships discussed in this section.

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[75]Stephen Killick, "Tailoring Reporting Systems to Individual Circumstances," Management Accounting (England), December 1980, pp. 26-27.

Summary of Selected Empirical Studies

The studies reviewed in this section provide support for the notion that management accounting concepts used in a company are a result of numerous factors, some internal and some external. In addition, they provide support and background in that they are similar in nature to this study. It should be noted that some are narrower in scope and thus treat the topic under consideration in greater depth than is the case in this study. The studies are treated in chronological order. The common elements of the studies are summarized in Table III-3.

Khandwalla examined the relationships between different types of competition, such as price and product quality, and the usage of a number of sophisticated accounting controls.[76] The controls were those commonly used in manufacturing firms such as standard costs, flexible budgeting, and statistical quality control. He found that a positive relationship existed between the intensity of competition and the extent of use of management controls. He concluded that intensified competition caused managers to search for ways to control costs, and that management accounting controls were employed for this purpose.

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[76]Pradip N. Khandwalla, "The Effect of Different Types of Competition on the Use of Management Controls," Journal of Accounting Research, Autumn 1972, pp. 275-285.

TABLE III-3

SUMMARY OF SELECTED MANAGEMENT ACCOUNTING
EMPIRICAL STUDIES

Author and Date	Population	Relationships Examined
Khandwalla, 1972	United States Manufacturing Firms	Types of competition and usage of manufacturing controls
Chiu, 1973	Taiwan Manufacturing Firms	Usage of management accounting techniques; size of firms; education, tenure, and age of controllers; and national origin of firms
Lere, 1976	United States Manufacturing Firms	Types of reports and costing method used
Tang, 1977	United States and Japanese Manufacturing Firms	Type of transfer pricing used; national origin of firm; size of firm; and environmental factors
Imhoff, 1978	United States Manufacturing, Wholesale, Retail, and Service Type Firms	Survey of management accounting techniques used, how used, and purpose for which used
Yoshikawa, 1979	Japanese Manufacturing Firms	Survey of management accounting techniques and cost control procedures used, how used, and purpose for which used
McNally and Eng, 1980	New Zealand Manufacturing Firms	Survey of management accounting techniques used

Chiu's study was done as a doctoral dissertation.[77] He examined the relationship between personal attributes of controllers, such as education and major area of study, and the usage or non-usage of nine selected management accounting concepts such as standard costing and capital budgeting. He also examined the reasons for the use or non-use of the techniques. He found a statistically significant relationship between level of education and extent of usage of management accounting concepts; and between national origin of firms and extent of usage of management accounting concepts. He found no statistically significant relationship between tenure or age of controllers and the extent of usage of the concepts. Generally, the larger firms relied more heavily on management accounting concepts as tools for planning and controlling than did smaller firms.

Lere was primarily concerned with the differences in the characteristics of firms using direct costing and those using absorption costing.[78] He found that the emphasis that firms placed on the following items determined whether they used direct costing or absorption costing: (1) short-run profit planning, (2) variability of production volume, (3) percent of overhead fixed in nature, (4) long-range profit planning, (5) reports to top management, (6) inventory turnover, (7) pricing guidelines, (8) variability of sales

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[77]James S. Chiu, "An Empirical Investigation of Management Accounting Techniques in the Manufacturing Companies of Taiwan," (Unpublished PhD Dissertation, University of Missouri, 1973), pp. 138-147.

[78]Lere, op. cit., pp. 83-85.

volume, (9) cost control, and (10) amount of annual sales. The items listed are in order of importance in terms of which costing method is used.

Tang's study on transfer pricing is particularly significant for this study in that he compared Japanese and United States manufacturing firms using an English language questionnaire. He classified transfer pricing methods into cost-oriented or non-cost-oriented groups, and found that firms were approximately equally divided in a choice of methods among the two groups.[79] The most important factor affecting the choice of transfer pricing method was overall profit to the company, and the least important factor was anti-trust legislation of other countries.

Imhoff's study was referred to briefly in the section of this chapter related to a review of standard costing.[80] The study was directed toward determining the extent of usage of management accounting concepts and the factors related to their use. He found that a high degree of correspondence existed between the concepts taught in university level accounting courses and the concepts used in practice.

Yoshikawa utilized a comprehensive questionnaire containing seventy three questions to explore a wide variety of issues related to the use of management accounting concepts in Japan. His research was

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[79]Tang, op. cit. pp. 108-109.

[80]Imhoff, op. cit.

in the nature of a survey; that is, he did not use statistical techniques to examine relationships. However, he did draw some general conclusions from analyzing the data obtained.[81] He found: (1) an increase in the use of job order cost accounting systems and a decrease in the use of process systems over time, (2) an increase in the use of computers to speed up the process of data collection for periodic review, and (3) little difference among companies concerning the use of direct costing. Perhaps the most significant item from his research for purposes of this study is that 146 of 512 companies returned a questionnaire containing 73 questions for a 28.5 percent response rate. However, it should be noted that his questionnaire was written in the Japanese language.

McNally and Eng conducted a study directed toward identifying the characteristics that discriminate between companies in relation to the management accounting concepts used.[82] The characteristics examined were of two types: industry classification and financial data. The management accounting concepts were thirteen in number and included budgets, standard costing and other commonly used concepts. They found no statistically significant relationship between industry classification and use or non-use of management accounting concepts.

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[81] T. Yoshikawa, "Investigation of Cost Accounting Practice," Keieijitsumu, May 1979, pp. 2-33. This article is written in the Japanese language. The author of this study has an English language translation.

[82] Graeme M. McNally and Lee Hock Eng, "Management Accounting Practices and Company Characteristics," Abacus, December 1980, pp. 142-150.

They did observe a statistically significant relationship between financial measures and the use or non-use of management accounting concepts with size being the most significant. Measures of size used were: operating income, operating assets, net income, stockholders' equity, and total assets.

Summary

In the first part of this chapter, background information was presented on the more commonly used management accounting concepts. Where possible, survey type articles were reviewed. Then, relationships between management accounting concepts and environmental factors were explored. Finally, selected empirical studies of a type closely related to this study were summarized. The purpose of the review of literature was to provide background for the research design and analysis of research findings of this study.

CHAPTER IV

RESEARCH DESIGN AND METHODOLOGY

The purpose of this chapter is to present the sequence of events preceding the research design, the details of the research design, and the research methodology used. After an introduction, the chapter outline is as follows.

1. Explanation of questionnaire design.
2. Conduct of pilot study.
3. Conduct of full scale study.
4. Explanation of statistical methods used.

Certain preliminary steps were performed in preparation for formulating the research design.

First, a preliminary literature review was done to determine the suitability of the study as a dissertation. It was found that studies of management accounting practice had been done in the United States and in Japan, but no evidence existed that a comparative study had been done on management accounting involving both countries. A computer search of dissertations, initiated through the University of Nebraska Library, revealed that eight dissertations had been done on topics related to Japan. Of these, four treated management type topics and two treated accounting type topics. No dissertations had been written treating management accounting in the two countries.

Second, individuals were consulted by personal interview or by letter to determine the feasibility of doing the study. Comments were solicited by letter from a partner in an international accounting firm in Japan. A partner in another international accounting firm and an educator, both recently returned from Japan, were interviewed personally. The general thrust of comments, oral and written, were to the effect that the study might be desirable, but that it could be difficult to obtain data from Japanese firms. Information obtained at the Japan - United States Business Conference conducted at the University of Nebraska during October 1981 confirmed the desirability of doing the study. A pilot study would be necessary in order to make the final determination concerning the practicality of obtaining data from Japanese firms. A questionnaire would be used for this purpose.

Questionnaire Design

The means by which management accounting information can be obtained from both Japanese and United States companies are limited. Neither COMPUSTAT tapes for United States firms nor annual reports for Japanese and United States firms contain information on the use of management accounting concepts. Since it is not practical to conduct personal interviews due to time and cost constraints, the questionnaire is the only practical alternative. Prior to designing the questionnaire, a thorough review of the literature was conducted.

The purpose of the literature review was to obtain an in depth understanding of management accounting concepts so as to be able to

ask informed questions concerning significant management accounting issues. Following the review of literature, hypotheses were formulated and questions were developed to obtain data to test the hypotheses. The questions and the hypotheses to which they relate are presented in a subsequent section of this chapter.

The form and the arrangement of the questions were determined utilizing guidelines from two books on business research methods.[1] In addition, suggestions were solicited from two marketing teachers at Northwest Missouri State University with extensive experience in the use of questionnaires. The literature review revealed that Japanese management accounting terminology is virtually identical to that used in the United States; therefore, the questionnaires for Japanese and United States firms were identical except that sales volume was given in yen versus dollars for Japanese firms.

The questionnaires and the related cover letters for both Japanese and United States firms are contained in Appendix A.

Pilot Study

The objectives of the pilot study were twofold. First, response rates were needed in order to design the full scale study. It was especially important to determine the response rate of Japanese firms to an English language questionnaire in view of the pessimistic

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[1]Vernon T. Clover and Howard L. Balsey, Business Research Methods (Columbus, Ohio: Grid, 1974), and C. William Emory, Business Research Methods (Homewood, Illinois: Irwin, 1976), see especially pp. 208-222.

comments expressed by persons with experience in Japanese business matters. Second, it was desirable to test the questionnaire to ensure that the questions were clear to the recipients. Again, this was particularly important for Japanese companies in view of the language difference.

In view of the series of Japan - United States business conferences being conducted by the College of Business Administration of the University of Nebraska, it was thought that a cover letter signed by the Dean of the College would be helpful in obtaining responses to the questionnaire. The Dean was contacted and kindly consented to sign such a cover letter. In addition, a cover letter by the researcher was included which explained the purpose of the study. An international postal coupon was included in the letter to Japanese firms along with a self-addressed envelope. The letters to United States firms contained a stamped self-addressed envelope. A summary of the research findings was offered to each addressee as an inducement to return the questionnaire. Those desiring the summary were asked to complete and return a mailing label contained in the letter. Thus each packet contained two cover letters, a questionnaire, a mailing label, and a self-addressed envelope with a stamp or coupon as appropriate.

A number of directories were examined in an attempt to find two, one from each country, that were comparable in terms of size and type of companies listed. Using this criterion, The President Directory was chosen for Japanese firms and the Dun and Bradstreet Million

Dollar Directory was chosen for United States firms. Since two of the research hypotheses relate to size of companies, it was deemed desirable to obtain listings of companies which varied widely in size. The President Directory met this criterion in that it contains a listing of the 1115 leading mining and manufacturing companies in Japan. The Dun and Bradstreet Million Dollar Directory contains a listing of all United States companies with net assets over the indicated amount. This directory contains companies of comparable size to all companies listed in The President Directory. In it, companies are categorized according to Standard Industrial Classification (SIC) codes; thus it was possible to select companies similar in type to those listed in The President Directory.

The pilot study materials were sent to thirty five companies in each country. Five size categories or strata were used in the questionnaire, and it was deemed desirable to send an equal number to companies in each category. The companies for the pilot study were selected accordingly.

The letters to Japanese firms were mailed on August 26, 1982 and to United States firms on September 4, 1982. A follow up letter was sent to Japanese firms on October 25, 1982 and to United States firms on November 8, 1982. Copies of all materials sent as part of the pilot study are contained in Appendix A. Response data are presented in Table IV-1.

TABLE IV-1

PILOT STUDY RESPONSE DATA

Item	Japanese	U.S.	Total
Number of questionnaires sent	35	35	70
Number returned undeliverable	3	0	3
Net number delivered	32	35	67
Responses:			
To initial letter	4	14	18
To follow up letter	5	6	11
Total	9	20	29
Response rates	28%	57%	43%

The proportion of firms responding to the initial letter and the follow up letter differed significantly when comparing Japanese and United States firms. The follow up letter is more important for mailings to Japanese firms. Some such firms enclosed a note or a letter apologizing for not returning the initial questionnaire. It is noted that Tang experienced a similar pattern of responses in his study.[2] The offer of a summary of the research findings was apparently a greater incentive for United States firms than for Japanese firms. Seven of twenty (35 percent) responding United States firms returned the mailing label while only two of nine (22 percent) responding Japanese firms returned the label. It was noted that some Japanese firms used the label to address an envelope for return of the

[2]Roger Y. W. Tang, "An Empirical Investigation of the Transfer Pricing Practices of Large Industrial Corporations in the United States and Japan" (unpublished PhD dissertation, University of Nebraska 1977), p. 63.

questionnaire even though a self-addressed envelope was enclosed for that purpose. And some used the label to place their return address on the self-addressed envelope. The cover letter for the full scale study was revised to make more clear the use for which the mailing label was intended.

The most significant finding of the pilot study was the response rates for companies of different sizes. This is depicted in Table IV-2.

