

THE EXTENT OF OBSOLESCENCE OF SELECTED
CANADIAN BUSINESS MANAGERS

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CANADIAN BUSINESS MANAGERS

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CHAPTER I

INTRODUCTION

Decision-making has become one of the most complex and difficult aspects of the business enterprise in recent years, due to rapid social, political, economic and technological changes. These changes continuously generate vital information which must be incorporated by the management in the decision-making process in order to make sound decisions.

Since decisions made by the manager have a significant impact on the success of the organization, it is very important that the manager make sound decisions. In fact, sound decisions are the key to business success, and they are the heart and core of the organization. Sound decisions are necessary for the successful undertaking of the managerial functions, such as planning, organizing, controlling, coordinating, communicating, and motivating. Inability of the manager to make correct decisions would inevitably hamper the progress of the organization because, as stated by Myers, ". . . the

organization is . . . structurally dependent on the nature of the decisions and its decision entities."¹

Sound decisions, however, are hard to make as they primarily depend on two critical factors--namely, the availability of information and the manager's ability to deal with the information.² Because of these two important elements, decisions in the organization are frequently imprecise, ambiguous and nonrational. Moore believes that information available to the business organization is usually fragmentary and often distorted because of inaccurate channels of communications which frequently filter and, in many cases, block essential information completely.³ As a result, the manager finds it difficult to make correct decisions. And even if the information is available to the manager, it is often overly abundant, making it much more difficult for the manager to deal with.

Also, every decision requires judgments of value.

¹Charles A. Myers, The Impact of Computers on Management (Cambridge, Mass., 1967), p. 140.

²David G. Moore, "What Decision Makers Need," Nation's Business, XLVIII (November, 1960), 92-94.

³Ibid.

But values vary from one individual to the next. Moore writes:

Values are psychological and social phenomena; they are emotionally and culturally derived. You can get information about values, but all the information in the world will not tell you which values are correct or which should have priority over other.⁴

From this, it is easy to understand why decisions are nonrational in many instances, especially if the values of the decision maker are not in accordance with the needs of the organization and its technical and human systems.

In order to overcome the difficulties involved in the decision-making process, many management techniques and concepts have been developed in the last several years. These tools and concepts range from a very simple use of arithmetic to the sophisticated utilization of computers and many other types of business equipment. The general trend is ". . . toward reducing to a minimum . . . guesswork in business decision-making. The trend has been to express, wherever possible, the underlying business situation in mathematical quantities, and then

⁴Ibid., 92.

to base the decision upon a mathematical process of optimization."⁵ In general, the direction is toward a scientific approach to business problems.

The main purpose of this development is to assist the management in carrying out its functions and in fulfilling its obligations. Many techniques and concepts such as management by objective, job evaluation, discounted cash flow, and critical path method are designed to improve efficiency and effectiveness of the organization; they are designed to meet the challenges of the uncertain business future. Drucker states:

. . . it is possible by means of these new tools to plan future decisions more intelligently, with a greater chance of effectiveness and a greater chance of their being the right decisions for the future. That is, it is possible to project systematically and with a fair degree of rationality toward the future.⁶

⁵Leonard W. Hein, The Quantitative Approach to Managerial Decisions (Englewood Cliffs, N. J., 1967), p. 3.

⁶Peter F. Drucker, "The New Management Tools-- And What the Manager Can Expect of Them," Control and Techniques For Better Management, American Management Association, General Management Series Number 176 (New York, 1955), p. 7.

There are numerous other advantages of these management techniques and concepts. They are, however, not without limitations, but they can and do provide the means and methods to increase the organization's productivity.⁷

Despite the existence of this new knowledge and its benefits, it is evident that many business managers have ignored the evolution of new approaches and are still adhering to the old practices of managing business. As Frank states, there are ". . . examples of executives struggling to solve problems of the 1960's with management tools of the 1930's."⁸ In his study of more than 1,000 managers, Frank found that these managers had very little familiarity with modern techniques.⁹ According to him, these managers knew very little about operations research, statistical analysis, linear programming, marketing theory, and many other management techniques.¹⁰

⁷R. M. Gondra, "The Efficiency of Executives," Management International Review, VI (5, 1966), 123.

⁸George Frank, "The Menace of Management Obsolescence," The Personnel Job In A Changing World, The American Management Association Series Number 80, edited by Jerome W. Blood (New York, 1964), p. 205.

⁹Ibid., pp. 205-213.

¹⁰Ibid.

In general, he concluded that there was little or no appreciation of the fact that business management was evolving toward a science.¹¹ In another study by the Stanford Research Institute, it was found that about 200 large industrial organizations in the United States had very little or no long-range planning.¹² Not many other studies have been undertaken to determine how much these new management techniques and concepts are being understood and applied by managers in their daily work.

If many managers have failed to understand and apply managerial techniques and concepts, should they be regarded as obsolete? Should they be considered inefficient and ineffective? Is it possible that their performance, in comparison with the performance of managers who are making sufficient use of new knowledge in the present state of progress, would be less than satisfactory? What can be done to improve the performance of managers? How can high levels of productivity be achieved and maintained in an organization?

¹¹Ibid.

¹²John Berry, "The Short, Happy Life of the Long-range Planner," Dun's Review and Modern Industry, XC (January, 1967), 37.

Purpose of the Study

These are some questions which this research study examines. The study's main purpose is to explore the problem of managerial obsolescence in Canada. The purpose is accomplished through establishing the importance of management techniques and concepts and through determining the managerial level of the understanding of these techniques and concepts. On the basis of the importance and understanding of management techniques and concepts, the study aims to develop an approach which would provide an approximation of the extent of management obsolescence.

Scope of the Study

This research study is limited to Canadian business organizations and their environment. No effort is made to include organizations outside of Canada. The study is further limited to 66 Canadian firms included for the purpose of establishing the importance of techniques and to 282 other business firms included for the purpose of determining the level of understanding. In addition, the study is limited to individual responses received from managers of the participating firms.

Background and Significance of the Study

As stated earlier, there are very few studies concerning managerial obsolescence as it really exists in the business world. The only extensive study of obsolescence was carried out by Frederick C. Haas for his doctoral degree; his study entitled "Executive Obsolescence" was limited to the American business environment and it was later published by the American Management Association.¹³ There are, however, many articles on the subject of managerial obsolescence. These articles have appeared only in the last five to ten years and they largely deal with the subject in general and point out causes, symptoms, consequences and cures of obsolescence.

As far as the researcher can determine, no research studies have been made concerning the problem of managerial obsolescence in Canadian business firms. Furthermore, no research studies have been made concerning the problem of measurement or identification of managerial obsolescence

¹³Frederick C. Haas, Executive Obsolescence, The American Management Association Research Study Number 90 (New York, 1968).

even though indirect references have been made in a few articles. This lack of systematic studies on the subject of obsolescence makes it apparent that the subject is relatively new and has not been thoroughly investigated.

The selection of the Canadian environment makes this study significant, interesting and timely for several reasons. First, Canada is a neighbor of the United States and, therefore, any development in the U. S. economy, especially in the field of business management, is likely to affect business practices in Canada. Second, many foreign business firms, particularly the U. S. firms, are very active in the Canadian economy. These foreign firms compete with the Canadian firms, influence them, challenge them, and in many cases force them to change their business attitudes and practices. Many of these foreign firms are very strong and powerful and they share a large portion of the Canadian market. In fact, a large portion of the Canadian business capital is owned by foreigners.¹⁴ This active involvement of the foreign firms in the Canadian economy has resulted in

¹⁴According to Canada Year Book (1968), a publication of the Government of Canada, about 60 per cent of capital of manufacturing, mining and smelting, and petroleum and gas industries was subject to foreign control in 1963.

some degree of public resentment because Canadians are afraid that they may lose their cultural and political identity as a result of the economy's dependence on the foreign capital.¹⁵ Third, although Canada basically represents British and French cultures, the signs of foreign cultures are visible in almost all aspects of the Canadian life.

This conglomerate of cultures in Canada and other reasons just outlined make this research study of the Canadian environment interesting, timely and significant. The subject of obsolescence is relatively new and needs to be explored so that adequate efforts can be made to avoid its adverse effects.

It is necessary to recognize that findings from this research study are limited to individual responses of managers from the participating firms. Since characteristics of managers may vary from one person to another, from one functional area of business to another, from one firm to another and from one industry to another, it is impossible to determine the precise nature of the

¹⁵See, W. Eric Harris, Canada's Last Chance (Toronto, 1970).

universe. This difficulty severely limits the drawing of inferences about the universe on the basis of the sample findings. Nevertheless, the study is useful in indicating the extent of the problem of obsolescence, in developing a research approach that may be usable on a broader scale, and in pointing out further research needs on the subject.

Research Hypotheses

There is lack of understanding and application of management techniques and concepts in Canada. The Canadian manager does not have good understanding of the new knowledge in the field of business management; as a result, this new knowledge is not applied by the manager in his business activities.

Very few efforts are being made in Canada to update managerial understanding, approaches and methods.

Basic Assumptions

This research study is based on several assumptions. One of the assumptions is that the organization's performance is largely dependent on the abilities of its

management. Since management is an organizational phenomenon, managerial obsolescence would show itself in the development and relative performance of the organization.

Therefore, in order to detect the problem of managerial obsolescence or to build an index of managerial obsolescence, the organization's performance or productivity must be studied, measured, or indexed. However, any measure of productivity would be a fruitless effort because there are many other factors which also affect the productivity --for example, size of the organization, nature of business, competition, the general economic condition of the nation, and the nation's monetary and fiscal policies.

Also, it is a fact that the business firm may become obsolete even though it has been able to maintain the same rate of productivity year after year, for obsolescence is a comparative factor; only when compared to organizations with a higher rate of productivity does an organization appear obsolete. Hence, a measurement of the productivity of one company alone would not indicate the extent of managerial obsolescence in that company.

It is, therefore, necessary to measure something other than productivity in order to detect the extent of managerial obsolescence in any organization.

Since the productivity of organizations of the same size and industry would be expected to be the same, any difference in productivity may appear to result from the differences in the levels of the technical competence of their managers.¹⁵ The levels of the technical competence of managers of two different organizations could become wider apart if one organization makes sufficient efforts to keep its managers upto date in a changing environment while the other organization stands still. This could eventually result in higher productivity for the organization which has been flexible and adaptable to its environment.

Based on this fact, it would be safe to assume that the organizations which have been most progressive, most productive and most successful do have managers who have maintained their technical competence at higher levels

¹⁵The term "technical competence" is used to refer to the knowledge required of a manager so that he can efficiently and effectively carry out his activities. This knowledge could have been acquired by the managers through formal education, work experience, special training or through any other means. See, Theos A. Langlie, "Executive Appraisal: Diagnostic Performance Appraisal," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), p. 191.

than their counterparts in less successful firms. Unless this is true, it is very unlikely that the successful organizations would be able to maintain their positions in their respective industries or in the economy.

Thus, it would be appropriate to assume that the managers of the most successful firms--or the top firms by assets, by annual sales and/or by net earnings--are better qualified to indicate the importance of most of the new management techniques and concepts as related to various business functional areas, such as finance, accounting, marketing, and others. Once this importance is determined, each technique or concept may be assigned numbers or weights in terms of its importance. An index or a scale, then, can be developed which would indicate the extent of the obsolescence problem on the basis of the manager's technical competence. This index or scale can be used by any organization or individual to detect obsolescence; this can be accomplished by measuring the technological level and comparing it with the standards established by the index.

At this point, it should be noted that the technology is not the only factor that brings about the problem

of obsolescence. There are many psychological, physiological and organizational factors which also cause obsolescence. Although these causes will be briefly discussed later on, they will not be emphasized as each cause necessitates a separate research undertaking.

Research Methodology

This research study is based on published literature and empirical surveys. In order to accomplish the purposes of establishing relative importance and managerial understanding of management techniques and concepts, it was necessary to investigate the published literature and to undertake empirical surveys.

A depth investigation of the literature was made first in relation to managerial obsolescence and then in relation to management techniques and concepts. Many books, newspapers, periodicals, indexes, dissertations, research studies, and other source materials were studied. In the literature, no specific ways to measure obsolescence were found; also, relative importance of management techniques and concepts was found to vary from one writer to another. In most cases, the importance was found to be

more general and less specific in relation to functional areas of business. However, the literature did indicate the need for empirical investigations and did provide some guidelines for such investigations.

The research study originally began in the Spring semester of 1967 when the researcher undertook a project with one of his classmates to determine whether or not management obsolescence could be measured. In this initial survey, a questionnaire (See Appendix A) was used and a limited number of managers in the Dallas-Fort Worth area were interviewed.

Because of lack of time and funds, the subject was not thoroughly investigated. It was found, however, in the survey that managerial obsolescence could be measured, provided the importance of techniques and concepts were determined through some means. The study also suggested that self-evaluation by the manager would be sufficient for the purpose of making a rough determination of his understanding of management tools and techniques. One additional point observed in the survey was that a higher degree of response on the questionnaire was received from the organizations which had one of their members assisting

in the survey in terms of distributing and collecting questionnaires than from managers who received the questionnaire directly from the researchers. As the project generated a considerable degree of interest then, the researcher decided to undertake the current research to pursue the study of the subject further.

Based on the findings of the 1967 project, a tentative decision was made regarding the appropriateness of the questionnaire survey for this dissertation project. Before the final decision on the method was made, the individuals and organizations listed in Appendix B were contacted for suggestions on the research method.

Several suggestions on the method of obtaining data were received. Some of the suggestions can be summed up as follows:

Information can probably be secured either by written questionnaires or by personnel interviews, or a combination of both.¹⁶

¹⁶Letter from a member of Industrial Relations Counselors, Inc., New York, February 13, 1969.