The relationship between size and response rate was most pronounced for Japanese companies, but was also significant for United States companies. Since the study requires companies of similar size for comparative purposes, the lack of responses from the smaller Japanese companies made it necessary to reevaluate the sizing decision. The details of the results of the reevaluation are provided in the next section.

TABLE IV-2

PILOT STUDY RESPONSE DATA
BY SIZE OF COMPANY

	Japanese Companies				United States Companies		
Size[a]	Number dlvrd.	Number ret.	Rate	Size[b]	Number dlvrd.	Number ret.	Rate
Over ¥65	7	7	100%	Over $300	7	7	100%
25 - 65	6	1	16	100 - 300	7	6	86
10 - 25	7	1	16	50 - 100	7	2	29
5 - 10	7	0	0	25 - 50	7	2	29
Under 5	5	0	0	Under 25	7	3	43
	32	9	28%		35	20	57%

[a]Add 000,000,000

[b]Add 000,000

Full Scale Study

In evaluating the results of the pilot study, it was noted that minor revisions to the questionnaire were needed. In addition, the target population was revised and a new sampling plan was designed. These items, along with the results of the full scale study, are covered in detail in this section.

Revision of Questionnaire

The questionnaire used in the pilot study consisted of three pages of normal size typed material. For the full scale study, the contents were placed on an oversized page and then reduced in size so that the same material appeared on one normal size page in smaller print. This resulted in a neater arrangement, a smaller appearing questionnaire, and reduced postage expense in mailing the materials.

The content of the questions was not changed significantly. The time spans of the answers to the question on length of time of usage of selected management accounting tools was increased. In addition, an additional question was added asking how long the company had been engaged in manufacturing operations. This was deemed necessary in order to give meaning to the answers concerning length of time of usage of management accounting tools.

As mentioned in the preceding section, it became necessary to alter the size categories of companies to which the study is directed. This was due to the absence of responses from Japanese companies grouped in the lower two strata. Thus the five size categories for

the pilot study were changed to three for the full scale study. The rationale for the size and number of the categories is presented in subsequent paragraphs in connection with the definition of the target population.

In addition to the revision to the cover letter mentioned previously, one other change was made. It was noted that two companies returned the questionnaire to the University of Nebraska rather than to the location on the self-addressed envelope. This was probably due to the fact that both cover letters were on University of Nebraska letterhead. Therefore, in the full scale study, the researcher's letter was placed on Northwest Missouri State University letterhead so it would agree with the self-addressed envelope.

The revised questionnaire was submitted to a partner of an international accounting firm, with extensive experience in the design and installation of planning and control systems in Japanese manufacturing firms, for review and possible suggestions. His comments were mixed, but he stated that no changes needed to be made to the questionnaire. Thus with the exception of the changes noted above, the questionnaire used in the full scale study was the same as that used in the pilot study.

The hypotheses and the questions related to each, from the revised questionnaire, are presented below. The questions are from the questionnaire mailed to Japanese companies. Note that, due to space limitations, only the questions are presented. Refer to Appendix B for the complete contents, including the answers, of the

questionnaire.

Hypothesis no. 1: The stage of development of management accounting as indicated by the number of management accounting tools used and the importance attached to their use is not related to the size of the company using those tools.

Question no. 1: Please indicate the degree of importance of the following management accounting tools in carrying out the planning and control function for manufacturing operations in your company.

Question no. 8: What was the total amount of revenue from sales and other sources in 1981 of the segment, division, or company for which you furnished information in answering the preceding questions?

Hypothesis no. 2: The number of quantitative techniques used is not related to the size of the company using the techniques.

Question no. 2: Please check any and all of the following techniques that are used in the planning and control function for manufacturing operations in your company.

Question no. 8: What was the total amount of revenue from sales and other sources in 1981 of the segment, division, or company for which you furnished information in answering the preceding questions?

Hypothesis no. 3: There is no difference in the number of management accounting tools used and the number of quantitative techniques used when comparing companies having an affiliation with a company in Japan/the United States and those not having such an affiliation.

Question no. 1: Please indicate the degree of importance of the following management accounting tools in carrying out the planning and control function for manufacturing operations in your company.

Question no. 2: Please check any and all of the following techniques that are used in the planning and control function for manufacturing operations in your company.

Question no. 6: Is your company a parent or subsidiary of a company in Japan/the United States?

Hypothesis no. 4: There is no difference in the degree of importance attached to the purposes for which accounting data are used when comparing companies in the United States with companies in Japan.

Question no. 3: Please rank the following items in terms of their importance to the purpose for which accounting data are used.

Hypothesis no. 5: There is no difference in the extent of usage of long-range planning between companies in the United States and companies in Japan.

Question no. 4: Does your company have a formal statement of long-range plans, goals, or strategies?

Hypothesis no. 6: There is no difference in the extent of usage of participative budgeting between companies in the United States and companies in Japan.

Question no. 5: Please check any and all of the following persons that participate in the preparation of the operating budget for the fiscal period.

Hypothesis no. 7: There are no differences in the rates at which management accounting practice has developed in the United States and Japan.

Question no. 7a: How long has your company been using the following management accounting tools?

Question no. 7b: How long has your company conducted manufacturing operations?

Description of Populations

The decision concerning the size of companies toward which the

study was to be directed was influenced primarily by the results of the pilot study, but was also influenced by the business directories available. Since the population would consist of companies large in size, the Fortune directories of the 500 largest industrial firms and the second 500 largest industrial firms was more suitable than the Dun and Bradstreet Million Dollar Directory for use with United States companies.[3] The Fortune directories contain a relatively small number of companies that are close in size to those responding to the pilot study. The Fortune directories also arrange companies by size, an added advantage. The data on which the size rankings were based were for the year 1981.

The number of directories available for Japanese companies was limited. The President Directory, used in the pilot study, was discontinued in 1978. The nondeliverability of three of thirty five letters in the pilot study raised a question as to the correctness of the addresses in the 1978 edition for use in 1983. It was also considered desirable to have 1981 data on Japanese companies so as to be comparable with those for United States companies. Two English language directories were examined and the Japan Company Handbook was selected as being the most suitable of the two.[4] This handbook contains names, addresses, and financial data for 1037 companies

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[3]See "The 500 Largest Industrial Corporations," Fortune, May 3, 1982, pp. 260-278; and "The Second 500 Largest Industrial Corporations," Fortune, June 14, 1982, pp. 180-198.

[4]Japan Company Handbook (Tokyo: The Oriental Economist, first half 1982).

listed on Japanese stock exchanges. Of these, 504 were engaged in manufacturing activities similar to those of companies listed in the Fortune directories. Unfortunately, the Handbook does not contain a listing of companies arranged by size. Thus it was necessary to do a computer sort to obtain such a listing. The sales amounts in yen in the Handbook were converted to dollar amounts in order to develop listings of companies comparable in size from the two countries. An average exchange rate for 1981 was used for the conversion.

Comparison of the two listings revealed that the largest Japanese company was more nearly equal in size to the number 15 United States company and the number 1000 United States company was more nearly equal in size to the number 497 Japanese company. These relationships are depicted in Table IV-3.

TABLE IV-3

SIZE COMPARISON OF JAPANESE AND UNITED STATES COMPANIES

Japanese Companies		United States Companies	
Rank	Sales volume	Rank	Sales volume
1	$16,084,458,716	15	$15,966,000,000
497	123,215,596	1000	122,451,000
Number of companies		Number of companies	
497		986	

After the companies were arranged by amount of sales, the

decision concerning the size categories could be made. Ideally, company groupings should be homogeneous to the extent possible in regard to the attribute being studied.[5] Since a number of different attributes are being examined in this study, the approach used was to make the categories as nearly equal in terms of number of companies as possible. It was also desirable to have the upper and lower limits of the categories as nearly equal as possible in terms of sales volume across Japanese and United States companies. This presented somewhat of a problem in that Japanese companies were densely distributed at the low end of the sales volume range while United States companies were densely distributed at the high end. Therefore, the groupings necessitated a tradeoff between the desire to have the same number of companies in each group for each country and the desire to have companies equal in size when comparing across Japanese and United States companies. The final groupings are depicted in Table IV-4.

TABLE IV-4

STRATIFICATION OF COMPANIES
(Add 000 to amounts)

Japanese Companies			United States Companies		
Lower sales limit	Upper sales limit	Number co's.	Lower sales limit	Upper sales limit	Number co's.
$624,940	$16,084,458	165	$628,638	$15,966,000	407
259,261	619,748	165	259,428	624,208	266
123,216	256,881	167	122,451	256,764	313

[5]Thomas R. Dyckman and L. Joseph Thomas, Fundamental Statistics for Business and Economics (Englewood Cliffs: Prentice-Hall, 1977), p. 294.

Since the Japanese population was the smaller of the two, these companies were grouped first with the number in the groups approximately equal; then United States companies were arranged so that the sales ranges corresponded to those in the Japanese groupings. The density of the distribution of the United States companies at the high end of the sales range is more evident when the data are displayed graphically.

After the companies were arranged by groups, it was then possible to design a sampling plan.

Description of Sampling Plan

A number of factors affected the design of the sampling plan. First, the stratification of the two populations introduced the requirement for larger samples. Second, it was determined that nonparametric statistical methods would be utilized because of the use of nominal and ordinal scale data. This also introduced the requirement for larger samples.[6] Third, the answers to questions four and six in the questionnaire were mandated to be in one of two categories. This introduced the necessity to estimate the maximum proportion to be expected in the smallest category (Fifty percent would be the maximum in any case).[7] Fourth, the confidence interval

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[6]Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill, 1956), p. 31.

[7]Henry Hill, Joseph L. Roth, and Herbert Arkin, Sampling in Auditing (New York: Krieger, 1962) pp. 29-30.

and reliability measure (error margin) also affect sample size. And last, all of these factors must be weighed with the cost factor in mind. (The airmail postage rate for one letter to Japan and a return is approximately two dollars).

A statistical table was chosen so as to yield sample size while giving effect to the aforementioned factors.[8] Its use resulted in the sample sizes given in Table IV-5. When the statistical table did not fit the data precisely, a conservative interpretation was used. Table IV-5 also contains information on the number of questionnaires mailed. This was derived from the response rates obtained from the pilot study. The estimate of proportion was also made using data obtained in the pilot study. The confidence interval and reliability measure were matters of judgment. Even though the population of United States companies was the larger of the two, a smaller number of questionnaires was required due to the higher response rate of United States companies in the pilot study. The companies to which the questionnaires were sent were selected using a systematic sampling plan.

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[8]Robert W. Vanasse, Statistical Sampling for Auditing and Accounting Decisions: A Simulation (New York: McGraw-Hill, 1976) p. 98.

TABLE IV-5

SAMPLE DATA

Confidence interval = 95 percent
Reliability measure = ± 10 percent
Proportion estimate = 40 percent

Japanese Companies

Number of companies	Sample size	Number of questionnaires
165	63	74
165	63	84
167	63	163[a]
497	189[b]	321

United States Companies

Number of companies	Sample size	Number of questionnaires
407	75	94
266	69	81
313	71	83
986	215[c]	258

[a]Four companies in this group were used in the pilot study; therefore they were omitted in the full scale study.
[b]Desired sample size is 78 without stratification.
[c]Desired sample size is 84 without stratification.

Results of Mailing

The initial mailing to Japanese companies, consisting of 321 airmail letters, was made on February 22, 1983. Each packet contained a cover letter signed by the Dean of the College of Business Administration at the University of Nebraska, a cover letter signed by the researcher, a questionnaire, two international postal coupons, a mailing label, and a self-addressed airmail envelope. A copy of the cover letters and the questionnaire are contained in Appendix B. The

letters were addressed to the presidents of the companies.

The initial mailing to United States companies, consisting of 258 letters, was made on March 14, 1983. Each packet contained the same materials enumerated above except that a stamp was provided in lieu of postal coupons. The letters were addressed to the controller, vice president of accounting or finance, treasurer, secretary, or president of the company with preference in the order listed.

Follow up letters were sent to Japanese and United States companies on April 22 and May 18 respectively. Since many companies could be identified from responses to the initial mailing, it was necessary to send only 263 and 168 such letters to Japanese and United States companies respectively. Included with the follow up letter were a questionnaire and a mailing label. A copy of the letter is included in Appendix B.

The results of the mailings are presented in Table IV-6. The response rate for Japanese companies was slightly higher in the full scale study than in the pilot study (33 percent versus 28 percent). The rate for United States companies was the same in both studies. The response rate for Japanese companies appears to be normal for such mailings. It is comparable to that experienced by Tang using an English language questionnaire (28 percent) and to that of Yoshikawa (29 percent) using a Japanese language questionnaire.

TABLE IV-6

FULL SCALE STUDY RESPONSE DATA

Item	Japanese	U.S.	Total
Number of questionnaires sent	321	258	579
Responses:			
To initial letter	65	113	178
To follow up letter	41	38	79
	106	151	257
Usable responses	106	147	253
Rate of usable responses	33%	57%	44%
Companies requesting research summary	44	39	83

The offer of a summary of the research results was apparently a greater incentive for Japanese firms than for United States firms. It is noted that 42 percent of responding Japanese firms requested the summary while only 27 percent of United States firms requested the summary. Or this could be interpreted to mean that more of the Japanese companies that responded did so in order to obtain the summary while United States companies responded as a result of company policy or for some other reason. This seems a more reasonable interpretation in view of the overall response rates.

There was one puzzling aspect to the responses from Japanese firms. Although the response rate of such firms was low in comparison to that of United States firms, almost all responses from Japanese firms contained a letter along with the questionnaire. The letters

were courteous in tone, identified the company, and often expressed a desire for the researcher to be successful in his efforts. Perhaps the only significance to be attached to this is that the Japanese companies that did respond to the survey did so in a noticeably courteous manner.

The response rate by size of company is presented in Chapter V.

Statistical Methods

The statistical methods chosen for use were a function of the type of data to be analyzed and the availability of a suitable computerized statistical package. The Statistical Package for the Social Sciences (SPSS) contains all statistical techniques needed to analyze the data; therefore, it was the choice.[9]

Hypothesis number one explores the relationship between size of company and number of management accounting tools used. Size of company was measured on an ordinal scale using three categories, and the number of management accounting tools used was measured using a ratio scale. Under these conditions, the analysis of variance (ANOVA) test is appropriate.[10] Also, under hypothesis number one, the relationship between size of company and the importance attached to the use of nine management accounting tools is examined. Both variables were measured on an ordinal scale; therefore, the chi-square

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[9]Norman H. Nie and others, Statistical Package for the Social Sciences (New York: McGraw-Hill, 1975).

[10]Dyckman, op. cit., p. 474.

test was chosen to test this relationship.[11] The comparative tests across Japanese and United States companies in connection with hypothesis number one also utilizes the ANOVA and chi-square tests.

Hypothesis number two is directed toward the relationship between size of company and number of quantitative techniques used. The test is similar to that in connection with hypothesis number one, and again the ANOVA test was chosen. The comparison of Japanese and United States companies utilizes the ANOVA test also.

Hypothesis number three is directed toward determining the relationship between an affiliation with a company in the United States/Japan and the numbers of management accounting tools and quantitative techniques used. Since the independent variable was measured on a nominal scale and the dependent variable was measured on a ratio scale, the ANOVA test was chosen for this analysis.

Hypothesis number four is concerned with the use of accounting data. Companies were asked to rank four items in terms of their importance for which accounting data were used. Since the rank scale was ordinal, the nonparametric Spearman's rank correlation was selected to compare the rankings of Japanese and United States companies.[12]

Hypothesis number five examines the extent of usage of long-range planning on a comparative basis for Japanese and United States

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[11] Nie and others, op. cit., p. 223.

[12] Ibid., pp. 288-289.

companies. The dependent variable was measured on a nominal scale; therefore, the chi-square test was selected. In addition, the length of time for long-range planning is examined under this hypothesis. This measurement utilized a ratio scale, therefore the ANOVA test was chosen to compare Japanese and United States companies.

Hypothesis number six is related to budget participation. Five categories of company personnel were checked as participating or not participating in the budget process. This was a nominal scale, therefore the chi-square test for independence was chosen for use with each of the five categories in order to compare Japanese and United States companies.

Hypothesis number seven is directed toward comparing the rate of development of management accounting practice in the two countries. Six management accounting concepts were selected and companies were asked to indicate the length of time each had been used. Five time categories were provided for each of the six items. The ANOVA and chi-square tests were selected to compare each of the six concepts.

In summary, the statistical methods chosen for analysis of the seven hypotheses were the ANOVA test, the chi-square test, and the Spearman rank correlation test. The factors entering into the choice of statistical methods were the form of the data (nominal, ordinal, etc.) and the availability of a computer package containing suitable statistical techniques.

Summary

In this chapter, the research design and methodology were described. Following a review of literature and personal interviews to determine the feasibility of the study, the objectives of the study were formulated. The hypotheses to achieve the objectives were designed and a questionnaire was organized to gather data for analysis. A pilot study was conducted to test the questionnaire; to determine response rates; and to ensure that data were available for the study. Upon completion of the pilot study, a full scale study was conducted. Statistical methods suitable for analysis of the data were chosen. The results of the research are presented in Chapter V.

CHAPTER V

RESEARCH RESULTS

The purpose of this chapter is to present the results of the research within the framework of the seven hypotheses given in Chapter IV. An analysis of the results, with emphasis on similarities, differences, and the environment in which the companies operate, will be presented in Chapter VI.

The chapter is organized as follows. First, some general characteristics of the sample populations are presented. Second, the relationships examined and the results of the examination are presented in the order of the seven hypotheses of the study. And last, a summary of the research results is presented.

Characteristics of Populations

Two populations were sampled: Japanese manufacturing firms and United States manufacturing firms. Each population was divided into three strata according to the level of sales volume. Thus the primary independent variables in the study are size of company and country in which the companies are located. Table V-1 contains a listing of companies arranged according to size and country of origin. Included also are data on response rates for the survey.

A comparison of this table with Table IV-5 reveals that the desired sample sizes for each of the strata was not obtained. The

limitation in this regard proved to be the stratum containing the smallest size Japanese companies. Even though all but four of the companies in this stratum were sent a questionnaire, only thirty six responses were obtained. The pattern of responses affects the research analysis as follows.

Stratification of the two populations was done in order to analyze data according to size of company within each population. The results of the analysis of the two populations by size is further compared to determine if differences exist between companies in the two countries. The analysis by size of company is performed for two of the seven hypotheses of the study. A direct comparison of the two populations, without stratification, is performed for all seven hypotheses. It should be noted that the total sample size obtained from each of the two populations is larger than the desired sample size if the two populations are not stratified. Since the primary purpose of the research is a comparative analysis of companies in the two populations, and since a direct comparison is made under all seven hypotheses, the smaller than desired sample size for each stratum is not considered a significant limitation.

It should be noted that one positive benefit resulting from stratification is an approximately equal number of companies from each stratum and thus a representative sample of the two populations.

TABLE V-1

GENERAL CHARACTERISTICS OF RESEARCH POPULATIONS AND RELATED SAMPLES

	United States Companies				Japanese Companies			
Size[a]	No. of co.s	Number sent	Number responses	Response rate	No. of co.s	Number sent	Number responses	Response rate
1	407	94	49	52%	165	74	37	50%
2	266	81	45	56%	165	84	33	39%
3	313	83	53	64%	167	163	36	22%
	986	258	147	57%	497	321	106	33%

[a]One indicates the largest size companies in this and succeeding tables.

Analysis of Research Results

The research results were analyzed using the Statistical Package for the Social Sciences.[1] This package provides degrees of freedom and the related significance level for both the analysis of variance (ANOVA) and chi-square tests. Thus two approaches are available to determine whether the null hypothesis should be rejected in a particular case. One, given degrees of freedom and significance level, an F table could be consulted to obtain an F statistic to be used for comparison with the F statistic obtained from the statistical analysis. If the F statistic obtained from the analysis is larger than the F statistic obtained from the table, this implies that the null hypothesis of no difference in the relationships examined should be rejected. Second, the significance statistic obtained from the

[1]Norman H. Nie and others, Statistical Package for the Social Sciences (New York: McGraw-Hill, 1975).

analysis can simply be compared with the level that is set for rejection of the null hypothesis. This is so because both the ANOVA and the chi-square procedures are difference or discrepancy type tests. If the statistic obtained from the analysis is less than the level set for rejection, this implies that the null hypothesis should be rejected. The second approach is used in this study, and the data are presented in the following tables in accordance with this approach. The 0.05 level of significance is used throughout this study to determine whether or not a hypothesis is rejected.

The following diagrams depict the relationships examined under each of the hypotheses of the study. The item on the left, in each case, is the independent variable or discriminating factor as appropriate. The item on the right is the dependent variable or the item being discriminated upon as appropriate. And the item in the middle is the statistical technique used to examine the relationship between the other two items. The values in parentheses indicate the number of categories or the range of the items depicted.

Hypothesis number one:

Size of company (3) ----------ANOVA---------- Number of management accounting concepts used (1-9)

(Performed separately for U.S. and Japanese companies)

Size of company (3) ----------chi-square---------- Importance of each of nine concepts (1-5)

(Performed separately for U.S and Japanese companies)

Type of company (2 - U.S. or Japan) ----------ANOVA---------- Number of management accounting concepts used (1-9)

Type of company (2) ----------chi-square---------- Importance of each of nine concepts (1-5)

Hypothesis number two:

Size of company (3) ----------ANOVA---------- Number of quantitative techniques used (1-9)
(Performed separately for U.S. and Japanese companies)

Type of company (2) ----------ANOVA---------- Number of quantitative techniques used (1-9)

Hypothesis number three:

Affiliation status (2) ----------ANOVA---------- Number of management accounting concepts used (1-9)
(Performed separately for U.S. and Japanese companies)

Affiliation status (2) ----------ANOVA---------- Number of quantitative techniques used (1-9)
(Performed separately for U.S. and Japanese companies)

Hypothesis number four:

Type of company (2) ----------Spearman rank coefficent---------- Ranking of importance of uses of accounting data (1-5)

Hypothesis number five:

Type of company (2) ----------chi-square---------- Usage of long range planning (2)

Type of company (2) ----------ANOVA---------- Time span of long range plans (1-10)

Hypothesis number six:

Type of company (2) ----------ANOVA---------- Number of categories participating in budget preparation (1-6)

Type of company (2) ----------chi-square---------- Each of six categories of company personnel, budget preparation (2)

Hypothesis number seven:

Type of company (2)	ANOVA & chi-square	Length of time of use of each of six management accounting concepts (1-40)

The following paragraphs contain the results of the examination of the relationships depicted.

Relationship Between Size of Company, Country of Origin, and Selected Management Accounting Concepts

Hypothesis number one states that the stage of development of management accounting as indicated by the number of management accounting concepts used and the importance attached to their use is not related to the size of the company using those concepts. This hypothesis was tested as stated for companies within each country and was also tested using the country of origin of companies as the independent variable.

Respondents were asked to indicate one of three levels of sales volume, and were also asked to indicate the importance, on a five category scale, of each of nine management accounting concepts to the planning and control function for their company. The number of management accounting concepts used was obtained by counting those that were checked in any of the four highest categories of importance. If a company checked the lowest category ("not important at all"), it was not counted as being used by the company.

Table V-2 presents the data and the related statistics for Japanese and United States companies where size is the independent

variable and the number of management accounting concepts is the dependent variable. The ANOVA technique was used for the analysis.

TABLE V-2

NUMBER OF MANAGEMENT ACCOUNTING CONCEPTS USED BY SIZE OF COMPANY

	United States Companies		Japanese Companies	
Size	Number of responses	Mean of number used	Number of responses	Mean of number used
1	49	8.57	37	8.32
2	45	8.36	33	8.82
3	53	8.49	36	8.72
	Degrees of freedom = 2/144		Degrees of freedom = 2/103	
	F = 0.913		F = 2.00	
	Significance of F = 0.404		Significance of F = 0.141	

Inspection of the data reveals that companies generally attached some degree of importance to eight or nine of the management accounting concepts listed. The data suggest that size is more of a discriminator for Japanese companies than for United States companies.

Table V-3 presents the data and the related statistics where country of origin is the independent variable and the number of management accounting concepts used is the dependent variable. Again, the ANOVA test was used.

Inspection of Tables V-2 and V-3 reveals that United States and Japanese companies are quite similar when compared in this manner.

TABLE V-3

NUMBER OF MANAGEMENT ACCOUNTING CONCEPTS USED

Origin	Number of Responses	Mean of Number of Concepts Used
United States	147	8.48
Japan	106	8.61

Degrees of freedom = 1/251
F = 1.320
Significance of F = 0.252

The next analysis performed in relation to hypothesis number one was that of comparing the ratings of the importance of nine management accounting concepts in relation to the size of the respondent companies. The chi-square statistic was obtained for this analysis using the SPSS CROSSTABS procedure. Again, United States and Japanese companies were analyzed separately by size and then the importance of the concepts was analyzed by country of origin of the companies. The importance of the management accounting concepts was ranked by respondents on an ordinal scale from one to five with five indicating the highest degree of importance. Table V-4 presents the results of the comparison of the rankings of the concepts by size of company.