The most suitable method to undertake the project I would think, is by personal interview, although I doubt this is the most practical approach particularly if you intend to cover the whole Canada.¹⁷

From a logistics problem I would expect that questionnaires are your only available means, unless you can obtain a financial grant for personal interviews.¹⁸

Many survey techniques could possibly be used to collect data for the study: questionnaires, personal interviews, telephone interviews, observation, panel study, and many others. However, since no financial aid was made available, the researcher found it necessary to rely upon questionnaires as the primary means of obtaining the necessary information.

The next step in the research was the development of the questionnaires which would obtain personal information about the respondents, determine the importance of management techniques and concepts, and evaluate the manager's understanding of these techniques and concepts.

¹⁷Letter from a director of Atlantic Region Work Study Center, Halifax, N. S., December 30, 1968.

¹⁸Letter from a director of Canadian Management Center of the American Management Association, Inc., Montreal, December 16, 1968.

Two separate questionnaires were designed to achieve the objectives of the study. To measure the effectiveness of the questionnaires, a pilot study was made which involved about 30 managers of two organizations in the Moncton area; nine of these managers were later interviewed informally. The questionnaires were also shown to some of the researcher's colleagues for their comments, and various aspects of the questionnaires were informally discussed with them. In addition, the questionnaires were sent to the individuals who responded to the initial inquiry of the researcher concerning the importance of the study and the appropriateness of the research methodology.

Generally, almost all individuals found the questionnaire simple to understand. Many individuals indicated that the questionnaires were adequate for the purpose of the study. A member of the Applied Arts and Technology Branch of Ontario Department of Education stated that both questionnaires were "most complete" and ". . . the questions should yield valuable data."¹⁹ A member of

¹⁹Letter from a member of Ontario Department of Education, Toronto, Ontario, April 25, 1969.

Operations Research Division, Bureau of Management Consulting Services, Public Service Commission of Canada, also found the questionnaires quite adequate and good for the purpose of this study.²⁰ Of all the individuals included in the pilot study, only two in the Moncton area had encountered some difficulties with the names of a few techniques; but on the basis of discussion with them, it was concluded that their difficulties were due to their lack of familiarity with the techniques.

On the basis of the findings of the pilot study, the questionnaires were revised; the changes made were of very minor nature. Finally, the questionnaires shown in Appendices E and F were used in the major investigations of this study. One of the questionnaires was sent to 66 different firms and the other was sent to 282 other business firms. The description of the questionnaires and the selection of the firms will be discussed in detail in the following chapters.

Altogether 688 questionnaires were received over a period of four months. The data were compiled manually

²⁰Letter from a member of Public Service Commission, Ottawa, April 29, 1969.

and electronically and were analyzed statistically.

Definitions of Terms

"Management" is one of the most frequently used terms in this study. The term is used in a broad sense throughout the study and includes all individuals of a firm who directly or indirectly manage or help others to manage; the term includes managers at all levels of the management hierarchy and those who assist managers in a staff capacity.

The term "obsolescence" in the study refers to the state of knowledge which is outdated, inadequate or insufficient for carrying out business activities in the current economic environment. It refers to the technical competence of the manager including outdated, inadequate or uneconomic skills, abilities, practices, procedures, approaches and methods.

Order of Presentation

The sequence of the remaining chapters of this study is as follows: Chapter II presents a general discussion of managerial obsolescence including meanings, causes, preventive measures, consequences and identification of

of obsolescence; Chapter III presents a brief discussion of management activities in each of the functional areas of business and techniques which may be useful to the manager; Chapter IV discusses the significance of management techniques and concepts to each of the functional areas as it is viewed by the respondents in the survey; Chapter V discusses the survey results concerned with the understanding and application of management techniques and with the extent of managerial obsolescence; and Chapter VI presents a summary of this research and highlights the major findings and implications of the study.

CHAPTER II

MANAGERIAL OBSOLESCENCE

In order to explore the problem of managerial obsolescence, it is necessary to investigate the literature on the subject and to explore many aspects of managerial obsolescence. This chapter presents significant aspects of managerial obsolescence including meanings, causes, preventive measures and identification of obsolescence.

Meanings of Obsolescence

In the literature, the term "managerial obsolescence" has been defined in many different ways. According to Gershenfeld, the term refers to managers ". . . who have (a) no skills useful in today's market or (b) failed to acquire skills, tools, and attitudes required for changes in production and processing operation."¹ Wytmar regards managerial obsolescence as decay in management and explains it as ". . . a creeping, pernicious envelopment that saps the strength, vitality, and creativity of an organization;"²

¹Walter J. Gershenfeld, "What is the Problem Concerning Obsolescence of Managerial Personnel?" Personnel Administration, XXIX (September-October, 1966), 17.

²Richard J. Wytmar, "Management Obsolescence," Personnel Administrator, XI (January, 1966), 35.

he further describes it as ". . . an unhealthy combination of attitudes, philosophies, procedures and understandings that block enlightened response to the competitive environment."³ As stated by Jacobs, "management obsolescence is . . . 'the difference between the practicing manager's knowledge of the current state of conceptual thinking and the current state of conceptual development in the field of professional management.'"⁴ According to Marshall, an obsolete individual is one who has failed to keep abreast of new knowledge in his field and who ". . . suffers from the ignorance of the vast amounts of new information which are continually created and hence, which are unavailable to him in the solution of new problems."⁵

Mahler defines managerial obsolescence as ". . . the failure of a once capable manager to achieve results that are currently expected of him."⁶ He identifies the following six types of obsolescence:

³Ibid.

⁴Thomas L. Jacobs, "Combating Managerial Obsolescence," Business Horizons, XII (October, 1969), 59-60.

⁵W. R. Marshall, Jr., "Educators Get Obsolete Too," Chemical Engineering Progress, LIX (October, 1963), 19.

⁶Walter R. Mahler, "Every Company's Problem: Managerial Obsolescence," Personnel, XLII (July, 1965), 8.

Abrupt obsolescence occurs when an innovation, such as the introduction of a computer, eliminates or drastically changes a manager's job.

Creeping obsolescence comes about when the nature of the job slowly ossifies--develops "hardening of the managerial arteries."

Pseudo obsolescence applies to the lay-off of a large number of managers at one time.

Ability obsolescence means that a manager's abilities, his skills, are no longer sufficient for him to keep up with past job demands, let alone meet new ones.

Attitudinal obsolescence is a manager's failure to maintain the necessary flexibility in attitude and approach to changing problems and conditions. Such a manager is usually described as rigid, inflexible, set in his ways.

Industrial obsolescence. This type of obsolescence is broader than that of any individual manager; it is the obsolescence of an entire industry.⁷

There are other definitions of managerial obsolescence. Generally, the meaning is related to the individual's technical competence which is likely to be less than satisfactory if he does not possess the technical knowledge necessary to perform tasks efficiently and effectively in the current environment. Furthermore, the meaning is usually related to the individual's state of knowledge

⁷Ibid., 8-10.

which is inadequate, insufficient or non-current; because of his state of knowledge, his performance would be most likely unsatisfactory in comparison with the performance of another individual whose knowledge is adequate, sufficient, and current. Since obsolescence is a relative rather than an absolute concept, only when the individual's technical knowledge or competence is compared with the knowledge or competence which is most essential and required in the current environment, does an individual appear obsolete.

In brief, managerial obsolescence may be regarded in a similar manner as that of plants and equipments. Plants and equipments are considered obsolete when they do not function economically or are outdated and can be replaced with modern and efficient plants and equipments. Similarly, there is a vast amount of knowledge, which is relatively new and which can be most useful to the manager in his day-to-day decision-making and in overcoming business problems of the present economic environment; if the manager fails to understand this development in his field and fails to apply this knowledge in his business activities, he is nothing but obsolete because his performance

would be inefficient, ineffective, uneconomic, and generally unsatisfactory. Whether or not his unsatisfactory performance is a result of ". . . malfunctioning, aging, neglect, displacement, or other factors is irrelevant."⁸

Causes of Obsolescence

Many factors contribute to the problem of managerial obsolescence, some of which are apparent in the preceding discussion. Most of these factors are either personal, organizational or environmental.

One of the major factors is the lack of efforts by the individual to remain up to date in his technical knowledge and training beyond the initial period of education and training. Although the individual may have good initial education and training, the neglect of it by him in the following years can cause him to become obsolete. This point is illustrated by Jacobs, who shows how a college graduate slowly becomes obsolete beyond his college years as he gradually lags behind in his reading program and conceptual development.⁹ Frank points out

⁸Frederick C. Haas, Executive Obsolescence, The American Management Association Research Study Number 90 (New York, 1968), p. 10.

⁹Thomas Jacobs, op. cit., 58-60.

that the individuals generally "stop learning new ideas and new techniques virtually the day they step off campus. Beyond the initial practical experience in which they may apply some of the skills acquired in classrooms, they appear to use progressively less of their training."¹⁰

In addition to neglect of education, advancing age of the individual may cause his effectiveness to deteriorate. In his study, Haas found no definite trend of obsolescence relative to age; however, most of the participating firms in his survey reported that the problem was much more acute among the individuals who were around 50 years of age or over.¹¹ Perhaps the relationship between the problem of obsolescence and age can be understood by evaluating life patterns of the individual. As summarized by Haas, the individual generally shows different concerns at different intervals in his life:

Between 20 and 30 years of age he establishes his social identity and therefore makes a number of major decisions about his life pattern, such

¹⁰George Frank, "The Menace of Management Obsolescence," The Personnel Job in Changing World, edited by Jerome W. Blood, The American Management Association Research Study Number 80 (New York, 1964), p. 206.

¹¹Haas, op. cit., pp. 21-22, 32-33.

as selecting his job, his wife, and the community in which he lives. During the next decade--between the ages of 30 and 40--he is busy achieving occupational success. He has fewer doubts and anxieties and a strong feeling of identity, especially identity with the organization for which he works.

When a man is in his forties his personal goals become more important. He may experience conflict between his own goals and those of the organization and want to change his role or job. Or he may see the organization's goals in broader perspective and direct some of his energies away from the job and into civic activities. Above all, a man in his forties may experience anxiety and maladjustment.

But other types of problems come during the next decade. After he reaches his fifties, a man has to work harder to maintain his position. He has less energy; he is not alert; and he must exert himself more to maintain his former level of competence.¹²

In general, there seems to be less evidence of the relationship between the obsolescence problem and age of up to 50 years, but beyond or about 50 years of age, lack of energies and other physical abilities seems to be one of the causes of obsolescence.

There are other personal traits which may bring about individual obsolescence. They can be listed as follows: a

¹²Ibid., p. 32-33.

negative attitude, inflexibility, cynicism, excessive egotism, indecisiveness, and undue concern about competition from his fellows.¹³

In addition to personal factors, very often organizational and environmental forces may cause the manager to become obsolete. Lack of communication in the organization or the concentration of decisions in one man could cause managerial obsolescence.¹⁴ Wytmar believes lack of leadership in the firm as the basic cause of obsolescence; this lack of leadership may be manifested in complacency, fear, insensitivity, autocratic leadership.¹⁵ Other contributing factors to a manager's decline, according to Wytmar¹⁶ and Schoderbek and Bryant,¹⁷ are insufficient financial rewards, too much responsibility without adequate authority, politics, more emphasis on routines and procedures and not enough on creativity and innovation, and organizational structure.

¹³"What Makes Managers Obsolete?" The Iron Age, CXCIV (August 13, 1964), 51.

¹⁴Ibid.

¹⁵R. J. Wytmar, op. cit., 35.

¹⁶Ibid.

¹⁷Peter Schoderbek and Lynn Bryant, "Executive Dropout," Personnel Administration, XXXI (September, 1968), 47.

Although personal and organizational causes of obsolescence can be controlled by the individual and the organization, the environmental factors are beyond individual control.

One such factor largely responsible for the problem of obsolescence is continuous and rapid scientific and technological progress in the environment. The progress in science and technology is so rapid and frequent that it is almost impossible for any individual to keep up with. The problem is further made difficult by constant social, political, economic and international developments. These and other environmental forces add to the complexity of doing business and often bring about individual, organizational, and/or industrial obsolescence.

Thus, in general, as Weigler has indicated, obsolescence results from a) physical and mental deterioration, b) process or system inadequacy or outdatedness and c) growing complexity in the mechanics of doing business.¹⁸

¹⁸Lester J. Weigle, "Growing Problem of Executive Obsolescence," Dun's Review and Modern Industry, LXXXIII (April, 1964), 39.

Prevention of Obsolescence

The causes of obsolescence very often suggest the remedial measures which must be taken by the individual, the organization and the industry. As most writers suggest, largely the responsibility for preventing obsolescence lies in the hands of management.

Management can eliminate, or at least reduce, the problem of obsolescence in several ways. Weigle provides managerial guidelines for preventing obsolescence and for minimizing the effect of changes: a) promote individuals in the organization on the basis of ability rather than seniority; b) expand the experience of outstanding young people; c) give individuals very challenging assignments; d) avoid specialization of individuals in a particular method, job, task or assignment; e) do not let managerial personnel or staff be in specific responsible positions for long time; f) develop an atmosphere and attitude of questioning current business practices; g) encourage new ideas and approaches to problems; h) encourage new members to question traditions without ridiculing them or punishing them; i) allow individuals to make errors in

judgments without fear of punishment.¹⁹

According to Schoderbek and Bryant, the realistic setting of goals and objectives for the manager, the development of interpersonal communication, the development of "super-generalists" rather than specialists, and the continuous education and training of individuals could prevent obsolescence of managers.²⁰ They write:

Methods currently employed to check incipient dropout-itis from developing are the realistic setting of objectives, the re-education of executives, the training of super-generalists instead of over-specialists, the understanding of motivational needs, and the development of interpersonal communications. It is to be hoped that as these techniques, and others to be developed, are increasingly employed, the effectiveness of executives will be maintained.²¹

The effectiveness of managers can be obtained and maintained, suggests Drucker, if managers are encouraged to apply continuously knowledge in terms of concepts, ideas and theories so that managerial knowledge could become more productive.²² To make knowledge productive, it

¹⁹Ibid., 69.

²⁰Schoderbek and Bryant, op. cit., 49-51.

²¹Ibid., 52.

²²Peter F. Drucker, "Management's New Role," Harvard Business Review, XLVII (November-December, 1969), 52-53.

may be necessary that management make changes in

job structure, careers, and organizations as drastic as those which resulted in the factory from the application of scientific management to manual work. The entrance job will, above all, have to be changed drastically to enable the knowledge worker to become productive. For it is abundantly clear that knowledge cannot be productive unless the worker finds out who he himself is, what kind of work he is fitted for, and how he works best.²³

In addition to making necessary changes, management must create an environment which would make business life enjoyable and encourage individuals to be concerned with the firm's success as well as their own; this environment coupled with encouragement to undertake physical exercises and extra-curricular activities likely would prevent physical and mental deterioration.²⁴

The responsibility of preventing obsolescence is not limited only to management or to the organization. The individual also must share the responsibility and undertake measures to prevent personal obsolescence.

²³Ibid., 53.

²⁴Thomas R. Brooks, "Mid-Career Slump--The Unspoken Threat," Dun's Review and Modern Industry, LXXXIV (November, 1964), 114.

The individual, today more than ever before, must work hard and be alert to keep abreast of the times and to prepare for tomorrow.²⁵ Furthermore, he must learn to be a better evaluator of his and his organization's present and future needs; he must acquire skills to make decisions without the guidance of his superiors; he must constantly think about change, and above all, he must not stand still.²⁶ Various writers suggest other measures of preventing obsolescence; but all these measures are directly or indirectly implied in the preceding discussion and, therefore, are not investigated further.

One measure of preventing obsolescence, which is frequently mentioned by most writers, is continuous education and training of managers and their active participation in educational and training programs. The programs should be generally directed for training individuals for managerial positions or for improving the

²⁵Harwood F. Merrill, "Watch Out for Personal Obsolescence," Management News, XXXVIII (December, 1965), 6.

²⁶Ibid.

efficiency and effectiveness of managerial performance. As found by the American Institute for Research in its study of top management development and succession, the special education programs of many U. S. business firms for upper management are basically directed at "building strength on strength and not repairing weaknesses;" these programs involve the broadening concept.²⁷

A variety of programs can be undertaken to achieve the basic purposes. Most commonly mentioned programs include: job rotating assignments, correspondence courses, formal schooling at colleges and universities, company organized schools, seminars, conferences, workshops, and lectures by educators and leading businessmen.

Before any measure of preventing obsolescence becomes effective, it is most essential, according to Weigle, that management and the individual develop an attitude and a willingness to take action.²⁸ There must be a conscious recognition of the problem; otherwise, a

²⁷Albert S. Glickman and others, Top Management Development and Succession, An Exploratory Study (New York, 1968), p. 11.

²⁸Weigle, op. cit., 69.

measure would fail to produce desired results and the problem of obsolescence would remain unresolved.

Consequences of Obsolescence

The inability or the failure to overcome the problem or the neglect of the problem have many undesirable consequences. Brooks states: "Where it is ignored, not only might a man crack up, the company suffers. Morale becomes low, and a good man is likely to leave at the first opportunity."²⁹ Gershenfeld sees the importance and seriousness of the problem at three different levels:

First, it raises questions for the economy as a whole. Recognition that the quality of human capital is directly correlated with the quality of life in a society demands national attention to the problem of managerial obsolescence. At the other end of the scale, managerial obsolescence can mean the end of line for the individual. Questions of individual responsibility and indeed even of mental health under conditions of stress come to the fore when we analyze the problem from the viewpoint of the individual. Finally, we come to the impact of managerial obsolescence on the organization.³⁰

²⁹Thomas Brooks, op. cit., 39.

³⁰Walter J. Gershenfeld, op. cit., 17.

The impact of obsolescence on the organization is quite obvious. Because of obsolescence, the organization is likely to have inefficiency and ineffectiveness which would result into higher costs, lower profits, poor growth, and perhaps nonexistence; the organization is likely to encounter poor morale, employee dissatisfaction and disloyalty and possibly separation.³¹

Although the consequences of obsolescence are serious for any society or economy, it is perhaps much more serious for the Canadian economy. As Brownridge of American Motors (Canada) Limited asserts, Canada is a small country and this puts her into a disadvantageous position to compete successfully with larger nations, particularly with the United States.³² As a result, he further comments, Canadians must work hard and be productive more than anyone else in order to take advantage of unlimited opportunities in Canada; and to benefit from the available opportunities, the Canadian manager must learn and utilize knowledge which would increase

³¹Ibid.

³²E. K. Brownridge, "The Challenge to Canadian Management," Advanced Management Journal, XXX (July, 1965), 74-78.

efficiency and effectiveness in business management.³³

The need for higher efficiency and effectiveness was indicated in a 1968 report of the Economic Council of Canada; the total national income of Canada from 1950 to 1962 increased at the rate of 3.8 per cent per year, but the increase in growth was relatively inefficient.³⁴ The report states that ". . . the underlying sources of economic growth reveals that such growth in Canada was not achieved very efficiently."³⁵ It further states:

Roughly two-thirds of Canada's rate of growth in total National Income from 1950 to 1962 can be attributed to massive infusion of labour and capital; only about one-third can be attributed to factor productivity--that is, to gains in the efficiency with which labour and capital were combined in production processes.³⁶

³³Ibid.

³⁴Economic Council of Canada, The Challenge of Growth and Change, Fifth Annual Review (Ottawa, 1968), pp. 7-28.

³⁵Ibid., p. 8.

³⁶Ibid.

In contrast, the report indicates, the efficiency of other nations, especially that of European nations, has increased during this period; and Canada thus occupies an undesirable position in the world trade.³⁷

Also, because of lack of efficiency and effectiveness of the Canadian managers, foreign control of the Canadian economy seems to have increased. In 1963, Canadian manufacturing was more than 50 per cent owned by foreigners; mining and smelting was 62 per cent foreign-owned; petroleum and natural gas industry was 64 per cent owned by foreigners; capital subject to foreign control was about 60 per cent or more in each of these industries.³⁸ As a result of this foreign economic control, it is very likely that the Canadians may be subjected to political, social and cultural pressures by foreigners.

Therefore, management obsolescence must be overcome in order to avoid the social, political and economic consequences of the problem.

³⁷Ibid., pp. 7-28.

³⁸Canada Year Book (1968) (Ottawa, 1968), p. 1087.

Identification of Obsolescence

Before any efforts can be made to overcome the problem of obsolescence, it is first necessary for the individual or the organization to become aware of the problem; obsolescence must then be identified and its seriousness must be measured.

Although many symptoms of obsolescence have been indicated in the literature, there appears to be lack of systematic approaches by which the problem is identified and studied. In his study, Haas found that some organizations were making efforts to identify the problem by such methods as performance appraisal, generally based in terms of profits; performance evaluation in relation to the past performance; the study of evidence which suggest managerial failure to use new methods; and the audit of managers through various information and psychological and physical examinations.³⁹

³⁹Frederick Haas, op. cit., pp. 11-13.

There is no definite evidence available on the methods used by the individual to determine whether or not he is becoming obsolete. There are, however, many guidelines which he or the organization may follow. The individual can consider himself in the process of becoming obsolete if he is less inclined toward new and rigorous solutions to problems, if he has forgotten much of what he learned in school, if he finds difficulty in understanding new papers in his field, if he finds his work assignments difficult or impossible, or if his competitors come up with new ideas and products and he finds himself wondering why he could not come up with these ideas and products.⁴⁰ There are other symptoms of obsolescence which may be useful in identifying the problem.

⁴⁰Cecil H. Chilton, "What Do You Mean, 'Obsolete'?" Chemical Engineering Progress, LIX (October, 1963), 14.

The following paragraphs from Dun's Review highlight some symptoms of obsolescence:

The mid-career slump . . . starts at the point where physical and nervous capacity begins to worry a man. "He tires more easily; pressures affect him more; his virility wanes. He gets introspective, and his concern with himself slows him up on the job. If he thinks he's achieved his goals, then he asks, 'Why didn't I exceed them.' If he hasn't, then he thinks, 'I'm a failure.' Naturally, a man is reluctant to blame himself, so he becomes critical of others, his business associates, particularly his bosses. He also loses . . . 'loyalty to his heroes.' This brings him into some conflict with his company, the people who run it, associates, even friends if they have achieved greater success than he."

Dr. Karl A. Menninger, a founder of the Menninger Foundation, gives the classic description of melancholia that so closely parallels the mid-career blues: "The first symptoms of depression are usually a slight reduction in energy, a mild tendency to inactivity, a suggestion of undue preoccupation, a little disturbance of sleep; later of loss of weight and appetite, a suggestion of restlessness or irritability and a loss of interest in things. Obsessive worry and especially a preoccupation with some real or imaginary physical symptom are common. Later come feelings of inadequacy, uselessness, futility. . . ." ⁴¹

Another symptom is the tendency to minimize the importance or value of new techniques, ideas, concepts and approaches. ⁴²

⁴¹Brooks, op. cit., 114.

⁴²Bill Hodson, "Success or Obsolescence--Are You at the Crossroads?" Factory, CXXIII (August, 1965), 81.

The tendency to minimize the value of new techniques, concepts, ideas and approaches generally results from lack of understanding. Because of inadequate understanding, the individual tends to shy away from the application of new knowledge. As a result, his performance becomes unsatisfactory.

Since an individual's performance depends on his skills, abilities, tools, techniques, and attitudes, it is possible to detect approximately his level of obsolescence by evaluating his understanding of techniques, concepts, approaches and procedures useful in the current economic environment. But, before his understanding may be evaluated, it is necessary to examine his managerial functions and activities and determine techniques and concepts useful to his job. The next chapter deals with the functions of managers and suggests some specific techniques and concepts which may be useful for those functions.

CHAPTER III

MANAGERIAL FUNCTIONS AND TECHNIQUES

Since the purpose of this research study is to evaluate the level of management obsolescence on the basis of the significance and understanding of management techniques, it is necessary to examine managerial functions generally carried out in a typical business firm and techniques useful to those functions. This chapter presents a general discussion of management functions and techniques.

Managerial Functions

Management functions in any organization are largely focused on the primary organizational objective of getting things done through people as efficiently and effectively as possible. To attain the objective, the managing process takes the form of a three-step cycle: a) the establishment of goals and objectives, b) the directing of people and activities to achieve the goals and objectives and c) the measurement of results.¹

¹H. B. Maynard, "Management and Managing," Top Management Handbook, edited by H. B. Maynard (New York, 1960), p. 22.

Maynard states:

The manager must first determine what he wishes to have done. Then he must organize his people and direct them so that they do it. Finally, he must measure the results to determine how well his original goals were achieved. Often this measurement, or evaluation step, results in the establishing of new objectives. These in turn he seeks to attain by proper direction of others. In due course, he measures what has been accomplished, which again leads to the establishing of still further objectives. Thus the managing process is a continuous repetition of the three step. It goes on and on and is never finished.²

If these steps are carefully examined, it becomes apparent that management functions include planning, organizing, directing, coordinating, controlling, motivating, and communicating. Dale points out seven basic functions of management: planning (forecasting), organization, staffing, direction, control, innovation, and representation.³ Albers perceives managerial functions almost the same as Dale, but he considers planning, communication and motivation as the basic elements of managerial action.⁴ Similarly, Katz sees management functions as

²Ibid., p. 23.

³Ernest Dale, Management Theory and Practice (New York, 1965), pp. 225-580.

⁴Henry H. Albers, Principles of Management (New York, 1969), pp. 317-625.

those ACTIVITIES and SKILLS involved in RELATING TOGETHER: (1) the requirements of the ENVIRONMENT in which the manager operates; (2) the RESOURCES available to that manager; and (3) the capabilities, demands and behavioral tolerances of the persons with whom he deals.⁵

A careful analysis of the management functions mentioned by Maynard, Dale, Albers and Katz reveals that most of the functions are basically the same; essentially, they all refer to getting work done through people to achieve organizational goals and objectives. Most of the functions are common to all managerial positions-- to all levels of the management hierarchy, to all departments, divisions or branches in the organization, even though the nature of activities may differ significantly from one area of the firm to another. The scope of the functions, however, would vary from one level to another or from one area to another, depending on the meaning of the terms "environment," "resources" and "people."⁶ The scope usually becomes broader and broader at each higher level of management; the scope would be narrower at the "departmental" level than what it would

⁵Robert Katz, "The General Management Functions," Mimeograph, 1965, p. 1.

⁶Ibid.

be at the "divisional" level. The scope of the functions becomes further apparent by considering the activities of each of the functional areas in which the management carries out its specific responsibilities.

Functional Areas

For the sake of efficiency and effectiveness, managerial responsibilities are normally divided and limited to specific areas of business operations. Managers are generally held responsible for operations and activities of their areas; and within the context of their areas, they are expected to carry out managerial functions of planning, organizing, coordinating, controlling, communicating, directing, and motivating.

Areas of business operations may differ from one organization to another or from one industry to another; however, there are some functional areas of business which are usually found in most organizations. Fayol points out six such areas: technical, commercial, financial, security, accounting, and managerial.⁷

⁷Henri Fayol, General and Industrial Management (London, 1949), p. 3.

Most writers mention production, sales and finance at least as three basic areas which are part of the business organization. Weimer outlines major business operations in terms of marketing, production, finance, personnel and organizational behavior, transportation, research and development and international operations.⁸ In this study, seven areas are considered essential for business operations even though they may not be distinct in all business organizations. These areas are: marketing and sales, finance and accounting, production, purchasing, research and development, personnel and industrial relations, and administration.⁹

The importance given each area in the enterprise may vary from one organization to another or from one industry to another. Albers writes: "Although some functions occupy an important hierarchical position in almost every organization, a wide diversity can be found in the status accorded particular functions."¹⁰ Irrespective of the importance given, many business operations

⁸Arthur M. Weimer, Business Administration (Homewood, Ill., 1966), pp. 351-571.