Inspection of the data for United States companies reveals that return on investment and responsibility accounting were considered most important and that transfer pricing and direct costing were considered least important. The data suggest that size of company discriminated most in analyzing return on investment and discriminated

least in analyzing standard costing.

TABLE V-4

IMPORTANCE OF SELECTED MANAGEMENT ACCOUNTING CONCEPTS BY SIZE OF COMPANY

Concept	United States Companies							Japanese Companies						
		Number indicating							Number indicating					
	Size	1	2	3	4	5	Total	Size	1	2	3	4	5	Total
Accounting Data	1	0	1	14	21	13	49	1	0	2	7	17	11	37
	2	0	0	9	17	19	45	2	0	1	13	13	6	33
	3	0	3	7	29	14	53	3	0	2	11	18	5	36
		0	4	30	67	46	147		0	5	31	48	22	106
	Chi-sq. = 10.068 Sig. = 0.122							Chi-sq. = 5.614 Sig. = 0.468						
Static Budgets	1	3	7	14	18	7	49	1	2	3	8	17	7	37
	2	5	10	11	15	4	45	2	0	6	14	10	3	33
	3	3	10	22	16	2	53	3	1	2	14	13	6	36
		11	27	47	49	13	147		3	11	36	40	16	106
	Chi-sq. = 7.955 Sig. = 0.438							Chi-sq. = 9.715 Sig. = 0.286						
Flexible Budgets	1	5	6	8	16	14	49	1	6	3	12	10	6	37
	2	7	8	10	13	7	45	2	1	8	8	14	2	33
	3	6	3	11	21	12	53	3	1	4	7	17	7	36
		18	17	29	50	33	147		8	15	27	41	15	106
	Chi-sq. = 6.819 Sig. = 0.556							Chi-sq. = 14.911 Sig. = 0.061						
Direct Costing	1	8	3	13	15	10	49	1	4	7	10	10	6	37
	2	8	8	8	15	6	45	2	0	3	6	15	9	33
	3	7	10	14	18	4	53	3	3	4	6	10	13	36
		23	21	35	48	20	147		7	14	22	35	28	106
	Chi-sq. = 7.982 Sig. = 0.435							Chi-sq. = 10.882 Sig. = 0.209						
Resp. Accounting	1	1	3	6	20	19	49	1	3	1	7	18	8	37
	2	0	2	4	22	17	45	2	1	4	9	12	7	33
	3	1	4	4	28	16	53	3	0	2	4	23	7	36
		2	9	14	70	52	147		4	7	20	53	22	106
	Chi-sq. = 3.317 Sig. = 0.913							Chi-sq. = 10.743 Sig. = 0.217						
C-V-P Analysis	1	2	1	10	17	19	49	1	1	2	7	17	10	37
	2	1	3	8	20	13	45	2	0	3	3	14	13	33
	3	1	5	12	25	10	53	3	0	0	5	17	14	36
		4	9	30	62	42	147		1	5	15	48	37	106
	Chi-sq. = 7.649 Sig. = 0.469							Chi-sq. = 7.237 Sig. = 0.511						

TABLE V-4 (continued)

Concept	United States Companies						Japanese Companies						
		Number indicating						Number indicating					
	Size	1	2	3	4	5	Total	Size	1	2	3	4	5	Total
Standard Costing	1	1	3	7	21	17	49	1	3	5	6	17	6	37
	2	2	3	6	20	14	45	2	1	5	9	14	4	33
	3	1	3	11	26	12	53	3	2	2	10	16	6	36
		4	9	24	67	43	147		6	12	25	47	16	106
	Chi-sq. = 3.333 Sig. = 0.912							Chi-sq. = 4.080 Sig. = 0.850						
Transfer Pricing	1	1	15	11	13	9	49	1	6	1	17	10	3	37
	2	6	15	12	10	2	45	2	3	4	18	6	2	33
	3	8	11	17	13	4	53	3	2	6	17	8	3	36
		15	41	40	36	15	147		11	11	52	24	8	106
	Chi-sq. = 12.531 Sig. = 0.129							Chi-sq. = 6.693 Sig. = 0.570						
Return on Investment	1	0	0	3	22	24	49	1	0	1	11	13	12	37
	2	0	4	7	17	17	45	2	0	0	9	18	6	33
	3	0	3	12	18	20	53	3	1	0	8	14	13	36
		0	7	22	57	61	147		1	1	28	45	31	106
	Chi-sq. = 10.484 Sig. = 0.106							Chi-sq. = 8.013 Sig. = 0.432						

Inspection of the data for Japanese companies reveals that cost-volume-profit analysis and responsibility accounting were ranked as being most important and that flexible budgeting and transfer pricing were ranked as being least important. The data suggest that size of company discriminated most in analyzing flexible budgeting and discriminated least in analyzing standard costing.

The rankings of the items were also compared using country of origin of the companies. The results are depicted in Table V-5.

TABLE V-5

IMPORTANCE OF MANAGEMENT ACCOUNTING CONCEPTS

Concept		Rankings						Statistics	
		Number indicating							
	Country	1	2	3	4	5	Total	Chi-square	Sig.
Accounting Data	U.S.	0	4	30	67	46	147		
	J.	0	5	31	48	22	106		
		0	9	61	115	68	253	5.230	0.156
Static Budgets	U.S.	11	27	47	49	13	147		
	J.	3	11	36	40	16	106		
		14	38	83	89	29	253	7.540	0.110
Flexible Budgets	U.S.	18	17	29	50	33	147		
	J.	8	15	27	41	15	106		
		26	32	56	91	48	253	5.174	0.270
Direct Costing	U.S.	23	21	35	48	20	147		
	J.	7	14	22	35	28	106		
		30	35	57	83	48	253	9.883	0.042*
Resp. Accounting	U.S.	2	9	14	70	52	147		
	J.	4	7	20	53	22	106		
		6	16	34	123	74	253	10.108	0.039*
C-V-P Analysis	U.S.	4	9	30	62	42	147		
	J.	1	5	15	48	37	106		
		5	14	45	110	79	253	3.488	0.480
Standard Costing	U.S	4	9	24	67	43	147		
	J.	6	12	25	47	16	106		
		10	21	49	114	59	253	10.341	0.035*
Transfer Pricing	U.S.	15	41	40	36	15	147		
	J.	11	11	52	24	8	106		
		26	52	92	60	23	253	17.843	0.001*
Return on Investment	U.S.	0	7	22	57	61	147		
	J.	1	1	28	45	31	106		
		1	8	50	102	92	253	11.061	0.026*

*Statistically significant.

Note that five of the nine concepts have significance levels less

than Ø.Ø5, indicating a statistically significant difference in degree of importance indicated by Japanese and United States companies. The five are direct costing, responsibility accounting, standard costing, transfer pricing, and return on investment. By comparing the mean rankings by country, it was determined that Japanese companies ranked direct costing and transfer pricing as being more important than did United States companies; United States companies attached more importance to responsibility accounting, standard costing, and return on investment than did Japanese companies.

It was noted, in coding the data from the questionnaires, that there were some inconsistencies in the answers to questions number one and number seven (See Appendix B). There were four items common to both questions, and in some cases, a certain management accounting concept would be ranked as being of some degree of importance in answering question number one, and then the same management accounting concept would be indicated as not being used in answering question number seven. This inconsistency was apparently due to the fact that question number seven contained an explicit statement to the effect that responses for management accounting concepts not used by the company should be omitted. To assess the effects, if any, of this inconsistency, the data for question one were analyzed two ways. First, the responses were analyzed as given. The results of this analysis were presented in the preceding paragraphs. Second, the responses to question number one were modified to agree with the responses to question number seven. That is, if any management

accounting concept was indicated as not being used in answering question number seven, the response to question number one was modified to indicate that that particular concept was "not important at all". After the modification, the data were analyzed by repeating all of the aforementioned tests. In other words, all of the aforementioned tests under hypothesis number one were conducted twice. The results of the tests under the two alternatives were not significantly different. Therefore, only the results from the first approach were presented in the preceding paragraphs.

Hypothesis number one must be interpreted in terms of the variety of relationships examined in connection therewith. The interpretation of the results under this approach is somewhat mixed. The hypothesis cannot be rejected for the relationship between size of company and number of management accounting concepts used, for country of origin and the number of management accounting concepts used, or for size of company and rankings of importance of the nine selected management accounting concepts. However, when the relationship between country of origin and rankings of each of the nine management accounting concepts is analyzed, the hypothesis is rejected for five of the nine. Stated differently, a precise interpretation of the data results in rejection of the null hypothesis of no difference between the importance attached to direct costing, responsibility accounting, standard costing, transfer pricing and return on investment when comparing United States and Japanese companies. However, interpretation of the overall results obtained in connection with

hypothesis number one provides insufficient grounds for rejection in total as stated.

Relationship Between Size of Company, Country of Origin, and Use of Quantitative Techniques

Hypothesis number two states that the number of quantitative techniques used is not related to the size of companies using the techniques. The relationship between size and number of techniques used is examined for companies within each country and then the relationship between the number of techniques used and country of origin is examined. The questionnaire item relating to size was explained in the preceding section. Respondents were asked to specify whether or not they used each of nine quantitative techniques by indicating those used with a checkmark.

The ANOVA statistical method was used to examine both of the described relationships. Table V-6 depicts the relationship between size of company and the number of quantitative techniques used.

Inspection of the data suggests that larger companies tend to use a larger number of quantitative techniques. However, the relationship is significant for United States companies only.

TABLE V-6

NUMBER OF QUANTITATIVE TECHNIQUES USED
AND SIZE OF COMPANY

	United States Companies		Japanese Companies	
Size	Number of responses	Mean of number of techniques used	Number of responses	Mean of number of techniques used
1	49	3.63	37	3.05
2	45	2.16	33	3.30
3	53	2.17	36	2.72
	Degrees of freedom = 2/144 F = 9.221 Significance of F = 0.001		Degrees of freedom = 2/103 F = 0.860 Significance of F = 0.426	

Table V-7 depicts the relationship, and the related data, between the number of quantitative techniques used and the country of origin of responding companies.

TABLE V-7

NUMBER OF QUANTITATIVE
TECHNIQUES USED

Origin	Number of Responses	Mean of Number of Techniques Used
United States	147	2.65
Japan	106	3.02
Degrees of freedom = 1/251 F = 2.112 Significance of F = 0.147		

The data suggest that Japanese companies tend to use a larger

number of quantitative techniques than do United States companies, but the difference between the two in this regard is not statistically significant.

Again, as with hypothesis number one, the results under hypothesis number two are mixed. Larger companies in both countries tend to use a larger number of quantitative techniques than do smaller companies; however, the relationship is statistically significant for United States companies only. When the relationship between country of origin and the number of quantitative techniques used is examined, it is noted that Japanese companies tend to use the largest number. However, the relationship is not statistically significant. Therefore, an interpretation of the overall results provides no basis for rejection of the null hypothesis as stated.

Relationship Between Company Affiliation and Number of Management Accounting Concepts and Number of Quantitative Techniques Used

Hypothesis number three was designed to test the relationship between companies having or not having an affiliation with a company in the counterpart country and the number of management accounting concepts and number of quantitative techniques used. It states that there is no difference in the number of management accounting concepts used and the number of quantitative techniques used when comparing companies having an affiliation with a company in the United States/Japan and those not having such an affiliation.

Companies in Japan were asked to indicate whether or not they were affiliated, as parent or subsidiary, with a country in the United

States. In a like manner, United States companies were asked about affiliation with a company in Japan. The ANOVA technique was used for the analysis of responses. Japanese and United States companies were analyzed separately with the number of management accounting concepts used and the number of quantitative techniques used each as dependent variables and affiliation status as the independent variable. Table V-8 contains the data from the analysis.

TABLE V-8

NUMBER OF MANAGEMENT ACCOUNTING CONCEPTS USED, NUMBER OF QUANTITATIVE TECHNIQUES USED, AND AFFILIATION STATUS OF COMPANIES

	United States Companies		Japanese Companies	
Management Accounting Concepts:				
	Number of responses	Mean of number used	Number of responses	Mean of number used
Affiliated	22	8.73	52	8.60
Not affiliated	122[a]	8.42	52[b]	8.62
	Degrees of freedom = 1/142		Degrees of freedom = 1/102	
	F = 2.942		F = 0.007	
	Significance of F = 0.089		Significance of F = 0.931	
Quantitative Techniques:				
	Number of responses	Mean of number used	Number of responses	Mean of number used
Affiliated	22	3.55	52	3.08
Not affiliated	122[a]	2.52	52[b]	2.92
	Degrees of freedom = 1/142		Degrees of freedom = 1/102	
	F = 4.719		F = 0.186	
	Significance of F = 0.031		Significance of F = 0.667	

[a]Three companies did not indicate affiliation status.
[b]Two companies did not indicate affiliation status.

The difference between means of both the number of management accounting concepts and the number of quantitative techniques used in regard to affiliation status is most pronounced for United States companies. Note that such companies having an affiliation with a Japanese company tend to use more management accounting concepts and more quantitative techniques than those not having an affiliation. Note also that Japanese companies, regardless of affiliation status, use a larger number of management accounting concepts and quantitative techniques than do United States companies (See Tables V-3 and V-7). Thus the findings under hypothesis number three are consistent with those under numbers one and two.

Of the relationships depicted in Table V-8, only that between affiliation status of United States companies and the number of quantitative techniques used is significant at the Ø.Ø5 level of significance. Thus the null hypothesis of no difference is rejected for the relationship between affiliation status of United States companies and the number of quantitative techniques used. The hypothesis cannot be rejected in terms of the other relationships tested.

Relationship between the Importance Attached to Uses of Accounting Data and Country of Origin

Hypothesis number four states that there is no difference in the degree of importance attached to the purposes for which accounting data are used when comparing companies in the United States with companies in Japan.

Companies were asked to rank four items in terms of their importance to the purpose for which they used accounting data. A rank of one assigned indicated the highest degree of importance. The four purposes were:

1. Determining the cost of finished products for external financial statement presentation.

2. Evaluating the efficiency of manufacturing operations.

3. Determining the cost of finished products for pricing purposes.

4. Evaluating the performance of individual managers or supervisors.

In addition, an "other" category was provided so that respondents could include and rank some other purpose if they so desired.

The Spearman's rank-order correlation coefficient was chosen to compare the responses from companies in the two countries. This procedure requires that the data be arranged in paired ranks. The paired ranks were obtained by calculating the means from the rankings assigned to each of the four items by country of origin. The means were then used to rank the items from one to five with one indicating the highest rank in terms of importance. Table V-9 presents the rankings thus obtained and the results of the Spearman test. The means obtained from the initial rankings are also included.

The derivation of the rankings was complicated by two factors. First, some respondents assigned the same value to two or more items. Second, some respondents did not rank all four items. In regard to

the first factor, no compensatory procedures were used; that is, the data were used as given for calculating the means. In regard to the second factor, the following procedure was used. Means were first calculated for each of the five items using data from those items that were ranked. For example, if only 143, rather than 147, United States companies ranked "evaluating manufacturing operations", then the mean was calculated by summing the rankings and dividing by 143. Second, the data were adjusted where no ranking was assigned as follows.

TABLE V-9

IMPORTANCE OF USES OF ACCOUNTING DATA

	United States Companies		Japanese Companies	
Purpose	Mean score	Rank	Mean score	Rank
Evaluate efficiency of manufacturing operations	1.91	1	1.66	1
Determine cost for pricing purposes	1.98	2	2.35	2
Evaluate performance of managers and supervisors	2.82	3	3.30	4
Determine cost for external financial statements	2.92	4	2.44	3
Other	3.78	5	4.00	5

r_s = 0.9 Significance = 0.019[2]

It was assumed that failure to rank an item indicated that it had

[2]When the number of paired ranks is less than ten, the significance measure may not be reliable. See Thomas R. Dyckman and L. Joseph Thomas, Fundamental Statistics for Business and Economics (Footnote continued)

a lesser degree of importance than if the item had been ranked. Stated differently, if a respondent did not rank an item, this was taken as an indication that it was not considered very important. Thus, nonranked items were assigned a value one higher (a higher number indicating less importance) than the highest ranked value used by the respondent. This resulted in rankings for all items for all respondents. The means of each item were again calculated and rankings were derived therefrom. The rankings obtained under both methods were the same. These are depicted in Table V-9 along with the means obtained using the last mentioned procedure.

Note that the correlation statistic obtained indicates a high degree of correlation between the rankings. Inspection of the rankings by observation reveals that only two items were ranked differently (Two is the minimum number of items that could be ranked differently). United States companies ranked use of accounting data for evaluating individual managers higher than did Japanese companies. And Japanese companies ranked use of accounting data for external financial statements as being more important than did United States companies. All of the remaining items were ranked the same using the means from rankings from companies in the two countries.

The items included by respondents under the "other" category are worthy of mention. Nine companies in each country made use of this category. The majority of companies in both countries ranked the item

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[2](continued)
(Englewood Cliffs: Prentice-Hall, 1977), p. 658.

named last in importance. The purposes indicated for United States companies were profitability, taxes, and internal control. Japanese companies named evaluation of new products, long range planning, improvement of quality, determination of product mix, and control of costs.

The correlation coefficient obtained, and included in Table V-9, indicates a high degree of correlation between the two rankings. Since there were a number of tied ranks, the Kendall coefficent was also calculated on the data.[3] This resulted in a coefficient of Ø.8 with a significance level of Ø.Ø25. Both types of coefficients indicate that a high degree of correlation exists between the two rankings and that the probability of the relationship occurring by chance is very low. Therefore, the null hypothesis of no difference cannot be rejected.[4]

Relationship Between Long Range Planning and Country of Origin

The relationship between each of two items, extent of usage of long range planning and time frame of long range plans, and country of

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[3]The Kendall coefficient is perhaps more meaningful when there are a large number of tied ranks. See Nie and others, Statistical Package for the Social Sciences (New York: McGraw-Hill, 1975), p. 289.

[4]Note that the statistical measures obtained are similarity type measures rather than difference type measures as is the case with the ANOVA and chi-square techniques. Thus the inability to reject the null hypothesis of no difference in the rankings even though the significance statistics are less than Ø.Ø5 for both coefficients. The significance level here merely indicates that a high degree of reliance can be placed on the correlation coefficients obtained.

origin of responding companies was explored under hypothesis number five. It states that there is no difference in the extent of usage of long range planning when comparing companies in the United States with companies in Japan.

Respondents were asked whether or not their company had a formal statement of long range plans, goals, or strategies. If the answer to the question was yes, they were further asked to indicate the time span of long range plans.

Companies in the two countries were compared on whether or not they had a statement of long range plans using the chi-square test, and were compared on the length of time of long range plans using the ANOVA test. Table V-10 contains the data and the results for the chi-square test.

TABLE V-10

EXTENT OF USAGE OF LONG RANGE PLANNING

	Answering Yes		Answering No	
Country	Number	Percent	Number	Percent
United States	120	81.6%	27	18.4%
Japan	98	92.5%	8	7.5%

Chi-square = 4.175
Degrees of freedom = 1
Significance = 0.023
Phi = 0.155

Note that a larger percentage of Japanese companies indicated existence of a formal statement of long range plans than did United

States companies. Note also that a large number of companies in both countries have such a statement. The significance level obtained indicates that the null hypothesis of no difference between the extent of long range planning in the two countries should be rejected. Note that the phi statistic is also included in the table. This is so because this statistic is useful in connection with a two by two table as a measure of the strength of the relationship examined.[5] The value obtained indicates that the relationship observed is not very strong. Stated positively, the results indicate a high probability (approximately 98 percent) that a weak relationship exists between usage of long range planning and country of origin.

Table V-11 contains the data and the results of the ANOVA test conducted on the relationship between time span of long range plans and country of origin.

TABLE V-11

TIME SPAN OF LONG RANGE PLANS

Country	Number of Companies	Mean of Number of Years
United States	120[a]	4.55
Japan	98[b]	3.95

Degrees of freedom = 1/216
F = 7.484
Significance of F = 0.007

[a]Twenty seven United States companies indicated non-use of long range planning; therefore, this item was not answered. See Table V-10.
[b]Eight Japanese companies indicated non-use of long range planning and therefore left this item blank. See Table V-10.

[5]Nie and others, op. cit., p. 224.

Inspection of the raw data revealed that a large majority of Japanese companies use a time span of three years. This was explained by one respondent (company president) voluntarily in a note included with the completed questionnaire. He stated that the three year time span was part of what is called "middle range planning". Middle range planning includes, among other things, an outline of selected strategy. He also stated that middle range planning was adopted as a result of the first oil embargo. He indicated that a time span longer than three years was not considered realistic in view of the rapidity of change of economic factors.[6]

One additional test was conducted in connection with this analysis, although it was initially unplanned. It seemed desirable to examine the relationship between affiliation status and time span of long range planning in view of the fact that the effects of long range planning might transcend the parent-subsidiary relationship. United States and Japanese companies were analyzed separately using the ANOVA technique with time span as the dependent variable and affiliation status as the independent variable. The relationship was significant only at the 0.833 level for United States companies and only at the 0.759 level for Japanese companies. In addition, the means for the time spans in both countries were in the opposite direction to what would be expected if the relationship was significant.

Inspection of the data in Table V-11 reveals that United States

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[6]Case number 2029 of the researcher's files.

companies use a longer time span than do Japanese companies for long range planning and that the relationship in this regard is significant when comparing the responses from the two countries.

The data in Tables V-10 and V-11, when analyzed together, indicate that companies in the two countries do differ in both the extent of usage of long range planning and the time span used for long range planning. Thus the null hypothesis of no difference for hypothesis number five is rejected.

Relationship Between Number and Type of Persons Participating in Budget Preparation and Country of Origin

In relation to hypothesis number six, companies were asked to indicate, by a check mark, the persons participating in the preparation of the operating budget for the fiscal period. Listed were production workers, shop foremen, department heads, division heads, and company president. A space was provided for respondents to write in others who participated. The hypothesis states that there is no difference in the extent of usage of participative budgeting between companies in the United States and companies in Japan.

Two types of analyses were performed to test the hypothesis. First, the relationship between the number of categories of persons participating in budget preparation and the country of origin was examined using the ANOVA test. The results are depicted in Table V-12.

TABLE V-12

NUMBER OF CATEGORIES OF PERSONS PARTICIPATING IN PREPARATION OF THE OPERATING BUDGET

Origin	Number of Companies	Mean of Number of Persons Participating
United States	147	3.24 (3.07)[a]
Japan	106	2.92 (2.79)
Degrees of freedom = 1/251 (1/251)[a]		
F = 7.035 (6.114)		
Significance of F = 0.009 (0.014)		

[a]See explanation in text below.

The items in parentheses are the results of the same test as previously described, except that the "other" category was excluded from the analysis. This was done to make allowances for the possibility that respondents in one of the two countries may have been more inclined to write in an "other" category than in the other of the two countries. The results are only slightly different under the two approaches.

Second, the number of persons in each category (production workers, foremen, etc.) were compared by country of origin using the SPSS CROSSTABS procedure to obtain the chi-square statistic. The results are depicted in Table V-13.

TABLE V-13

PARTICIPATION IN BUDGET FORMULATION
FOR SELECTED CATEGORIES
OF PERSONS

	United States Companies[a]		Japanese Companies[b]		Statistics		
Category	Number partic.	Percent partic.	Number partic.	Percent partic.	Chi-sq.	df	Sig.
Prod. wkrs.	6	4.2%	8	7.5%	Ø.758	1	Ø.380
Foremen	48	33.3%	26	24.5%	1.869	1	Ø.172
Dept. heads	134	93.1%	96	90.6%	4.482	1	Ø.630
Div. heads	141	98.6%	98	92.5%	4.482	1	Ø.034[c]
Co. pres.	122	84.7%	68	64.2%	13.060	1	Ø.001[c]
Other[d]	24	16.7%	14	13.2%	Ø.330	1	Ø.566

[a]For United States companies, 144 respondents answered the appropriate questions for all categories except division heads; 143 answered for this category.
[b]For Japanese companies, all 106 respondents answered the appropriate questions for all categories.
[c]The phi statistic for these two categories is Ø.15 and Ø.24 respectively.
[d]The most common categories named were controllers and other similar staff positions.

Examination of the percentage columns reveals that, except for production workers, a larger proportion of persons in all categories for United States companies participate in budget formulation in comparison to Japanese companies. However, the results for production workers, foremen, and department heads merely suggest that a difference may exist, since the results are not statistically significant. The results for division heads and company presidents are statistically significant. The phi statistic for these two categories indicates that the relationship between country of origin and budget participation is slight for division heads and definite,

but small, for company presidents.[7]

The results of the analysis of the number participating in each category are consistent with the results of the analysis of the number of categories of persons participating in budget preparation (See Table V-12). The results of the analysis, when viewed from a broad perspective, indicate that more categories of persons in United States companies participate in budget preparation than in Japanese companies, and that a larger percentage of higher level executives participate in United States companies than in Japanese companies.

A mixed interpretation results when the data are analyzed within the framework of hypothesis number six. A statistically significant difference is observed when comparing United States and Japanese companies in terms of the total number of categories of persons participating. A statistically significant difference is also observed when comparing companies in the two countries in terms of the categories of division heads and company presidents. This represents two of five meaningful categories (The "other" category is not considered to be meaningful since, in most cases, staff type persons who normally are expected to participate were indicated). Thus the data, when viewed as a whole, indicates rejection of hypothesis number six.