⁹"Administration" is not generally considered a functional area, but it is regarded as such in order to differentiate it from the other areas.

¹⁰Henry H. Albers, op. cit., p. 128.

and activities are carried out in each of the seven areas. Operations and activities of each area are briefly discussed in the following pages.

Marketing and Sales--Major operations and activities of the Marketing and Sales area are very important to the organization and they are primarily concerned with directing and encouraging "the flow of goods from producer to consumer or user."¹¹ The operations and activities of this area are not limited only to selling of goods and services; they also include determining what is to be produced, when it is to be produced, and at what price and how it is to be offered. Furthermore, efforts are made by members of this area in gathering information related to future demands, new products, competition, market potentials, and new ideas. According to Maynard, among the major and minor tasks of members of this area are: marketing research, including market analysis, product requirements and determination, and analysis of distribution problems; advertising, including campaign planning, copy preparation, media selection, and

¹¹Maynard, op. cit., p. 15.

production; sales promotion, including program development and sales aids; sales planning, including sales policies, budgeting, pricing, buying, and packaging; sales operations, including salesmen procurement, salesmen training, salesmen direction, salesmen compensation, order service and selling; and physical distribution, including warehousing, shipping, and product service.¹² Almost all of these tasks are stressed by Weimer¹³ and Beckman and Davidson.¹⁴

Finance and Accounting--Although the activities and operations of the Marketing and Sales are significant to the organization, they cannot undermine the importance of activities and operations carried out by members of the Finance and Accounting area. The Finance and Accounting area basically has responsibilities to "plan, direct, and measure the results of company monetary operations."¹⁵ In this area the responsibilities and

¹²Ibid., p. 18.

¹³Theodore N. Beckman and William R. Davidson, Marketing, Eighth Edition (New York, 1967).

¹⁴Weimer, op. cit., pp. 351-382.

¹⁵Maynard, op. cit., p. 15.

obligations are carried out through the maintenance of financial records, through financial planning, through the analysis of business activities in financial terms, through the financial control, and through other activities such as management of cash, receipts and disbursements of capital funds, budgeting, credit and collection, management of taxes, insurance, internal auditing, design of systems and procedures, financial relations and policies.¹⁶ Almost all of these activities and operations are also stressed by Weston and Brigham.¹⁷

Production--The activities and operations of the Production area are important to the business firm, as are those of the Marketing and Sales and of the Finance and Accounting area. The primary concern of the Production area is with the supply side of business and the area's major responsibilities are to provide form, time and place utilities in the output of the firm as economically as possible.¹⁸ Essentially, the problems generally faced by this area concern questions such as

¹⁶Ibid., p. 19.

¹⁷J. Fred Weston and Eugene F. Brigham, Managerial Finance, 2nd Edition (New York, 1966), Chapter 1.

¹⁸Howard L. Timms, The Production Function in Business (Homewood, Ill., 1966), p. 384.

"what is to be produced, how much, for whom, at what rate, by what methods, and at what costs."¹⁹ After these questions have been answered, the inputs are acquired and converted into output at the lowest possible cost at a given point in time. Thus, major activities of the Production area include: product and process planning; acquisition of plants, equipments, raw materials, other types of materials, and people; processing of materials through different production stages; quality controls; repairs and maintenance of plants and equipments.²⁰ These major activities and operations require many additional "minor" activities such as methods study, work measurement, material handling, purchase and production expediting, traffic, factory shipping, performance appraisal, dispatching, storeskeeping, inspection of materials and testing.²¹

Purchasing--Among the activities and operations of the Production area just outlined was purchasing. The

¹⁹Weimer, op. cit., p. 384.

²⁰Maynard, op. cit., p. 17.

²¹Ibid.

area of Purchasing is either fused together with the Production area or it is kept autonomous; in either case, this area is very significant. Almost all the activities and operations of this area are primarily concerned with the acquisition of inputs such as materials, goods, and services. As a result, this area has responsibilities of finding sellers who can supply the necessary materials, goods and services on time at the lowest possible price. The Purchasing area further has responsibilities to check that purchases meet specifications and quality standards and they are available on time to meet productions schedules and other needs. In addition, members of this area must make certain that services provided by suppliers are prompt and adequate; also, they have to be certain that items are stocked in sufficient amounts in accordance with the periodic requirements, and storage and carrying costs.²² In order to fulfill their responsibilities and obligations, members of this area have to deal frequently with matters related to the selection of vendor, price

²²Paul V. Farrell, "Purchasing," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 791-795.

negotiations with the supplier, quality negotiations, delivery time, quality control, inventory management, purchase research, purchase records, transportation, search for alternate materials and processes, product features, and others.²³ Maynard also lists the preceding matters related to the Purchasing area.²⁴

Research and Development--Similar to the activities and operations of the Purchasing area, activities and operations of the Research and Development area may be integrated with the Production area or they may be carried out by an autonomous unit in the organization; or the R & D area may be part of the Marketing and Sales area. In any case, the primary activities of this area are related to basic and applied research and they are directed to promoting scientific knowledge and to finding industrial and commercial applications of this knowledge. The activities of this area include: development of new products, improvement of existing products, development of new manufacturing processes, improvement of the existing processes, product design, search for new applications

²³Ibid.

²⁴Maynard, op. cit., p. 17.

of existing products and processes, cost reduction,
and sales assistance.²⁵

Personnel and Industrial Relations--Another area that may not be distinct in a business firm is Personnel and Industrial Relations. Although the area may not be visible, activities and operations related to this area are common to almost all organizations. The primary concern of this area is with human resources; therefore, activities of this area relate to planning, obtaining, developing and controlling of people. In addition, the Personnel and Industrial Relations area has responsibilities of gathering information concerning what individual skills are available, where they are located, what they are doing, how they can be improved, and when they could be reassigned. Specifically, this area deals with such problems as

(1) attracting people to the organization, (2) training and developing them, (3) directing their decisions and activities through the proper exercise of authority and by means of effective

²⁵Ibid., p. 16.

communications, (4) motivating them to put forth productive effort, (5) compensating them fairly, (6) recognizing good performance, (7) maintaining required discipline, and (8) providing for personal satisfaction in work and association with the organization.²⁶

Meeting these problems requires many activities on the part of members of this area--recruitment, selection, indoctrination, promotion and transfer, separation, employee classification, rate determination, merit ratings, work schedules and control, communications, collective bargaining, personnel research, manpower planning and development, training, medical services and counsel, recreation, protection and security.²⁷

Administration--A study of the activities and operations of the Personnel and Industrial Relations and of previously mentioned areas clearly reveals that these activities and operations must be assigned and that each area must be made aware of its responsibilities and obligations. The assignment of activities, responsibilities, authority and obligations is generally made by members of the area here referred to as "administration."

²⁶Weimer, op. cit., p. 441.

²⁷Maynard, op. cit., p. 20.

Normally, Administration is not a distinguishable area in an organization; however, it is treated as such in order to differentiate it from the other areas. Administration refers to the management of the organization as a whole rather than a specific division, department or branch; the emphasis is on the concept of total organization, not on a segment. This area is usually composed of members of the board of directors and other top executives who have the authority and responsibility of managing overall functions of the enterprise. Essentially, the members of this area set short term and long term objectives of the firm, make policies and important decisions, design the organizational structure of authority and responsibility, establish communication channels and points of decision-making in the organization, plan corporate strategies, determine how economic resources are to be acquired and allocated, and provide guidelines for other members of the organization.²⁸ In addition, they carry out social and civic affairs, deal with legal matters, and overall determine the characteristics and features of the whole firm.²⁹

²⁸Robert Katz, op. cit., p. 4.

²⁹For further discussion, see Part Six of Top Management Handbook, edited by H. B. Maynard (New York, 1960).

Characteristics and features of the organization would normally vary from one firm to another and from one industry to another depending on the needs of the organization. On the basis of needs, some firms may have all the functional areas distinct while others may have only a few of them visible. Whether or not the activities outlined here are grouped together in terms of a functional area, they are usually carried out and are common to most business firms. And through these activities, the manager with the assistance of his subordinates tries to achieve the goals and objectives of his organization and he undertakes his functions of planning, organizing, coordinating, directing, controlling, communicating, motivating and representing. Undoubtedly, the scope of these functions would vary from one unit of the organization to another and from one level of managerial hierarchy to another.

Based on the scope of his functions, the manager should have attitudes and skills which would increase his productivity. For the successful operations in the organization, the manager should possess many qualities. Among the qualities which the manager should possess,

according to Dale³⁰ and Keith and Gubellini,³¹ are desire for achievement, drive for mobility, decisiveness, assertiveness, respect for and acceptance of authority, initiative, intelligence, dependability, integrity, inquisitiveness, good judgment, good memory, ability to identify and solve problems, ability to communicate, and ability to act effectively with people. According to Katz, the manager should have the attitudes and skills of

- commitment to the organization and its objectives
- personal responsibility for outcomes
- risk-taking, profit-seeking, action-taking, and innovation, along with maintaining some sense of certainty and stability
- flexibility and realism
- self-confidence, and willingness to accept uncertainty, to live with incomplete information and ambiguous circumstances
- integration of partial pieces into whole pattern (whole-part conceptualization)
- definition of problems and concepts
- differentiating situations from one another
- identifying common elements in a series of situations
- evaluation and diagnosis of events, situations, and persons
- working with wide time dimensions and converting abstract goals into a sequence of precise day-by-day actions
- self-awareness of values, biases and blind spots, and of his impact on others.³²

³⁰Dale, op. cit., pp. 41-42.

³¹L. A. Keith and C. E. Gubellini, Introduction to Business Enterprise (New York, 1967), pp. 137-138.

³²Katz, op. cit., pp. 6-7.

Continuing, Katz states the manager should possess those attitudes and skills which would increase his abilities and which would enable him to be "an analyst of conditions affecting his unit, a procurer and allocator of the resources to be used by his unit, and a diagnostician of the interpersonal relationships, values and norms within his unit."³³

Managerial Techniques

To increase managerial productivity and to assist the manager in carrying out his functions successfully, many management techniques and concepts have been developed over a number of years. Some of these techniques are simple while others are fairly complex and require very sophisticated knowledge. These techniques are generally known by various names such as management techniques, management tools, operational research techniques, management science techniques, and quantitative and behavioral science techniques.

Regardless of their names, management techniques and concepts are useful in problem-solving and decision-making. According to Drucker, these techniques

³³Ibid., p. 1.

and tools are most useful because of the following reasons:

1. They enable a manager in a business to see and understand the whole business in fairly simple terms.
2. They make it possible to make decisions with respect to one area of the business without 'sub-optimizing.'
3. They represent to the manager all the alternatives of action possible in a situation.
4. The manager should expect--and demand--of these new tools that they show him what risks there are in each course of action, what assumptions underlie it, and what efforts and resources will be needed to carry it out successfully.
5. These new tools can determine what measurements are appropriate to a certain decision and to a certain area of business.
6. The new tools can help the manager to find out who should know about decisions and about things that go on; who should have information, when he should have it, and in what form.
7. Finally, these new tools can tell the manager what to look out for in the future.³⁴

In general, writers suggest that management techniques are important because they provide the management with systematic approaches and methods to increase efficiency and effectiveness in the organization.

³⁴Peter F. Drucker, "New Management Tools--and What the Manager Can Expect of Them," Controls and Techniques For Better Management, American Management Association, General Management Series Number 176 (New York, 1955), pp. 3-15.

How important each of management techniques and concepts is to the business firm would be difficult to determine. It would be impossible to include all techniques; furthermore, their importance is likely to vary from one firm to another depending on the needs of the organization. There are, however, certain techniques whose importance has been emphasized repeatedly in recent years. Argenti and Rope list about 75 such techniques and classify them in terms of their usefulness in specific functional areas as follows:

Area: Administration (including Finance and Accounting)

Techniques: Corporate planning
 Decision theory
 Decision trees
 Games theory
 Models
 Discounted cash flow
 Net present value
 Replacement theory
 Portfolio selection
 Costing systems
 Reporting by responsibility
 Organization and methods
 Systems analysis
 Data processing
 Management by exception
 Information retrieval
 Random observation studies
 Information theory
 Cybernetics
 CPM/PERT
 PERT/Cost
 Branching networks
 Resource allocation

Area: Marketing and Sales

Techniques: Exponential smoothing
 Market research
 Moving averages
 Regression analysis
 Box/Jenkins
 Time series
 Input-output tables
 Brainstorming
 Value analysis
 Computer techniques
 CPM/PERT
 PERT/Cost
 Branching networks
 Marginal costing
 Contribution analysis
 Profit-volume ratio
 Break-even charts
 Linear programming
 Ergonomics (human or human factor engineering)

Area: Production

Techniques: Computer techniques for production control
 CPM/PERT
 Branching networks
 Resource allocation
 Simulation
 Monte Carlo method
 Queuing theory
 Statistical quality control
 Computer techniques for process control
 Mathematical programming
 Method study
 Incentive schemes
 Ergonomics
 Productivity bargaining
 Job relations program

Area: Personnel and Industrial Relations

Techniques: Teaching machines
 Business games
 Job description
 Job evaluation

Merit rating
 Salary progressing curves
 Time-span of discretion
 Manpower planning
 Psychological testing

Area: Purchasing

Techniques: Statistical quality control
 Quality protection
 Sampling
 Sequential analysis
 Stock control
 Exponential smoothing
 Market research
 Moving averages
 Regression analysis
 Time series
 Input-output tables
 Economic batch re-ordering quantities
 Simulation

Area: Research and Development

Techniques: Method study
 CPM/PERT
 PERT/Cost
 Branching networks
 Research allocation
 Computer techniques
 Simulation.³⁵

All of the preceding techniques are also discussed in another article by Argenti and Rope.³⁶ According to them, the techniques listed under the Administration area are specifically useful to many activities, including developing strategy for the organization, capital expenditure proposals, flow of information necessary

³⁵John Argenti and Crispin Rope, "Three Star Guide to Management Techniques," Management Today (April, 1966), pp. 126-127, 172.