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[7]See Frederick Williams, Reasoning with Statistics (New York: Holt, Rinehart, and Winston, 1979), p. 128 for a suggested interpretation of correlation type statistics.

Relationship Between Length of Time of Usage of Selected Management Accounting Concepts and Country of Origin

Hypothesis number seven was designed to provide a framework for analyzing the rates at which the usage of certain management accounting concepts have developed when comparing United States and Japanese companies. Companies were asked to indicate, for each of six management accounting concepts, the length of time that they had been using the indicated concept. The concepts were operating budgets, direct costing, responsibility accounting, cost-volume-profit analysis, standard costing, and inventory models. Companies were also asked to indicate the length of time that they had been engaged in manufacturing operations. The purpose of the latter question was to make more meaningful the answers provided if companies had just recently become engaged in manufacturing operations.

Five categories of time were provided for responses, which included a total time frame from "one to ten years" to "more than forty years". Depending on the category checked, the data were coded in ten year increments beginning with five years as the shortest increment and forty five as the longest. As a result of coding the data in this form, the ANOVA technique is suitable for the analysis. In addition, it is also appropriate to use the chi-square test since the data were arranged in categories.[8] The data related to the use of the chi-square test are provided in Table V-14 (The means of the

[8]Nie and others, op. cit., p. 5.

number of years of usage were calculated using the ANOVA test).

As previously mentioned, the ANOVA test was also used in this analysis and the results were consistent with those obtained using the chi-square test. In addition, the data were analyzed under both tests using 1) companies of all ages and 2) only companies forty five years old or older. The results under all alternatives were consistent with the data in Table V-14.

TABLE V-14

LENGTH OF TIME OF USAGE OF SELECTED MANAGEMENT ACCOUNTING CONCEPTS

	United States Companies		Japanese Companies		Statistics		
Concept[a]	No. of companies	Mean of years	No. of companies	Mean of years	chi-sq.	df	Sig.
Operating budgets	97	25.7	56	28.6	6.089	4	0.193
Direct costing	59	19.1	44	19.6	2.024	4	0.731
Responsibility accounting	91	21.2	43	20.6	4.635	4	0.327
C-V-P analysis	85	19.4	55	20.6	0.937	4	0.919
Standard costing	93	24.5	46	24.9	1.422	4	0.841
Inventory models	63	10.9	35	17.6	10.132	4	0.038

[a]Companies were asked to leave blank the spaces for those concepts not used.

Examination of the data in Table V-14 reveals a marked similarity in the time spans over which companies in the two countries have used all of the concepts, except for inventory models. This is also the

only concept where the difference is statistically significant. Respondents for Japanese companies indicate a longer time usage of inventory models than do respondents for United States companies. Thus, the analysis of the data provides no basis for rejection of hypothesis number seven as written, although a detailed interpretation for each management accounting concept results in its rejection for the use of inventory models.

Summary

In this chapter, the research results were presented. A comparative analysis was performed on data from 147 United States manufacturing companies and 106 Japanese manufacturing companies representing total populations of 986 and 497 companies respectively.

When companies were compared by size within each country in terms of the number of management accounting concepts used, no statistically significant difference was detected. When companies were compared by country in terms of the number of management accounting concepts used, no statistically significant difference was detected. When the degree of importance assigned to nine selected management accounting concepts was analyzed in relationship to size of company within each of the two countries, no statistically significant differences were detected. When the degree of importance assigned to each of the nine concepts was compared by country, a statistically significant relationship was found for direct costing, responsibility accounting, standard costing, transfer pricing, and return on investment. Japanese companies ranked

direct costing and transfer pricing higher than did United States companies, and United States companies ranked responsibility accounting, standard costing, and return on investment higher than did Japanese companies. No statistically significant relationship was found for the importance rankings by country for the use of accounting data, static budgets, flexible budgets, and cost-volume-profit analysis.

When companies were compared by size within each country in terms of the number of quantitative techniques used, it was found that a statistically significant difference existed for United States companies but not for Japanese companies. Larger companies in the United States used a larger number of quantitative techniques. When United States and Japanese companies were compared with each other in terms of the number of quantitative techniques used, it was found that Japanese companies tend to use a larger number; however, the relationship was not statistically significant.

When companies were compared according to whether or not they were affiliated with companies in the counterpart country in terms of the number of management accounting concepts used and the number of quantitative techniques used, only one statistically significant relationship was detected. This was for the relationship between the number of quantitative techniques used and the affiliation status of United States companies.

When the rankings of United States and Japanese companies on the importance of the uses to which accounting data were put were

compared, the rankings were found to be highly correlated and statistically significant. United States companies attached more importance to the use of accounting data for evaluating individual manager's performance than did Japanese companies, and Japanese companies attached more importance to the use of accounting data for external financial statements than did United States companies. All other items were ranked the same by companies in both countries.

When companies were compared on the extent of usage of long range planning by country of origin, a statistically significant difference was noted. More Japanese companies used long range planning than did United States companies. When the companies that did use long range planning were compared on the basis of the time span of long range plans, a statistically significant difference was noted with United States companies utilizing a longer time span than Japanese companies.

When the number of categories of persons participating in preparation of the operating budget was compared by country, it was found that United States companies utilized a greater number than did Japanese companies. The difference was statistically significant. It was also found that a larger percentage of division heads and company presidents participated in budget preparation in United States companies than in Japanese companies. The difference was statistically significant.

When comparing companies in the two countries in terms of the length of time that selected management accounting concepts had been in use, only one statistically significant difference was noted.

Japanese companies indicated a longer time period for use of inventory models than did United States companies.

A majority of the relationships examined were tested for nonresponse bias. Companies that responded to the initial mailing were coded "early" and companies that responded to the follow up letter were coded "late". Early and late responses were compared and were found to be quite similar for the relationships examined.

In this chapter, the research findings were presented within the framework of the hypotheses of the study. The findings will be presented and analyzed in the next chapter in terms of similarities and differences noted and the environment in which Japanese and United States companies operate.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The objective of this study was to compare the management accounting practices of large manufacturing companies located in the United States and Japan.

A literature review was conducted in order to gain a better understanding of management accounting in general and to became familiar with the development and current state of management accounting practice in the two countries. Seven hypotheses were formulated in order to explore specific and well defined areas of management accounting practice. A questionnaire was developed to gather data to test the seven hypotheses.

The conclusions are based on the literature review and the statistical analysis of the data obtained through use of the questionnaire, with emphasis on the latter. In addition to the conclusions, this chapter contains sections on the implications of the findings, limitations of the study, and suggestions for further research.

Conclusions

In Chapter II, the development and current state of management accounting practice in the United States and Japan were examined and compared through a review of literature. Generally, indications were

that more similarities than differences existed. However, the analysis of the results of the questionnaire survey indicates a more mixed view in this regard.

The analysis of the results of the survey were presented in Chapter V within the framework of the hypotheses of the study. A summary is presented here in terms of similarities and differences noted during the analysis.

Similarities Noted

Similarities in management accounting practice were noted in the following areas.

Companies of different sizes tended to use the same number of management accounting concepts, both in the United States and Japan. And companies in the United States and Japan, when compared with each other, tended to use the same number of management accounting concepts. Companies of different sizes in both countries tended to assign the same degree of importance to each of nine management accounting concepts. The concepts were: use of accounting data of previous periods, static budgets, flexible budgets, direct costing, responsibility accounting, cost-volume-profit analysis, standard costing, transfer pricing, and return on investment. When companies in Japan and the United States were compared with each other according to the degree of importance assigned to the nine concepts, the ratings were similar for the use of accounting data of previous periods, static budgets, flexible budgets, and cost-volume-profit analysis.

Japanese companies of differing sizes tended to use the same

number of quantitative techniques. When United States and Japanese companies were compared with each other in this regard, they tended to use the same number of quantitative techniques.

Japanese companies having an affiliation with United States companies did not differ from those not having such an affiliation when compared in terms of the number of management accounting concepts and the number of quantitative techniques used. When Japanese and United States companies were compared with each other in these terms, they were found to be similar.

The rankings assigned to the uses of accounting data were highly correlated when comparing Japanese and United States companies. Only two differences were noted in the rankings; these will be presented in the next section. The uses of accounting data that were compared were 1) determining the cost of products for external financial statements, 2) evaluating the efficiency of manufacturing operations, 3) determining the cost of products for pricing purposes, 4) evaluating the performance of individual managers or supervisors, and 5) other uses.

When individual categories of persons in the two countries were compared with each other as to whether or not they participated in budget preparation, no differences were noted for production workers, foremen, and department heads.

When United States and Japanese companies were compared with each other on the basis of how long they had used six management accounting concepts, the times were similar for five of the six. The five were:

operating budgets, direct costing, responsibility accounting, cost-volume-profit analysis, and standard costing.

Differences Noted

Differences in management accounting practice were noted in the following areas.

When Japanese and United States companies were compared with each other according to the degree of importance assigned to nine management accounting concepts, differences were noted for five of the nine. Japanese companies ranked direct costing and transfer pricing higher than did United States companies, and United States companies ranked responsibility accounting, standard costing, and return on investment higher than did Japanese companies.

When United States companies were compared by size in terms of the number of quantitative techniques used, it was found that larger companies used a larger number of quantitative techniques.

When United States companies were compared by affiliation status in terms of the number of quantitative techniques used, it was found that those affiliated with Japanese companies used a larger number of quantitative techniques than those not affiliated.

As mentioned in the previous section on similarities, Japanese and United States companies were found to be similar in terms of the rankings assigned to the uses to which accounting data were put. Two differences occurred in the rankings: United States companies attached more importance to the use of accounting data for evaluating the performance of individual managers, and Japanese companies attached

more importance to the use of accounting data for external financial statements.

Japanese and United States companies differed in both the extent of usage of long range planning and in the length of time used for long range plans. More Japanese companies used long range planning than did United States companies, and United States companies used a longer time span than Japanese companies.

The analysis of responses concerning participative budgeting revealed that United States companies had a larger number of categories of person participating in budget preparation than did Japanese companies. When individual categories were compared, it was found that more United States companies indicated that division heads and company presidents participated in budget preparation than did Japanese companies.

When companies in the two countries were compared with each other on the length of time they had used six management accounting concepts, only one difference was noted. Japanese companies had been using inventory models for an average of approximately 18 years. The comparable figure for United States companies was 11 years.

When the research results are presented in terms of similarities and differences, it is noted that an approximately equal number of items fall in each category.

Implications of the Study

In this section, the implications of the research are presented.

Patterns in the findings are noted. In addition, the results are interpreted in terms of what is generally known about United States and Japanese companies.

The findings indicate that Japanese companies are more homogenous than are United States companies. Stated differently, United States companies are more diverse than are Japanese companies. Five types of tests were conducted where companies within each country were compared with each other. The five tests discriminated among companies by size and affiliation status, and in none were differences noted among Japanese companies. Yet in two of the five tests, differences were noted among United States companies. The apparent similarity of Japanese companies may be due to geographic concentration, better communications between companies, the influence of government, or a combination of these and other factors.

Both the literature review and the analysis of responses to the survey imply that Japanese companies generally are flexible, are responsive to short term factors, and are export oriented. These items were specifically noted in Chapter II, and the responses are consistent with this description. The greater degree of importance placed on direct costing and the lesser degree of importance placed on standard costing by Japanese companies is consistent with the indication of flexibility and response to short term factors. The shorter time frame of long range plans is also consistent with flexibility. The greater emphasis on transfer pricing is consistent with the export orientation of Japanese companies mentioned in Chapter

II. It is also noted that the greater degree of importance attached to transfer pricing by Japanese companies is consistent with the fact that a greater proportion of Japanese companies are affiliated with United States companies (50 percent) than are United States companies affiliated with Japanese companies (15 percent).

In Chapter I, it was noted that the Japanese record of economic growth is attributed in part to the successful application of Japanese type management techniques and a high degree of cooperation between labor and management. The analysis of responses to the survey are consistent with this view. Three items in the questionnaire are related to these factors. They are responsibility accounting, the uses to which accounting data are put, and participative budgeting. First, responsibility accounting is associated with a top-down management philosophy (See Chapter III). In answering question number one, 83 percent of United States companies ranked responsibility accounting as being either "extremely important" or "very important". The corresponding rating by Japanese companies was 71 percent. In answering question number seven, 62 percent of United States companies indicated usage of responsibility accounting; the comparable figure for Japanese companies was 41 percent (This apparent inconsistency between the answers to questions number one and seven was explained in Chapter V). Second, participative budgeting also gives an indication of the degree of cooperation between labor and management and between levels of management. Question number five had to do with participative budgeting. When comparing the responses from the two

countries by category of persons participating in budget preparation, two statistically significant differences were noted. United States companies reported a higher proportion of division heads and company presidents participating in budget preparation than did Japanese companies. Again, this is consistent with the results of the questions on responsibility accounting and the philosophy of top-down management. Third, the rankings on the uses to which accounting data were put differed in two respects. One of these had to do with the use of accounting data to evaluate the performance of individual managers. United States companies ranked the item third and Japanese companies ranked it fourth. This too is consistent with the concept of responsibility accounting and top-down management.