³⁶John Argenti and Crispin Rope, "Glossary of Management Techniques," Management Today (September, 1966), pp. 78-81 133

for adequate control in the organization, and launching of a new project.³⁷ The techniques listed under the Marketing and Sales area are especially useful to the matters related to forecasts, new product ideas, launching of new products, profitability of a product or product line, and improvement of product design.³⁸ The techniques listed under the Production area are particularly applicable to removing factory bottlenecks, to improving product quality and reliability, to determining complex production mixes and processes, to solving transportation problems, to cutting labor and production costs, and to improving labor relations.³⁹ The techniques listed under the Personnel and Industrial Relations area are specifically useful in improving training methods, in bringing order and equity in wages and salary, and in obtaining qualified individuals.⁴⁰ The techniques listed under the Research and Development area are desirable for reducing research time and costs; and those listed under

³⁷Ibid.

³⁸Ibid.

³⁹Ibid.

⁴⁰Ibid.

the Purchasing area are useful particularly in increasing quality and reliability of purchases and in keeping the purchase and inventory costs down.⁴¹

George agrees with Argenti and Rope in listing the following techniques: decision theory, including organization theory, learning theory, cybernetics, and suboptimization; experimental design; game theory; information theory; inventory control; linear programming; probability theory; queuing theory; replacement theory; sampling theory; simulation theory, including Monte Carlo methods; and symbolic logic.⁴² George had added in this list four techniques which are not listed by Argenti and Rope--namely, symbolic logic, experimental design, organization theory and suboptimization.⁴³

According to George, these techniques are useful to many areas, including determination of objectives, the assessment of group conflicts and interactions, job performance estimates, organization analysis, the construction of any predictive model, timing and pricing in a competitive market, data processing system design,

⁴¹Ibid.

⁴²Claude S. George, Jr., The History of Management Thought (Englewood Cliffs, N. J., 1968), pp. 157-159.

⁴³Ibid.

advertising effectiveness, economic lot size, inventory control, allocation of equipment and personnel, scheduling, input-output analysis, transportation routing, product mix, allocation processes, traffic control, replacement of equipment, quality control, simplified accounting and auditing, consumer surveys and product preferences, systems reliability evaluation, logistics studies, and manpower planning.⁴⁴

Hein also agrees with Argenti and Rope and George.⁴⁵ He provides a detailed discussion of quantitative techniques and concepts, including statistical decision theory, electronic data processing, distribution matrix, probability theory, linear programming, simplex method, learning curve theory, Monte Carlo method, waiting lines, control charts, work sampling, performance and cost evaluation, PERT, CPM, branching networks, line of balance, management by exception, sampling theory, PERT/Cost, games

⁴⁴Ibid.

⁴⁵Leonard W. Hein, The Quantitative Approach to Managerial Decisions (Englewood Cliffs, N. J., 1967).

theory, random observation studies, statistical quality controls, and simulation.⁴⁶

Several of these techniques and concepts are also discussed in standard textbooks and in other publications. Discussions are in the following publications: Mayer, Production Management;⁴⁷ Timms, The Production Function in Business;⁴⁸ Bell, Marketing Concepts and Strategy;⁴⁹ Beckman and Davidson, Marketing;⁵⁰ Weimer, Business Administration;⁵¹ Lindsay and Sametz, Financial Management: An Analytical Approach;⁵² Weston and Brigham, Managerial Finance;⁵³ Haynes and Massie, Management: Analysis, Concepts, and Cases;⁵⁴ Heyel,

⁴⁶Ibid.

⁴⁷Raymond R. Mayer, Production Management (New York, 1968).

⁴⁸Howard L. Timms, op. cit.

⁴⁹Martin Bell, Marketing Concepts and Strategy (New York, 1966).

⁵⁰Beckman and Davidson, op. cit.

⁵¹A. M. Weimer, op. cit.

⁵²J. Robert Lindsay and Arnold W. Sametz, Financial Management: An Analytical Approach (Homewood, Ill., 1967).

⁵³Weston and Brigham, op. cit.

⁵⁴W. Haynes and J. L. Massie, Management: Analysis, Concepts, and Cases (Englewood Cliffs, N. J., 1969).

editor, The Encyclopedia of Management;⁵⁵ Bogen, editor, Financial Handbook.⁵⁶

In addition to the quantitative techniques, there are non-quantitative techniques and concepts which are useful to the manager in overcoming human behavioral problems. Megginson⁵⁷ and Miner⁵⁸ are particularly concerned with personnel and industrial relations techniques. Among the techniques and concepts Megginson⁵⁹ and Miner⁶⁰ discuss are: motivation theories, communication theory, incentive schemes, performance appraisal, management audit, productivity bargaining, psychological testing, business games, role playing, simulation, sensitivity training, job evaluation, job analysis, merit rating, sociometric methods, critical incident techniques, salary surveys, In-basket techniques, teaching machines,

⁵⁵Carl Heyel, Editor, The Encyclopedia of Management (New York, 1963).

⁵⁶Jules I. Bogen, Editor, Financial Handbook (New York, 1965).

⁵⁷Leon C. Megginson, Personnel: A Behavioral Approach to Administration (Homewood, Ill., 1967).

⁵⁸John B. Miner, Personnel and Industrial Relations (New York, 1969).

⁵⁹Megginson, op. cit.

⁶⁰Miner, op. cit.

manpower planning, and cybernetics.

In brief, techniques and concepts have been emphasized in recent publications, and their potential usefulness in various areas of business has been stressed.

Table I provides an indication as to the coverage given to some aspects of business in the issues of Management Science alone from 1955 through September 1966.

TABLE I

COVERAGE OF BUSINESS PROBLEMS AND TECHNIQUES IN ISSUES
OF MANAGEMENT SCIENCE FROM 1955 TO SEPTEMBER 1966

Problem Areas:	Total
Inventory.....	72
Allocation.....	142
Queuing.....	18
Sequencing.....	22
Routing.....	11
Replacement.....	18
Competition.....	15
Search.....	17
Business Functional Areas:	
Purchasing.....	69
Production.....	104
Marketing.....	51
R & D.....	26

(Continued...)

TABLE I --Continued

Business Functional Areas:	Total
Personnel.....	42
Finance and Accounting.....	33
Functional Planning.....	39
Communications.....	12
Supply.....	12
Maintenance.....	2
 Managerial Functions:	
Planning.....	133
Organizing.....	12
Staffing.....	29
Directing.....	10
Coordinating.....	91
Controlling.....	85
 Management Science Techniques:	
Linear programming.....	112
Dynamic programming.....	69
Simulation.....	111
Game theory.....	43
Statistical.....	26
Behavioral science.....	7
Descriptive.....	17
Other.....	10
 Recommendations to solve problems:	
New equipment.....	34
New procedure.....	76
Reorganizing.....	30
Training.....	13
Mathematical solutions.....	183
 Type of Authors:	
Business.....	132
Academic.....	222

Source: Adapted from S. Benjamin Prasad, "Problem Solving Trends in Management Science," Management Science, XIII (October, 1966), C-10 - C-15.

It is apparent from the preceding discussion that there are many techniques and concepts which may be useful to the manager in overcoming business problems. In order to arrive at a list of techniques and concepts to be included in the empirical surveys of managerial obsolescence, the following selection process was employed:

- 1) Listing of techniques and concepts discussed by Argenti and Rope;⁶¹
- 2) Listing of techniques and concepts discussed by George;⁶²
- 3) Listing of techniques and concepts covered in The Encyclopedia of Management;⁶³
- 4) Listing of techniques and concepts discussed in selected textbooks on management, production, purchasing, finance, accounting, personnel, marketing, and related fields of business;⁶⁴

⁶¹Argenti and Rope, op. cit.

⁶²Claude S. George, op. cit.

⁶³Carl Heyel, op. cit.

⁶⁴See the sources already indicated in this chapter and the sources listed in the bibliography and in Appendix G at the end of discussion of each technique.

5) Listing of techniques discussed in the selected trade magazines and newspapers in the field of business; and

6) Extracting from all of the above sources a list of techniques that are relatively new yet are now widely recognized for their potential value in management.

This process resulted in the selection of 106 techniques. Almost all of the techniques indicated by Argenti and Rope were selected and to their list about 30 more techniques and concepts were added. The selection was somewhat arbitrary, and it did require some value judgments of the researcher. However, much care was taken to base the judgment on the emphasis given each technique in the literature.

The selected techniques are as follows:

- Organizational planning
- Decision theory
- Decision trees
- Reporting by responsibilities
- Systems analysis
- Management by exception
- Management by objective
- Results management
- Management of time
- Organization and methods
- Motivation theory
- Participative management
- Matrix organization
- Information theory
- Information retrieval
- EDP
- Cybernetics

Economic/market indicators
Market research
Brainstorming
Probability theory
Sociometric method
Costing systems
Marginal analysis
Contribution analysis
Sensitivity analysis
Break-even analysis
Performance and cost evaluation
Simulation
Business games
Role playing
Monte Carlo method
Value analysis
Ergonomics
Random observation studies
In basket techniques
Critical path methods
PERT/CPM
PERT/Cost
Branching networks
Resource allocation
Distribution matrix
Search theory
Method study
SOPs
Payback or payout period
Accounting or average rate of return
Time-adjusted or Internal rate of return
Net present value
MAPI
Utility theory
Indifference analysis
Replacement theory
Portfolio selection
Cashflow analysis
Working capital cycle
Ratio (financial) analysis
Budgetary planning and control
Profit-volume ratio
Exponential smoothing
Moving averages
Regression analysis
Box/Jenkins
Time series analysis

Input-output tables
"Objective and task" method
Vendor rating
Preference distribution analysis
Queuing theory
S. Q. C.
Mathematical programming
Work simplification
Work measurement
Time and motion study
Time standards
Work sampling
Line of balance
Work study
Control charts
Material handling
Productivity bargaining
Learning curve theory
Salary progression
Salary surveys
Manpower planning
Critical incident technique
Job rotation
Sensitivity training
Sampling method
Sequential analysis
Economic reorder quantities
Stock control
Work planning and review
Management audit
Performance appraisal
"Five-by-five" approach
Job analysis
Job evaluation
Job description
Incentive schemes
Programmed instructions
Merit rating
Time-span of discretion
Model
Testing
Managerial grid

Brief definitions of these 106 techniques are presented
in Appendix G.

It was difficult to determine exactly the significance of each technique to a specific functional area of business; a survey was carried out in which managers of 66 different business firms were asked to specify this relationship. The survey is described in Chapter IV.

CHAPTER IV

SIGNIFICANCE OF MANAGEMENT TECHNIQUES

In order to determine the importance of the 106 techniques, a questionnaire survey was carried out as a part of this study. The survey was directed to establish the importance of each technique as it related to Administration, Finance and Accounting, Marketing and Sales, Production, Purchasing, Personnel and Industrial Relations, and Research and Development areas. The questionnaire used in the survey was developed through the initial research and the pilot study explained earlier.

Description of the Questionnaire

As can be seen in Appendix F, the questionnaire was divided into two separate sections. Section I of the questionnaire was designed to obtain general information about the respondent and his firm, while Section II was designed to determine the significance of the management techniques. The cover page of the questionnaire

included the information concerning the purpose of the survey and other facts useful to the respondent.

In Section I, there were questions related to the respondent and his organization. The respondent was asked to indicate the name of his firm, the size of his firm in relation to the annual sales revenue and the total number of employees, the firm's nature of business, the major products of the organization, his title in the organization, the level of his position in the management hierarchy, his functional area, the number of individuals who report to him, the number of years he has been with the organization, his annual salary, his age, his educational background, his practical or work experience, his affiliation with professional associations or organizations, and professional and trade magazines and newspapers which he regularly reads.

The questions in this section were designed in such a manner that the respondent could answer them with ease; most questions required only check-marks or very brief answers from the respondent.

In Section II of the questionnaire, 106 management techniques were presented and the respondent was asked to indicate the importance of each technique in connection with the specified functional area by circling A, B, C or D categories. It was explained in the beginning of the section that the letters A, B, C and D represented the following four categories respectively: (1) a manager in charge of this functional area must have basic understanding of the technique in terms of its applications, advantages and disadvantages; (2) a manager's understanding of the technique can be very helpful to him; (3) any understanding of the technique is insignificant, and (4) the respondent is not qualified to indicate the importance because of lack of knowledge. Thus, the importance, essentially, was to be classified as very important, helpful or insignificant.

Also, in Section II, space was provided for the respondent to include any technique which he thought was important but was not included in the questionnaire. The 106 techniques were selected for the survey in a systematic manner explained in Chapter III.

Selection of Respondents

Since the importance of the 106 techniques was necessary to develop an index or a scale which could be used to determine the extent of managerial obsolescence, it was essential that this importance was pointed out by individuals who could be classified as competent and qualified. Therefore, it was necessary to include in the survey those managers who could be regarded as competent. As stated in Chapter I, this study assumed that the managers of the most progressive and dynamic firms could be classified as competent managers and, therefore, they should be able to point out the significance of the techniques in relation to their respective functional areas.

On the basis of the assumptions of this study, the concern was to select the most progressive and dynamic firms of Canada. A list of Canada's 100 major industrial and six financial firms was obtained from Canadian Business, a major Canadian publication for management; these firms were regarded as major according to their total assets. Also, the July 20, 1968, issue of the Financial Post listed more than 100 firms, which were prominent in manufacturing, resources, utility, merchandising,

and finance.

From the lists, 15 manufacturing, resource and utilities firms were selected as they were among the top 10 in Canada by either sales, by assets and/or by net earnings; six finance companies including three chartered banks were selected as they were ranked either first, second or third by assets and profits in their respective fields. Thirty other firms were selected from the list of Canadian Business since they were among the top 100 but their head offices were outside the Toronto, Montreal and Vancouver areas; other firms in the list were not included in this survey as they were going to be included in the study concerning the understanding of techniques to be discussed in the following chapter. Also, 15 management consulting firms were chosen at random for this survey, because the managers of these firms could be considered competent to indicate the importance of management techniques. Thus, altogether 66 different Canadian business firms were selected to determine the importance of techniques. (See Appendix C)

The questionnaire was sent to presidents of 60 firms and each president was asked in the cover letter to have some qualified members of his organization indicate the importance of the techniques to each of the seven functional areas. The presidents of six finance companies who received the questionnaire were asked to have some one indicate the importance only in relation to the area of Finance and Accounting.

Data Collection and Analysis

Eighty-one individuals from 23 different firms responded to the questionnaire, each indicating the importance of the techniques to one of the seven functional areas. There was no reply from any member of the management consulting or finance firms. The largest response was for the area of Finance and Accounting; the lowest one was for the area of Research and Development. Table II shows the distribution of the respondents by the functional activity areas.

TABLE II
DISTRIBUTION OF RESPONDENTS BY
FUNCTIONAL AREAS

Areas	Number of Respondents
Administration.....	13
Finance and Accounting.....	15
Marketing and Sales.....	10
Personnel and Industrial Relations.....	14
Production.....	12
Purchasing.....	14
R & D.....	3
 Total.....	 81

As the table points out, 10 or more individuals responded to each of the areas with the exception of the Research and Development area.

Characteristics of Respondents

As indicated earlier, 81 respondents represented 23 different firms. All of these firms were among the largest 100 firms by assets in Canada, according to the list provided by Canadian Business, dated April 19, 1969. Eight of these firms were in the top 25 by assets, five in the top 10 by net operating profits, and 15 in the top 50 by net operating profits; the ranking of these firms was

based on the figures made available to the Financial Post for the year 1967.

The respondents furnished information about annual sales of 22 firms; the annual sales of one firm were not reported. On the basis of the information received, 22 firms together had total annual sales of approximately five and one-half billion dollars; the average was about one quarter billion dollars in sales. The highest annual sales among the firms was about one and one-half billion dollars and the lowest was about 20 million dollars. Twenty-five per cent of the firms had more than 280 million dollars in annual sales, and another 25 per cent had below 54 million dollars in annual sales revenues. Although these sales figures may not appear to be outstanding to an American reader, they are outstanding in the Canadian context because the total gross national product of Canada is about 65 billion dollars per year. Thus, the amount of about five and one-half billion dollars together could be considered very outstanding. One firm, in particular, reported the annual revenues of over one billion dollars;

according to the figures available for the year 1967, there were only three firms in Canada which had over one billion dollars in sales. Undoubtedly, the firms represented in this survey could be classified as most prominent and significant in the Canadian economy.

As the firms were large in relation to assets and annual sales, it would be very likely that they would have a very large number of employees. As indicated by the respondents, 23 firms together had a total of about 145,000 employees; the average number of employees was approximately 6,300. Among the firms, the highest number of employees was about 24,000 and the lowest was about 650. Twenty-five per cent of the firms had over 8,700 employees and 25 per cent had below 2,000 individuals on their payroll. There were only two firms which had less than 1,000 employees. The number of employees again indicate the size and significance of the firms in the Canadian economy; in a nation of about 20 million people, these firms can certainly be classified as very large.

Thus, all the firms represented by the respondents

were leading Canadian firms and they together represented a large portion of the strength of the Canadian economy.

Almost all the firms were offering a large variety of major products. Among the major products were: lumber and wood products; primary metal industries, including blast furnaces and primary smelting and refining processes; fabricated metals; machinery; electrical machinery; instrument; food and related products; paper and allied products; printing and related products; chemicals; petroleum and coal products; rubber; services and others.

It is apparent that these firms represented almost all major industries. Many of the firms represented more than one industry. Table III presents the distribution of the respondents by the nature of their organization's business. As the table points out, 56 per cent of the respondents belonged to the firms which were in manufacturing business; about 30 per cent were in transportation, public utilities and communication;

TABLE III

DISTRIBUTION OF RESPONDENTS BY NATURE OF BUSINESS

Nature of Business	Frequency
Manufacturing.....	45
Construction.....	6
Transportation, public utilities and communication.....	24
Mines, quarries and oil.....	39
Finance, insurance, real estate.....	3
Trade.....	7
Services and others.....	11
Total.....	135*

*The total is greater than 81 because of more than one answer by the respondents.

about 48 per cent were in the mines, quarries and oil industry; 14 per cent in the service or some other type of industry, and so on. The largest number of the respondents were in manufacturing, and the lowest in finance, insurance and real estate.

In their respective firms, the respondents were designated by a variety of position titles: secretary and treasurer; administration manager; industrial relations officer; president; chairman and president; general manager; manager of special projects; vice president, operation; comptroller; manager, accounting; assistant

secretary and treasurer; assistant controller; vice president, finance; general commercial manager; general manager, marketing; vice president, marketing; co-ordinator, personnel planning and development; personnel manager; manager, employee relations; manager, recruitment; general personnel and public relations manager; vice president, corporate relations; production superintendent; general superintendent; vice president, production; industrial engineer; purchasing agent; manager, purchasing; director of engineering and construction, and many others.

The position titles of the respondents indicate that almost all the respondents were members of the middle or upper managerial levels or they were staff personnel; one respondent had classified himself as a member of a lower management level. The individual classification in terms of their positions is shown in Table IV. Thirty-six per cent of the respondents were members of the top management level; 42 per cent of the respondents belonged to the middle managerial

TABLE IV
DISTRIBUTION OF RESPONDENTS BY
POSITION IN ORGANIZATIONS

Position	Frequency
The top management level.....	29
The middle management level.....	34
The lower management level.....	1
Staff or specialist.....	12
Total.....	76*

* The total is less than 81 due to the fact that five respondents did not indicate their position.

level; 15 per cent were either specialist or staff members. Five individuals who failed to respond to the question had titles common to middle and upper managerial levels.

The respondents were involved in one or more functional activity areas of business. Thirty-three per cent of the respondents indicated that they spent most of their time in administration, planning and policy making activities related to the whole organization; about 15 per cent spent their working hours largely in the financial and accounting matters; approximately 12 per cent were largely engaged in the marketing and sales activities; about 16 per cent were in the production area; about 16 per cent

were engaged in the personnel and industrial relations activities; and about four per cent were involved either in the research and development or some other type of business activities. The distribution of the respondents by their functional activity areas is shown in Table V. More individuals were engaged in activities related to administration, planning and policy-making for the whole organization and fewer in the research and development and in unspecified areas.

TABLE V

DISTRIBUTION OF RESPONDENTS BY FUNCTIONAL AREAS

Functional Areas	Frequency
Administration.....	27
Finance and Accounting.....	12
Marketing and Sales.....	10
Production.....	13
Purchasing.....	11
Personnel and Industrial Relations.....	13
Research and Development.....	2
Others.....	2
Total.....	91*

*The total is greater than 81 as some individuals were involved in more than one area.

In relation to salary, 69 of the 81 respondents indicated their salaries and all but one had salaries of \$10,000 or more per year. Of the replies, 25 per cent indicated annual salaries between \$5,000 and \$16,000; 25 per cent had over \$25,000 in annual salaries, and the remaining 50 per cent were between \$16,000 and \$25,000. The distribution of the respondents by their annual salaries is presented in Table VI.

TABLE VI

DISTRIBUTION OF RESPONDENTS BY ANNUAL SALARIES

Salary in Dollars	Frequency
Less than 5,000.....	--
5,000 - 9,999.....	1
10,000 - 14,999.....	12
15,000 - 19,999.....	23
20,000 - 24,999.....	16
25,000 - 29,000.....	8
30,000 and over.....	9
Total.....	69*

*The total is less than 81 because the salaries were not reported by 12 respondents.

The educational background of the respondents seemed to be quite adequate. With the exception of seven respondents, all had over high school education and had

attended college. About 47 per cent of the respondents had education equivalent to four years of college and about 27 per cent had done some graduate studies. Table VII shows the distribution of the respondents by their educational background.

TABLE VII

DISTRIBUTION OF RESPONDENTS BY EDUCATIONAL BACKGROUND

Education	Frequency
High School and under.....	7
1st year college.....	4
2nd year college.....	2
3rd year college.....	8
4th year college.....	38
Graduate studies.....	22
Total.....	81

The respondents altogether held 69 diplomas, certificates, and degrees. Of those who attended college, 40 per cent were in engineering; 32 per cent in business, commerce or economics, and 28 per cent were in liberal arts, sciences, Law and education fields.

In addition to a substantial educational background, the respondents represented many years of practical experience. All the respondents had five years or more

of practical experience. Twenty-five per cent of the respondents approximately had between 5 to 18 years of experience; 25 per cent had about 28 years or more of practical experience. Table VIII shows the distribution of the respondents by their practical experience in terms of years. As the table indicates, 50 per cent of the respondents had between 18 and 28 years approximately of practical experience.

TABLE VIII

DISTRIBUTION OF RESPONDENTS BY PRACTICAL EXPERIENCE

Experience in Years	Frequency
Less than 5.....	--
5 - 9.....	3
10 - 14.....	6
15 - 19.....	18
20 - 24.....	27
25 - 29.....	13
30 and over.....	14
Total.....	81

It is apparent from the respondents' work background that most of them would be middle-aged. The average age of the respondents was about 43 years; none of them was under 25 or over 64 years. Table IX shows the distribution of the respondents by their age. As it can be

TABLE IX
DISTRIBUTION OF RESPONDENTS BY AGE

Age in Years	Frequency
Under 25.....	--
25 - 29.....	2
30 - 34.....	7
35 - 39.....	17
40 - 44.....	21
45 - 49.....	15
50 - 54.....	11
55 - 59.....	5
60 - 64.....	3
65 and over.....	--
Total.....	81

seen in the table, 25 per cent of the respondents were below 38 years of age and 25 per cent were approximately over 49; the remaining 50 per cent were between the ages of 38 and 49 years.

In relation to training programs, about 30 per cent of the respondents were engaged in some type of training at the time they were responding to the questionnaire. The programs in which they were engaged included management development programs, sensitivity training, computer programming, business administration courses at colleges and universities; programs related to the interviewing techniques, business games, and language programs.

Almost all the respondents indicated that they were regularly reading several trade and business periodicals and newspapers. Altogether 109 different magazines and newspapers were mentioned by the respondents and they included many of the leading American and Canadian publications such as Business Week, The Financial Post, The Financial Times, The Wall Street Journal, Fortune, The Journal of Accountancy, Datamation, Management Accounting, The Canadian Business, Financial Executive, Harvard Business Review, and Business Quarterly.

The respondents also belonged to many professional organizations, including the Institute of Chartered Accountants, Chartered Institute of Secretaries, Canadian Institute of Mining and Metallurgy, National Association of Accountants, Financial Executive Institute, Alberta and Ontario Institute of Chartered Accountants, Canadian Manufacturing Association, Institute of Public Administration, Personnel Association of Toronto, American Society of Training and Development, Calgary Personnel Association, Association of Professional Engineers, and Canadian Association of Purchasing Agents.

In general, it can be stated on the basis of the data on the respondents that they had important positions in their organizations and were responsible for the work of many individuals. They had good educational and practical backgrounds and qualifications. Many of the respondents were involved in the professional organizations and most of them were trying to keep up to date by the study of the current literature in the field of business; some were actually involved in the process of updating their qualifications and skills necessary for the successful undertakings of their tasks and activities. These facts about the respondents indicate that they were generally qualified to evaluate the importance of the management techniques and concepts in connection with their functional areas.

Significance of Techniques

Most of the respondents classified the importance of each of the management techniques in relation to the specified functional area of business by placing it in three categories: very important, helpful, and insignificant; some respondents did not classify the importance

because of their lack of familiarity with a few techniques, but they did classify the techniques with which they were familiar. Some of the respondents ignored certain of the techniques.

The importance of each technique in relation to each functional area, as viewed by the respondents, is discussed in the remainder of this chapter.

Administration--Thirteen respondents indicated the relative importance of the techniques in relation to the Administration area. Their responses are summarized in Table X.

TABLE X

RELATIVE IMPORTANCE OF MANAGEMENT TECHNIQUES TO
"ADMINISTRATION" AS VIEWED BY RESPONDENTS

Techniques	Per cent of respondents*				
	Importance			Unqualified	No response
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Org. planning	62	15	15	..	8
Decision theory	8	62	8	23	..
Decision trees	8	38	15	38	..
Reporting by responsibility	69	15	8	8	..
Systems analysis	30	46	15	8	..
Mngt by exception	62	30	..	8	..
Mngt by objective	77	8	8	..	8
Results management	62	15	..	15	8

TABLE X--Continued

Techniques	Per cent of respondents				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Management of time	54	15	15	15	..
Org. and methods	23	62	..	8	8
Motivation theory	54	23	8	8	8
Participative manage- ment	62	23	..	8	8
Matrix organization	..	30	15	46	8
Information theory	46	15	8	23	8
Information re- trieval	23	38	15	23	..
EDP	62	23	..	8	8
Cybernetics	..	23	30	30	15
Economic indicators	62	15	23	..	..
Market research	30	54	15	..	..
Brainstorming	15	30	38	15	..
Probability theory	15	46	23	15	..
Sociometric method	8	30	15	46	..
Costing systems	23	46	15	..	15
Marginal analysis	15	54	23	8	..
Contribution analysis	8	54	8	30	..
Sensitivity analysis	..	23	8	46	23
Break-even analysis	23	62	..	15	..
PACE	23	46	..	15	15
Simulation	8	46	30	15	..
Business games	8	46	30	15	..
Role playing	..	23	38	30	8
Monte Carlo method	..	15	30	30	23
Value analysis	8	38	23	15	15
Ergonomics	..	15	38	46	..
Random observation studies	..	15	46	38	..
In-basket techniques	..	46	15	38	..
Critical path method	15	54	23	8	..