Other differences between companies in the two countries were noted in the previous section of this chapter. It is difficult to imply anything from these in terms of what is generally known about firms in the two countries. Perhaps all that can be done at this point is to note that they exist. For example, United States companies assigned a higher degree of importance to the use of the return on investment concept than did Japanese companies. It is difficult to know what this implies beyond the fact that the difference exists. The same can be said concerning the difference noted in the length of time of usage of inventory models. Perhaps further study in these areas of differences is appropriate. This is the topic of the last section of this chapter. The next section has as its topic the limitations of the study.

Limitations of the Study

The use of a questionnaire to gather data carries with it certain inherent limitations. If the response rate is anything less than 100 percent, the question arises as to whether the responses obtained are representative of the total population. Attempts were made in the study to minimize the effects of this limitation by careful design of the sampling plan (See Chapter IV). In addition, the results were checked for nonresponse bias and none was detected.

The use of a questionnaire also introduces the possibility that the reader may place a different interpretation on the questions than did the researcher. This is recognized as a distinct possibility in this study because of the language difference between Japanese respondents and the researcher. Efforts were made to overcome this limitation by reviewing the literature in both countries for indications of the similarity of management accounting terminology, by conducting a pilot study to test the questionnaire, and by having a person with extensive experience in the Japanese manufacturing environment evaluate the questionnaire.

The lack of responses from smaller Japanese companies hampered the efforts at comparing companies according to size. Since the size comparisons were not the primary objective of the study, this is not regarded as a serious limitation.

Last, generalization of the results of this study to other than large manufacturing companies should be made with caution. Only large manufacturing firms in both countries were sampled.

Suggestions for Further Research

This study was broad in scope and exploratory in nature. As such, it touched on many aspects of management accounting, but did not provide an in depth analysis of any aspect. Thus almost any area of similarity or difference noted in the study could be subjected to further study and analysis. A few specific suggestions are offered.

First, question number two explored the extent of usage of quantitative techniques. Nine such techniques were named. The mean of the number used for United States companies was 2.65 and for Japanese companies was 3.02. When it is noted that the responses came from the largest manufacturing companies in both countries, these figures appear to be low. No attempt was made to analyze the responses in terms of the usage of individual techniques. Since educators have devoted considerable time to the teaching of these techniques in recent years, further study appears to be warranted.

Second, the relatively low degree of importance assigned to the use of direct costing seems to warrant further study. This low rating was most pronounced for United States companies. Thirty percent of United States companies ranked the item as either "not important at all" or "not very important" in answering question number one, and only 40 percent indicated that it was used at all in answering question number seven. Again, these responses seem to have implications for educators and seem to warrant further research.

Last, more meaningful results might be obtained if the data were

analyzed in other ways. For example, companies in the two countries could be compared by standard industrial classification code rather than in total. Or companies in the same size categories in Japan and the United States could be compared with each other. Other possibilities exist.

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APPENDIX A

Letters and Questionnaires Used in the Pilot Study

APPENDIX A-1

Sample of the Dean's Cover Letter to U.S. Companies

September 3, 1982

Dear Mr.

During the past year, our college has sponsored two United States-Japan business conferences in an effort to promote the exchange of useful information between persons in the two countries.

Mr. Charles Hawkins, a doctoral student in our college, is conducting research on management accounting practices in the United States and Japan. It is our opinion that the results of the research will be beneficial to persons in both countries who are associated with manufacturing firms.

Would you be kind enough to ask the appropriate official in your organization to complete the enclosed questionnaire? Your help will be greatly appreciated.

Sincerely,

Gary Schwendiman
Dean

APPENDIX A-2

Sample of the Dean's Cover Letter to Japanese companies

August 23, 1982

Dear Mr.

During the past year, our college has sponsored two Japan-United States business conferences in an effort to promote the exchange of useful information between persons in the two countries.

Mr. Charles Hawkins, a doctoral student in our college, is conducting research on management accounting practices in Japan and the United States. It is our opinion that the results of the research will be beneficial to persons in both countries who are associated with manufacturing firms.

Would you be kind enough to ask the appropriate official in your organization to fill out the enclosed questionnaire? Your help will be greatly appreciated.

Sincerely,

Gary Schwendiman
Dean

APPENDIX A-3

Sample of the Researcher's Letter to U.S. Companies

September 3, 1982

Dear Mr.

The relationships between management methods, manufacturing processes, and the selection and use of management accounting concepts in manufacturing firms operating in different environments remain largely unexplored. In order to gather information that will provide insight into these relationships, I am conducting a comparative study of manufacturing companies located in the United States and Japan.

Your firm has been selected as one that can provide useful information to assist me in my study. Your cooperation in completing the enclosed questionnaire will be greatly appreciated. The information you provide will be held in strict confidence and will be published in the form of statistical summaries which will make the identification of any specific company impossible.

The willingness of executives to share information in the past has contributed significantly to progress in accounting matters resulting in benefits to all concerned. It is expected that information obtained from this study will be useful to companies located in both the United States and Japan. If you would like a summary of the results, please complete and return the enclosed mailing label.

I am including a stamped envelope for your convenience in returning the questionnaire. Thank you for your help.

Sincerely,

Charles Hawkins

Enclosures

APPENDIX A-4

Sample of the Researcher's Letter to Japanese Companies

August 23, 1982

Dear Mr.

The relationships between management methods, manufacturing processes, and the selection and use of management accounting concepts in manufacturing firms operating in different environments remain largely unexplored. In order to gather information that will provide insight into these relationships, I am conducting a comparative study of manufacturing companies located in Japan and the United States.

Your firm has been selected as one that can provide useful information to assist me in my study. Your cooperation in completing the enclosed questionnaire will be greatly appreciated. The information you provide will be held in strict confidence and will be published in the form of statistical summaries which will make the identification of any specific company impossible.

The willingness of executives to share information in the past has contributed significantly to progress in accounting matters resulting in benefits to all concerned. It is expected that information obtained from this study will be useful to companies located in both Japan and the United States. If you would like a summary of the results, please complete and return the enclosed mailing label.

I am including a stamped envelope for your convenience in returning the questionnaire. Thank you for your help.

Sincerely,

Charles Hawkins

Enclosures

APPENDIX A-5

Sample of the Researcher's Follow-up Letter to U.S. Companies

November 8, 1982

Dear Mr.

On September 3, I sent the enclosed questionnaire to your company and other companies located throughout the United States. Since a limited number of questionnaires were sent to companies of specific sizes, each response is very important to the success of the research project.

Your assistance in taking a few minutes to answer the eight brief questions and in returning the results to me in the stamped envelope provided in the initial letter, have you not already done so, will be greatly appreciated. Responses will remain confidential and the research results will be written in such a way that data from a specific company cannot be identified.

I believe the research results will be of interest to manufacturing firms located in the United States and will be pleased to send you a summary of the results. To obtain the summary, please complete and return the enclosed mailing label along with the questionnaire.

Thank you for your help.

Sincerely,

Charles E. Hawkins
Assistant Professor

Enclosures

APPENDIX A-6

Sample of the Researcher's Follow-up Letter to Japanese Companies

October 25, 1982

Dear Mr.

On August 26, I sent a questionnaire to your company and other companies located in Japan concerning the use of management accounting methods. Since a limited number of questionnaires were sent to companies of specific sizes, each response is very important to the success of the research project.

Should the original questionnaire no longer be available to you, please note that I have enclosed another for your use. I have also enclosed an addressed envelope for its return. Included in the initial letter was an international postal coupon of an amount sufficient to cover the cost of postage.

Your assistance in taking a few minutes to answer the eight brief questions and in returning the results to me, have you not already done so, will be greatly appreciated. Responses will remain confidential and the research results will be written in such a way that data from a specific company cannot be identified.

I believe the research results will be of interest to manufacturing firms located in Japan and will be pleased to send you a summary of the results. To obtain the summary, please complete and return the enclosed mailing label along with the questionnaire.

Thank you for your help.

Sincerely,

Charles E. Hawkins
Assistant Professor

Enclosures

QUESTIONNAIRE

Instructions: Please check (✓) the appropriate response(s). If the responses provided to a question are not sufficient to express your reply, please provide your own response.

1. Please indicate the importance of the following management accounting tools in carrying out the planning and control function for manufacturing operations in your company by selecting the letter beside the appropriate statement below and placing it to the left of each of the items listed.

_____ Accounting data of previous periods
_____ Static budgets
_____ Flexible budgets
_____ Direct costing
_____ Responsibility accounting
_____ Cost-volume-profit analysis
_____ Standard costing
_____ Transfer pricing (Department or division level)
_____ Rate of return on investment (Department or division level)

Statements
a. Extremely important
b. Very important
c. Moderately important
d. Not very important
e. Not important at all (Not used)

2. Please check any and all of the following techniques that are used in the planning and control function for manufacturing operations in your company.

_____ Linear programming
_____ Correlation analysis
_____ Regression analysis
_____ Computer simulation of operations
_____ Statistical sampling
_____ Network analysis (PERT/CPM)
_____ Queueing theory
_____ Inventory models
_____ Game theory

3. Please rank the following items in terms of their importance to the purpose for which accounting data are used. (One is highest rank, two is second highest rank, etc.)

_____ Determining the cost of finished products for external financial statement presentation.

_____ Evaluating the efficiency of manufacturing operations

_____ Determining the cost of finished products for pricing purposes

_____ Evaluating the performance of individual managers or supervisors

_____ Other. Please specify. _____

4. Does your company have a formal statement of long-range plans, goals, or strategies.

_____ Yes

_____ No

If yes, what is the approximate time frame of long range plans?

_____ One year

_____ Two years

_____ Three years

_____ Other. Please specify. _____

_____ Four years

_____ Five years

_____ Ten years or longer

5. Please check any and all of the following persons that participate in the preparation of the operating budget for the fiscal period.

_____ Production workers

_____ Shop foremen

_____ Department heads

_____ Division heads

_____ Company president

_____ Other. Please specify. _____

6. Is your company a parent or subsidiary of, or is it in a joint venture with, a company in Japan?

_____ Yes

_____ No

7. How long has your company been using the following management accounting tools? (Please select the letter beside the appropriate statement below and place it to the left of each of the items listed. Omit answers to those items not used by your company.)

_____ Operating budgets

_____ Direct costing

_____ Responsibility accounting

_____ Cost-volume-profit analysis

_____ Standard costing

_____ Inventory models

Statements

a. Between 1 and 5 years
b. Between 5 and 10 years
c. Between 10 and 15 years
d. Between 15 and 20 years
e. More than 20 years

8. What was the total amount of revenue from sales and other sources in 1981 of the segment, division, or company for which you furnished information in answering the preceding questions?

_____ Over $300,000,000

_____ From $100,000,001 to $300,000,000

_____ From $50,000,001 to $100,000,000

_____ From $25,000,000 to $50,000,000

_____ Less than $25,000,000

THANK YOU FOR YOUR HELP

QUESTIONNAIRE

Instructions: Please check (✓) the appropriate response(s). If the responses provided to a question are not sufficient to express your reply, please provide your own response.

1. Please indicate the importance of the following management accounting tools in carrying out the planning and control function for manufacturing operations in your company by selecting the letter beside the appropriate statement below and placing it to the left of each of the items listed.

_____ Accounting data of previous periods
_____ Static budgets
_____ Flexible budgets
_____ Direct costing
_____ Responsibility accounting
_____ Cost-volume-profit analysis
_____ Standard costing
_____ Transfer pricing (Department or division level)
_____ Rate of return on investment (Department or division level)

Statements
a. Extremely important
b. Very important
c. Moderately important
d. Not very important
e. Not important at all (Not used)

2. Please check any and all of the following techniques that are used in the planning and control function for manufacturing operations in your company.

_____ Linear programming
_____ Correlation analysis
_____ Regression analysis
_____ Computer simulation of operations
_____ Statistical sampling
_____ Network analysis (PERT/CPM)
_____ Queueing theory
_____ Inventory models
_____ Game theory

3. Please rank the following items in terms of their importance to the purpose for which accounting data are used. (One is highest rank, , two is second highest rank, etc.)

_____ Determining the cost of finished products for external financial statement presentation

_____ Evaluating the efficiency of manufacturing operations

_____ Determining the cost of finished products for pricing purposes

_____ Evaluating the performance of individual managers or supervisors

_____ Other. Please specify. _____

4. Does your company have a formal statement of long-range plans, goals, or strategies.

_____ Yes

_____ No

If yes, what is the approximate time frame of long range plans?