TABLE X--Continued

Techniques	Per cent of respondents*				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
PER/CFM	15	54	15	15	..
PERT/Cost	15	46	15	15	8
Branching networks	..	38	8	54	..
Resource allocation	46	23	15	15	..
Distribution matrix	..	30	8	54	8
Search theory	..	30	15	54	..
Method study	15	54	23	8	..
SOPs	62	23	15	..	..
Payback period	69	23	8	..	..
Accounting rate of return	69	23	8	..	..
Internal rate of return	38	54	..	8	..
Net present value	30	62	..	8	..
MAPI	..	8	8	77	8
Utility theory	..	38	8	54	..
Indifference analysis	..	15	23	62	..
Replacement theory	..	38	8	46	8
Portfolio selection	8	54	8	23	8
Cashflow analysis	69	23	8	..	..
Working capital cycle	62	8	8	8	15
Ratio analysis	62	23	8	..	8
Budgetary planning and control	77	15	8	..	..
Profit-volume ratio	46	38	..	8	8
Exponential smoothing	..	30	15	38	15
Moving averages	15	38	38	8	..
Regression analysis	8	38	15	30	8
Box/Jenkins	..	..	15	77	8
Time series	..	46	8	46	..

TABLE X--Continued

Techniques	Per cent of respondents*				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Input-output	..	15	38	38	8
"Objective and task"	8	46	8	38	..
Vendor rating	..	46	15	38	..
Preference distribu- tion analysis	..	15	23	62	..
Queuing theory	8	8	30	54	..
S. Q. C.	15	8	38	38	..
Mathematic Program- ming	8	46	23	23	..
Work simplification	15	46	23	15	..
Work measurement	8	62	23	8	..
Time and motion	8	62	30	..	..
Time standards	8	62	30	..	..
Work sampling	..	46	30	15	8
Line of balance	..	30	15	46	8
Work study	8	54	23	8	8
Control charts	30	46	15	..	8
Material handling	8	62	23	..	8
Productivity bargaining	8	38	15	30	8
Learning curve	8	38	30	15	8
Salary progression	30	54	8	..	8
Salary surveys	54	38	8	..	..
Manpower planning	77	15	8	..	..
Critical incident	..	38	15	38	8
Job rotation	23	62	8	8	..
Sensitivity training	..	46	15	30	8
Sampling method	..	46	23	15	15
Sequential analysis	..	..	30	54	15
Economic reorder quantities	15	38	23	15	8
Stock control	23	46	23	8	..
Work planning and review	8	38	15	23	15

TABLE X--Continued

Techniques	Per cent of respondents*				
	Importance			Unqua- lified	No res- ponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Management audit	46	30	15	..	8
Performance appraisal	54	15	30	..	..
"Five-by-Five"	..	..	15	77	8
Job analysis	23	62	8	..	8
Job evaluation	23	54	15	..	8
Job description	30	54	15	..	..
Incentive schemes	62	15	15	8	..
Programmed instructions	15	46	23	8	8
Merit rating	62	15	23	..	..
Time-span of discretion	..	8	23	62	8
Model	8	23	23	..	46
Testing	15	54	23	8	..
Managerial grid	8	38	8	38	8

*Rounded to the nearest whole number.

From the table, it is apparent that the respondents had different views concerning the importance of each technique to the area of Administration; this makes it difficult to determine the importance of each technique. However, on the basis of the majority opinion, a category of the importance can be selected for each technique.

For example, the technique Business Games was classified as "very important" by eight per cent of the respondents; 46 per cent of the respondents classified it as "helpful," and 30 per cent classified it as "unimportant" or "insignificant." Since the category "helpful" was indicated by the majority of the respondents, the technique could be considered as "helpful" to the area of Administration.

Difficulties, however, are encountered when such clear-cut majority opinion is not available for all the techniques. For instance, only 16 per cent of the respondents were able to classify the importance of MAPI technique; of these 16 per cent, eight per cent considered this technique as "helpful" while other eight per cent considered it as "unimportant" or "insignificant." In such a situation, the lower category of the importance could be considered and selected as a safety measure against bias or errors. Thus, MAPI could be classified as "unimportant" in relation to the area of Administration.

There is also another situation which makes the selection of a category somewhat difficult. For example, the technique Moving Averages was classified as "very important" by 15 per cent of the respondents; 38 per cent

of the respondents classified it as "helpful" and another 38 per cent classified as "unimportant," thereby making two categories with the same number of responses; but, since the category "very important" implies the "helpful" category, the majority opinion may be classified as "helpful" and this category could be used to express the importance of the moving averages technique to the area of Administration.

Therefore, the importance of each of the techniques in relation to each functional area could be expressed in terms of a category selected on the basis of one of the following two criteria: 1) the clear-cut majority of opinion and 2) the selection of a lower category in the event two or more categories have the similar number of responses.

Based on these criteria, 26 of the 106 techniques were found to be very important to the Administration area; 65 were found to be helpful and 15 were found as unimportant or insignificant to this area. These techniques are shown in Table XVII which presents the relative importance of each technique to all of the seven functional areas. Table XVII is presented at the end of the discussion of the Research and Development area.

The opinions of the respondents concerning the relative importance of the techniques provide further insight into the area of Administration. Since the Administration area is involved in planning, administering, policy-making and decision-making for the whole organization, the individuals connected with this area should have knowledge of the techniques which are most important and helpful in determining the organization's goals, objectives and characteristics. Specific techniques such as Organizational Planning, Reporting by Responsibility, Management by Objectives, Management by Exception, and Motivation Theory are most useful in managing the whole organization. In addition, if the individuals have knowledge of some other techniques, they could easily guide and direct their subordinates. Because of the broad aspects of this functional area, it is desirable that the individuals should be familiar with as many techniques as possible; they do not need to know many techniques in detail, but they should have some basic understanding of the techniques.

Twenty-six techniques, regarded by the respondents as "most important," do have many applications to the

activities of this area; the techniques such as Payback Period and Average Rate of Return are most helpful in making financial decisions. In general, as the respondents had indicated, individuals in the Administration area must have understanding of 26 techniques; and, if they know 65 other techniques, they could easily carry out their functions.

Finance and Accounting--In contrast to the Administration area, the area of Finance and Accounting is more specific and narrower in scope. Therefore, the relative importance of the techniques to this area would be somewhat different. In the survey, 15 individuals pointed out the importance of the techniques to this area. Their responses are summarized in Table XI. It is apparent in the table that the respondents had different views concerning the importance of each technique to this particular area.

TABLE XI

RELATIVE IMPORTANCE OF MANAGEMENT TECHNIQUES TO
"FINANCE & ACCOUNTING" AS VIEWED BY RESPONDENTS

Techniques	Per cent* of respondents reporting				
	Importance			Unquali- fied	No Re- sponse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Org. planning	67	20	7	..	7
Decision theory	27	53	..	20	..
Decision trees	7	40	20	33	..
Reporting by re- sponsibility	53	40	..	..	7
Systems analysis	53	33	13	..	..
Management by exception	67	27	..	7	..
Management by objective	73	27	..	..	..
Results management	60	13	20	7	..
Management of time	53	33	7	7	..
Organization and methods	53	47	..	..	..
Motivation theory	20	33	20	13	13
Participative management	53	20	27	..	..
Matrix organiza- tion	7	27	27	47	..
Information theory	13	40	20	27	..
Information re- trieval	47	13	13	20	7
EDP	53	33	13	..	..
Cybernetics	7	13	20	53	..
Economic indicators	33	53	7	7	..
Market research	13	53	20	13	..
Brainstorming	7	20	40	27	..
Probability theory	13	27	40	20	..
Sociometric method	20	27	13	40	..
Costing systems	73	20	7	..	..
Marginal analysis	33	53	..	13	..
Contribution analysis	53	20	..	27	..

TABLE XI--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqual- ified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Sensitivity analysis	40	27	7	27	..
Break-even analysis	33	53	7	..	7
PACE	33	40	13	13	..
Simulation	13	40	27	13	7
Business games	13	33	27	20	7
Role playing	7	13	53	27	..
Monte Carlo method	..	13	33	53	..
Value analysis	13	13	33	40	..
Ergonomics	7	7	27	40	20
Random observation	7	7	47	40	..
In-basket method	..	27	20	47	7
Critical path method	27	33	33	7	..
PERT/CPM	27	27	40	7	..
PERT/Cost	20	27	40	..	13
Branching networks	..	13	27	60	..
Resource allocation	33	40	13	13	..
Distribution matrix	7	33	20	40	..
Search theory	..	13	27	53	7
Methods study	47	33	7	13	..
SOPs	47	33	..	20	..
Payback period	80	20	..	..	..
Average rate of return	67	27	7	..	..
Internal rate of return	53	33	13	..	..
Net present value	53	27	13	..	7
MAPI	..	7	20	60	13
Utility theory	..	13	33	53	..
Indifference analysis	..	7	33	60	..
Replacement theory	..	40	13	47	..

TABLE XI--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Portfolio selection	53	20	7	20	..
Cashflow analysis	67	20	13	..	..
Working capital cycle	67	13	7	13	..
Ratio analysis	73	27	..	..	..
Budgetary planning and control	93	7	..	..	..
Profit-volume ratio	60	27	13	..	..
Exponential smoothing	7	13	33	47	..
Moving averages	13	33	27	27	..
Regression analysis	13	13	47	27	..
Box/Jenkins	..	..	..	100	..
Time series	..	27	20	47	7
Input-output analysis	..	13	40	47	..
"Objective & Task"	7	33	27	33	..
Vendor rating	7	27	20	47	..
Preference distribution	..	13	27	60	..
S. Q. C.	7	40	33	20	..
Queuing theory	..	20	53	27	..
Mathematical programming	13	53	20	13	..
Work measurement	13	40	47	..	..
Work simplification	27	53	13	..	7
Time and motion	13	40	47	..	..
Time standards	13	33	40	13	..
Work sampling	7	20	53	20	..
Line of balance	..	..	20	67	13
Work study	13	33	40	13	..
Control charts	20	33	40	7	..

TABLE XI--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Material handling	13	40	40	7	..
Productivity bargaining	..	..	33	67	..
Learning curve theory	7	33	27	33	..
Salary progression	40	47	7	7	..
Salary surveys	47	33	7	7	7
Manpower planning	47	27	7	20	..
Critical incident	..	..	7	93	..
Job rotation	20	40	33	7	..
Sensitivity training	7	13	40	40	..
Sampling method	20	33	27	20	..
Sequential analysis	7	7	20	53	..
Economic reorder quantities	27	33	20	20	..
Stock control	40	47	13	..	..
Work planning & review	27	20	7	47	..
Management audit	53	27	..	20	..
Performance appraisal	53	20	20	7	..
"Five-by-Five" approach	..	..	..	100	..
Job analysis	33	53	13	..	..
Job evaluation	33	47	20	..	..
Job description	33	47	13	7	..
Incentive schemes	20	40	33	7	..
Programmed instructions	7	40	33	20	..
Merit rating	47	27	20	7	..
Time-span of discreption	..	..	20	80	..
Model	7	40	..	7	47
Testing	27	33	27	13	..
Managerial grid	13	20	13	53	..

*Rounded to the nearest whole number.

As Table XI indicates, the respondents expressed different opinions concerning the importance of each technique to the area of Finance and Accounting. Because of the differences in the opinions, the criteria discussed earlier may determine a category in order to specify the importance of each technique to this area. On the basis of these criteria, 32 techniques could be classified as "most important;" 47 could be classified as "helpful" and 27 techniques could be classified as "unimportant" or "insignificant" to the area of Finance and Accounting (See Table XVII). Thirty-two techniques with the importance category of "A" or "most important," as shown in Table XVII, are specifically useful in financial analysis and control; individuals responsible for financial planning, analysis and control also should have basic understanding of Organizational Planning, Reporting by Responsibility, Management by Objective, Costing Systems, Contribution Analysis, Payout period, and Average or Accounting Rate of Return. Furthermore, since the individuals in charge of this area have to provide assistance to the members of the other

functional areas, they would be at an advantage if they are familiar with the activities of the other areas and the techniques generally useful in those areas. Therefore, 47 techniques, pointed out as "helpful" by most of the respondents, can be helpful to the manager in the area of Finance and Accounting. The number of "most important" techniques is larger in this area than what it is in the area of Administration, but the number of "helpful" techniques is smaller; this is perhaps due to the fact that the functions of the manager of the Finance and Accounting are more specific but less narrow in scope in contrast with the functions of the manager of the Administration area.

Marketing and Sales--Similar to the Finance and Accounting area, the area of Marketing and Sales is also more specific and narrower in scope than is the Administration area. Because of the specific nature of the Marketing and Sales area, it is expected that the importance of each technique to this area would be different. In the survey, 10 participants pointed out the importance of each technique. Their responses are summarized in Table XII.