_____ One year

_____ Two years

_____ Three years

_____ Four years

_____ Five years

_____ Ten years or longer

_____ Other. Please specify. _____

5. Please check any and all of the following persons that participate in the preparation of the operating budget for the fiscal period.

_____ Production workers

_____ Shop foremen

_____ Department heads

_____ Division heads

_____ Company president

_____ Other. Please specify. _____

6. Is your company a parent or subsidiary of, or is it in a joint venture with, a company in the United States.

_____ Yes

_____ No

7. How long has your company been using the following management accounting tools? (Please select the letter beside the appropriate statement below and place it to the left of each of the items listed. Omit answers to those items not used by your company.)

_____ Operating budgets

_____ Direct costing

_____ Responsibility accounting

_____ Cost-volume-profit analysis

_____ Standard costing

_____ Inventory models

Statements

a. Between 1 and 5 years
b. Between 5 and 10 years
c. Between 10 and 15 years
d. Between 15 and 20 years
e. More than 20 years

8. What was the total amount of revenue from sales and other sources in 1981 of the segment, division, or company for which you furnished information in answering the preceding questions? (Add 000,000 to amounts.)

_____ Over ¥65,000

_____ From ¥25,001 to ¥65,000

_____ From ¥10,001 to ¥25,000

_____ From ¥ 5,000 to ¥10,000

_____ Less than ¥5,000

THANK YOU FOR YOUR HELP

APPENDIX B

Letters and Questionnaires Used in the Full Scale Study

APPENDIX B-1

Sample of the Dean's Cover Letter to U.S. Companies

March 14, 1983

Dear Mr.

During recent years, the College of Business at the University of Nebraska has sponsored two United States-Japan business conferences with the objective of promoting the exchange of mutually beneficial information between firms in the two countries. The third conference in the series is scheduled to be held in Tokyo on April 4-8, 1983.

In furtherance of this objective, Mr. Charles Hawkins, a doctoral candidate in the College of Business and a teacher at Northwest Missouri State University, is conducting research on management accounting practices in the United States and Japan. It is our opinion that the research findings will be beneficial to persons associated with manufacturing firms in both countries.

Would you be kind enough to ask the appropriate official in your organization to complete the enclosed questionnaire? Your assistance will be greatly appreciated.

Sincerely,

Gary Schwendiman
Dean

Enclosures

APPENDIX B-2

Sample of the Dean's Cover Letter to Japanese Companies

February 15, 1983

Dear Mr.

During recent years, the College of Business at the University of Nebraska has sponsored two Japan-United States business conferences with the objective of promoting the exchange of mutually beneficial information between firms in the two countries. The third conference in the series is scheduled to be held in Tokyo on April 4-8, 1983.

In furtherance of this objective, Mr. Charles Hawkins, a doctoral candidate in the College of Business and a teacher at Northwest Missouri State University, is conducting research on management accounting practices in Japan and the United States. It is our opinion that the research findings will be beneficial to persons associated with manufacturing firms in both countries.

Would you be kind enough to ask the appropriate official in your organization to complete the enclosed questionnaire? Your assistance will be greatly appreciated.

Sincerely,

Gary Schwendiman
Dean

Enclosures

APPENDIX B-3

Sample of the Researcher's Cover Letter to U.S. Companies

March 14, 1983

Dear Mr.

In order to obtain a better understanding of the relationships between management methods and management accounting concepts, I am conducting a comparative study of manufacturing companies located in the United States and Japan.

Your firm has been selected as one that can provide useful information for this study. The information you provide will be held in strict confidence and will be published in the form of statistical summaries so that the identification of any specific company will be impossible.

The willingness of executives to share information has contributed significantly to progress in accounting matters resulting in benefits to all concerned. It is expected that information obtained from this study will be useful to participating companies. If you would like a summary of the research results, please enter your name and address on the enclosed mailing label and return it with the questionnaire.

I am including a stamped envelope for your convenience in returning the questionnaire. Thank you for your help.

Sincerely,

Charles Hawkins
Assistant Professor

Enclosures

APPENDIX B-4

Sample of the Researcher's Cover Letter to Japanese Companies

February 15, 1983

Dear Mr.

In order to obtain a better understanding of the relationships between management methods and management accounting concepts, I am conducting a comparative study of manufacturing companies located in Japan and the United States.

Your firm has been selected as one that can provide useful information for this study. The information you provide will be held in strict confidence and will be published in the form of statistical summaries so that the identification of any specific company will be impossible.

The willingness of executives to share information has contributed significantly to progress in accounting matters resulting in benefits to all concerned. It is expected that information obtained from this study will be useful to participating companies. If you would like a summary of the research results, please complete and return the enclosed mailing label.

I am including a self-addressed envelope for your convenience in returning the questionnaire along with two international postal coupons to cover the cost of return postage. Thank you for your help.

Sincerely,

Charles Hawkins
Assistant Professor

Enclosures

APPENDIX B-5

Sample of the Researcher's Follow-up Letter to U.S. Companies

May 18, 1983

Dear Mr.

On March 14, I sent the enclosed questionnaire to your company and to other selected companies located throughout the United States. Since a limited number of questionnaires were sent to companies of specific sizes, each response is very important to the success of the research project.

Your assistance in taking a few minutes to answer the eight brief questions and in returning the results to me in the stamped envelope provided in the initial letter, have you not already done so, will be greatly appreciated. Responses will remain confidential and the research results will be written in such a way that data from a specific company cannot be identified.

I believe the research results will be of interest to manufacturing firms located in the United States and will be pleased to send you a summary of the results. To obtain the summary, please complete and return the enclosed mailing label along with the questionnaire.

Thank you for your help.

Sincerely,

Charles Hawkins
Assistant Professor

Enclosures

APPENDIX B-6

Sample of the Researcher's Follow-up Letter to Japanese Companies

April 19, 1983

Dear Mr.

On February 22, I sent the enclosed questionnaire to your company and other selected companies in Japan. Since a limited number of questionnaires were sent to companies of specific sizes, each response is very important to the success of the research project.

Your assistance in taking a few minutes to answer the eight brief questions and in returning the results to me in the envelope provided in the initial letter, have you not already done so, will be greatly appreciated. Two international postal coupons were included in the initial letter to cover the cost of return postage. Responses will remain confidential and the research results will be written in such a way that data from a specific company cannot be identified.

I believe the research results will be of interest to manufacturing firms located in Japan and will be pleased to send you a summary of the results. To obtain the summary, please complete and return the enclosed mailing label along with the questionnaire.

Thank you for your help.

Sincerely,

Charles Hawkins
Assistant Professor

Enclosures

APPENDIX B-7 Full-scale Study Questionnaire U.S. Companies 190

QUESTIONNAIRE

Instructions: Please check or indicate the appropriate response to the following eight questions.

1. Please indicate the degree of importance of the following management accounting tools in carrying out the planning and control function for manufacturing operations in your company.

	Extremely important	Very important	Moderately important	Not very important	Not important at all
Accounting data of previous periods	( )	( )	( )	( )	( )
Static budgets	( )	( )	( )	( )	( )
Flexible budgets	( )	( )	( )	( )	( )
Direct costing	( )	( )	( )	( )	( )
Responsibility accounting	( )	( )	( )	( )	( )
Cost-volume-profit analysis	( )	( )	( )	( )	( )
Standard costing	( )	( )	( )	( )	( )
Transfer pricing	( )	( )	( )	( )	( )
Rate of return on investment	( )	( )	( )	( )	( )

2. Please check (✓) any and all of the following techniques that are used in the planning and control function for manufacturing operations in your company.

____ Linear programming	____ Computer simulation	____ Queueing theory
____ Correlation analysis	____ Statistical sampling	____ Inventory models
____ Regression analysis	____ Network analysis (PERT/CPM)	____ Game theory

3. Please rank the following items in terms of their importance to the purpose for which accounting data are used. (One is highest rank; two is second highest; etc.)

_____ Determining the cost of finished products for external financial statement presentation

_____ Evaluating the efficiency of manufacturing operations

_____ Determining the cost of finished products for pricing purposes

_____ Evaluating the performance of individual managers or supervisors

_____ Other. Please specify. _____

4. Does your company have a formal statement of long-range plans, goals, or strategies?

_____ Yes _____ No

If yes, what is the approximate time frame of long range plans?

_____ One year	_____ Two years	_____ Three years
_____ Four years	_____ Five years	_____ Ten years or longer

5. Please check any and all of the following persons that participate in the preparation of the operating budget for the fiscal period.

_____ Production workers	_____ Shop foremen	_____ Department heads
_____ Division heads	_____ Company president	_____ Other. _____

6. Is your company a parent or subsidiary of a company in Japan? _____ Yes _____ No

7. Time oriented questions.

a. How long has your company been using the following management accounting tools? (Omit answers to those items not used by your company.)

	One to ten years	Ten to twenty years	Twenty to thirty years	Thirty to forty years	More than forty years
Operating budgets	( )	( )	( )	( )	( )
Direct costing	( )	( )	( )	( )	( )
Responsibility accounting	( )	( )	( )	( )	( )
Cost-volume-profit analysis	( )	( )	( )	( )	( )
Standard costing	( )	( )	( )	( )	( )
Inventory models	( )	( )	( )	( )	( )

b. How long has your company conducted manufacturing operations? ( ) ( ) ( ) ( ) ( )

8. What was the total amount of revenue from sales and other sources in 1981 of the segment, division, or company for which you furnished information in answering the preceding questions?

_____ Less than $250,000,000 _____ From $250,000,000 to $700,000,000 _____ More than $700,000,000

THANK YOU FOR YOUR HELP

APPENDIX B-8 The Full-scale Study Questionnaire Japanese Co's. 191

QUESTIONNAIRE

Instructions: Please check or indicate the appropriate response to the following eight questions.

1. Please indicate the degree of importance of the following management accounting tools in carrying out the planning and control function for manufacturing operations in your company.

	Extremely important	Very important	Moderately important	Not very important	Not important at all
Accounting data of previous periods	( )	( )	( )	( )	( )
Static budgets	( )	( )	( )	( )	( )
Flexible budgets	( )	( )	( )	( )	( )
Direct costing	( )	( )	( )	( )	( )
Responsibility accounting	( )	( )	( )	( )	( )
Cost-volume-profit analysis	( )	( )	( )	( )	( )
Standard costing	( )	( )	( )	( )	( )
Transfer pricing	( )	( )	( )	( )	( )
Rate of return on investment	( )	( )	( )	( )	( )

2. Please check (✓) any and all of the following techniques that are used in the planning and control function for manufacturing operations in your company.

____ Linear programming	____ Computer simulation	____ Queueing theory
____ Correlation analysis	____ Statistical sampling	____ Inventory models
____ Regression analysis	____ Network analysis (PERT/CPM)	____ Game theory

3. Please rank the following items in terms of their importance to the purpose for which accounting data are used. (One is highest rank; two is second highest; etc.)

____ Determining the cost of finished products for external financial statement presentation

____ Evaluating the efficiency of manufacturing operations

____ Determining the cost of finished products for pricing purposes

____ Evaluating the performance of individual managers or supervisors

____ Other. Please specify. _____

4. Does your company have a formal statement of long-range plans, goals, or strategies?

____ Yes ____ No

If yes, what is the approximate time frame of long range plans?

____ One year	____ Two years	____ Three years
____ Four years	____ Five years	____ Ten years or longer

5. Please check any and all of the following persons that participate in the preparation of the operating budget for the fiscal period.

____ Production workers	____ Shop foremen	____ Department heads
____ Division heads	____ Company president	____ Other. _____

6. Is your company a parent or subsidiary of a company in the United States? ____ Yes ____ No

7. Time oriented questions.

a. How long has your company been using the following management accounting tools? (Omit answers to those items not used by your company.)

	One to ten years	Ten to twenty years	Twenty to thirty years	Thirty to forty years	More than forty years
Operating budgets	( )	( )	( )	( )	( )
Direct costing	( )	( )	( )	( )	( )
Responsibility accounting	( )	( )	( )	( )	( )
Cost-volume-profit analysis	( )	( )	( )	( )	( )
Standard costing	( )	( )	( )	( )	( )
Inventory models	( )	( )	( )	( )	( )

b. How long has your company conducted manufacturing operations? ( ) ( ) ( ) ( ) ( )

8. What was the total amount of revenue from sales and other sources in 1981 of the segment, division, or company for which you furnished information in answering the preceding questions?

____ Less than ¥50,000,000,000 ____ From ¥50,000,000,000 to ¥150,000,000,000 ____ More than ¥150,000,000,000

THANK YOU FOR YOUR HELP