TABLE XII

RELATIVE IMPORTANCE OF MANAGEMENT TECHNIQUES
TO "MARKETING AND SALES" AS VIEWED BY RESPONDENTS

Techniques	Per cent of respondents reporting				
	Importance			Unqual- ified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Org. planning	80	20	..	..	..
Decision theory	30	50	10	10	..
Decision trees	10	40	20	30	..
Reporting by respon- sibility	60	20	20	..	..
Systems analysis	40	30	10	10	10
Management by exception	60	30	10	..	..
Management by objective	80	20	..	..	..
Results management	70	10	10	10	..
Management of time	50	20	20	10	..
Organization and methods	40	10	20	30	..
Motivation theory	50	10	10	20	10
Participative management	60	30	..	10	..
Matrix organization	..	40	20	40	..
Information theory	20	60	10	10	..
Information retrieval	20	70	10	..	..
EDP	20	60	20	..	..
Cybernetics	10	10	40	30	10
Economic/market indicators	70	30	..	..	..
Market research	100	..	..	..	..
Brainstorming	20	40	30	10	..
Probability theory	30	60	10	..	..
Sociometric method	20	30	10	40	..
Costing systems	20	50	10	10	10
Marginal analysis	30	40	10	20	..
Contribution analysis	40	30	10	20	..
Sensitivity analysis	..	20	40	40	..

TABLE XII--Continued

Techniques	Per cent of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Break-even analysis	70	10	10	..	10
PACE	40	50	10	..	..
Simulation	10	60	20	..	10
Business games	20	40	30	10	..
Role playing	..	20	60	20	..
Monte Carlo method	10	30	30	20	10
Value analysis	10	30	10	50	..
Ergonomics	..	..	60	40	..
Random observation studies	10	50	30	10	..
In-basket techniques	..	20	40	40	..
Critical path methods	10	40	40	10	..
PERT/CPM	10	40	30	..	20
PERT/Cost	10	40	40	..	10
Branching networks	..	40	30	30	..
Resource allocation	30	60	..	10	..
Distribution matrix	20	40	..	40	..
Search theory	..	30	40	20	10
Method study	10	80	10	..	..
SOPs	30	60	10	..	..
Payback or payout period	20	60	20	..	..
Accounting or average rate of return	20	60	10	10	..
Time-adjusted or inter- nal rate of return	10	30	20	40	..
Net present value	40	40	10	10	..
MAPI	..	..	10	90	..
Utility theory	..	..	20	70	10
Indifference analysis	..	..	20	80	..
Replacement theory	..	..	10	80	10
Portfolio selection	..	20	60	20	..
Cashflow analysis	30	40	30	..	..
Working capital cycle Ratio (financial) analysis	20	10	40	20	10
	30	10	50	10	..

TABLE XII--Continued

Techniques	Per cent of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Budgetary planning and control	80	20	..	..	..
Profit-volume ratio	70	10	..	20	..
Exponential smoothing	10	40	20	30	..
Moving averages	10	40	40	10	..
Regression analysis	30	50	20	..	..
Box/Jenkins	..	..	10	90	..
Time series analysis	60	20	10	10	..
Input-output tables	20	50	10	20	..
"Objective and task" method	..	30	40	30	..
Vendor rating	10	40	30	20	..
Preference distribution analysis	30	40	10	20	..
Queuing theory	..	40	20	40	..
S. Q. C.	..	20	40	40	..
Mathematical programming	10	60	20	10	..
Work simplification	20	50	20	10	..
Time and motion study	..	60	30	10	..
Time standards	..	80	20	..	..
Work Sampling	..	30	50	20	..
Line of balance	..	..	20	80	..
Work study	10	30	50	10	..
Control charts	..	40	30	30	..
Material handling	..	40	20	40	..
Productivity bargaining	..	10	10	80	..
Learning curve theory	..	10	10	80	..
Salary progression	..	60	20	20	..
Salary surveys	20	60	10	10	..
Manpower planning	60	40	..	..	..
Critical incident technique	..	..	40	60	..
Work measurement	10	60	30	..	..

TABLE XII--Continued

Techniques	Per cent of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Job rotation	20	50	30	..	..
Sensitivity training	..	50	10	40	..
Sampling method	20	80	..	..	..
Sequential analysis	..	30	30	40	..
Economic reorder quantities	..	20	30	50	..
Stock control	20	10	50	20	..
Work planning and review	20	60	10	10	..
Management audit	30	50	20	..	..
Performance appraisal	80	20	..	..	..
"Five-by-Five" approach	..	..	20	80	..
Job analysis	30	50	20	..	..
Job evaluation	30	40	20	..	10
Job description	30	50	20	..	..
Incentive schemes	20	60	10	10	..
Programmed Instructions	..	50	30	20	..
Merit rating	40	50	10	..	..
Time-span of discretion	..	..	20	80	..
Model	10	40	10	..	40
Testing	..	20	60	20	..
Managerial grid	..	40	20	40	..

This table reveals that 19 techniques could be classified as "most important," 59 as "helpful," and 28 as "unimportant" or "insignificant" to the area of Marketing and Sales (See Table XVII). Among the techniques which the majority of the respondents considered "most important" are Organizational Planning, Reporting by Responsibility, Results Management, Management by Exception, Market Research, Economic Indicators, Input-output Tables, and Time Series Analysis. All these techniques have many applications to the major activities of this area and, therefore, managers of this area should have basic understanding of these techniques. In addition, if they have knowledge of the other 59 techniques listed in Table XVII as "helpful," they would be at an advantage, since many of the business activities are centered around this area and frequently are guided and directed on the basis of what the Marketing and Sales area does. Thus, any understanding of the techniques related to other functional areas can be very helpful to the manager. It was surprising to note that some of the statistical techniques such as Sampling Method, Regression Analysis and a few others which are

most useful in sales forecasting were classified as "helpful;" in recent years these statistical techniques have been widely discussed in the marketing literature for their importance to the area of Marketing and Sales.

Personnel and Industrial Relations--The techniques, in relation to their importance to the Personnel and Industrial Relations area, were classified by 14 respondents in the survey. Their responses are summarized in Table XIII. On the basis of the criteria explained earlier, 35 techniques could be classified as "most important;" 25 as "helpful;" and 46 as "unimportant" or "insignificant" to this area (See Table XVII). Among the techniques which were considered by the majority of the respondents as "most important" are Organizational Planning, Management by Objective, Productivity Bargaining, Learning Curve, Role Playing, Salary Progression, Salary Surveys, and Performance Appraisal. These techniques are useful to the activities of the Personnel and Industrial Relations area and, therefore, managers of this area should have basic understanding of these techniques.

TABLE XIII

RELATIVE IMPORTANCE OF MANAGEMENT TECHNIQUES TO
 "PERSONNEL AND INDUSTRIAL RELATIONS" AS VIEWED
 BY RESPONDENTS

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Org. Planning	57	36	7	..	..
Decision theory	29	43	14	14	..
Decision trees	14	36	14	36	..
Reporting by respon- sibility	57	43	..	..	..
Systems analysis	14	43	29	14	..
Management by exception	14	57	14	7	7
Management by objective	71	14	14	..	..
Results management	71	14	..	14	..
Management of time	57	43	..	..	..
Organization and methods	57	21	14	7	..
Motivation theory	64	29	..	7	..
Participative management	50	29	..	14	7
Matrix organization	7	14	29	50	..
Information theory	43	29	14	14	..
Information retrieval	14	43	29	14	..
EDP	14	57	14	7	7
Cybernetics	..	36	36	29	..
Economic/market indicators	14	36	43	7	..
Market research	14	29	57	..	..
Brainstorming	14	43	29	14	..
Probability theory	14	43	14	29	..
Sociometric method	14	36	21	29	..
Costing systems	7	29	43	21	..
Marginal analysis	..	..	57	36	7
Contribution analysis	..	..	57	43	..
Sensitivity analysis	14	29	43	14	..

TABLE XIII--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Break-even analysis	..	..	71	29	..
PACE	14	14	29	43	..
Simulation	14	43	14	29	..
Business games	14	43	29	14	..
Role playing	57	29	7	7	..
Monte Carlo method	..	14	36	50	..
Value analysis	..	14	57	21	7
Ergonomics	14	14	29	43	..
Random observation studies	..	14	57	29	..
In-basket techniques	43	29	21	7	..
Critical path methods	14	29	43	14	..
PERT/CPM	14	29	43	14	..
PERT/Cost	..	14	43	43	..
Branching networks	..	7	43	50	..
Resource allocation	14	43	14	21	7
Distribution matrix	..	..	29	64	7
Search theory	..	14	29	57	..
Method study	14	50	14	21	..
SOPs	14	43	29	14	..
Payback or payout period	..	43	29	29	..
Accounting or average rate of return	..	43	36	21	..
Time-adjusted or inter- nal rate of return	..	14	36	50	..
Net present value	..	14	36	43	7
MAPI	..	..	..	93	7
Utility theory	..	..	29	57	14
Indifference analysis	..	..	21	71	7
Replacement theory	14	..	29	50	7
Portfolio selection	..	..	36	57	7
Cashflow analysis	..	43	36	21	..
Working capital cycle	..	..	36	64	..
Ratio (financial) analysis	..	14	64	14	7

TABLE XIII--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Budgetary planning and control	57	21	21	..	..
Profit-volume ratio	7	21	57	14	..
Exponential smoothing	7	..	21	71	..
Moving averages	7	7	29	57	..
Regression analysis	..	21	36	43	..
Box/Jenkins	..	..	7	93	..
Time series analysis	..	..	57	36	7
Input-output tables	..	21	43	36	..
"Objective and task" method	7	29	36	29	..
Vendor rating	..	14	43	43	..
Preference distribution analysis	..	7	36	57	..
Queuing theory	..	..	36	64	..
S. Q. C.	..	..	50	36	14
Mathematical programming	..	43	36	21	..
Work simplification	36	43	14	..	7
Work measurement	43	36	14	7	..
Time and motion study	57	29	14	..	..
Time standards	50	29	7	14	..
Work sampling	43	21	14	14	7
Line of balance	..	..	14	86	..
Work study	50	29	14	..	7
Control charts	14	29	29	29	..
Material handling	7	7	43	43	..
Productivity bargaining	43	21	14	21	..
Learning curve theory	36	21	14	21	7
Salary progression	71	14	14	..	..
Salary surveys	71	14	14	..	..
Manpower planning	86	14	..	..	..
Critical incident technique	..	43	29	29	..

TABLE XIII--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Job rotation	57	36	7	..	..
Sensitivity training	50	36	7	7	..
Sampling method	7	36	36	21	..
Sequential analysis	7	7	36	50	..
Economic reorder quantities	7	..	64	29	..
Stock control	7	..	57	36	..
Work planning and review	50	36	7	7	..
Management audit	71	14	7	7	..
Performance apprai- sal	86	14	..	..	..
"Five-by-Five" approach	21	29	14	29	7
Job analysis	100	..	..	..	..
Job evaluation	100	..	..	..	..
Job description	100	..	..	..	..
Incentive schemes	64	29	7	..	..
Programmed instruc- tions	57	29	..	14	..
Merit rating	71	21	..	..	7
Time-span of dis- cretion	..	43	7	50	..
Model	..	14	29	14	43
Testing	79	14	7	..	..
Managerial grid	50	29	..	21	..

*Rounded to the nearest whole number.

As this area is more specialized and narrow in scope, individuals of this area do not have to know techniques related to the other functional areas; but if they have understanding of these techniques, they can be at an advantage since they have to assist individuals of the other areas in connection with the personnel matters; the understanding of 25 techniques pointed out as "helpful" by the majority of the respondents could be useful to managers of the Personnel and Industrial Relations area.

Production--As the activities of the Production area are much more complex and difficult, it is apparent that managers of this area should have good understanding of many of the production techniques; furthermore, they should have some knowledge of the techniques related to other areas since they are constantly involved in the activities of the other areas. This fact was pointed out by 12 respondents who classified each technique in terms of its importance to this area. The responses of these individuals are summarized in Table XIV.

TABLE XIV

RELATIVE IMPORTANCE OF MANAGEMENT TECHNIQUES TO
"PRODUCTION" AS VIEWED BY RESPONDENTS

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Org. planning	67	25	8	..	..
Decision theory	58	17	8	8	8
Decision trees	50	17	8	17	8
Reporting by re- sponsibility	67	25	8	..	..
Systems analysis	58	17	8	17	..
Management by exception	75	17	..	8	..
Management by objective	67	25	8	..	..
Results management	50	33	8	8	..
Management of time	58	25	8	8	..
Organization and methods	83	17	..	..	..
Motivation theory	50	25	8	17	..
Participative management	58	33	..	..	8
Matrix organization	17	33	33	17	..
Information theory	17	58	..	17	8
Information retrieval	33	42	17	..	8
EDP	25	33	25	17	..
Cybernetics	..	8	33	58	..
Economic/market indicators	25	67	..	8	..
Market research	17	75	..	8	..
Brainstorming	17	33	33	17	..
Probability theory	50	25	..	25	..
Sociometric method	..	..	50	50	..
Costing systems	67	25	8	..	..
Marginal analysis	17	25	17	33	8
Contribution analysis	8	25	25	33	8
Sensitivity analysis	25	42	25	..	8

TABLE XIV--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Break-even analysis	25	42	8	17	8
PACE	8	25	25	33	8
Simulation	50	25	8	8	8
Business games	17	33	42	..	8
Role playing	17	42	25	8	8
Monte Carlo method	33	33	8	17	8
Value analysis	8	67	..	17	8
Ergonomics	8	33	17	33	8
Random observation studies	8	42	17	25	8
In-basket techniques	..	33	17	33	17
Critical path methods	58	25	..	8	8
PERT/CPM	58	17	..	8	17
PERT/cost	50	17	..	25	8
Branching networks	8	33	8	33	17
Resource allocation	25	58	..	8	8
Distribution matrix	..	33	17	42	8
Search theory	..	25	25	42	8
Method study	75	8	..	8	8
SOPs	75	25	..	..	..
Payback or payout period	25	50	8	8	8
Accounting or average rate of return	17	58	8	17	..
Time-adjusted or inter- nal rate of return	17	33	25	25	..
Net present value	17	42	25	17	..
MAPI	..	..	8	75	17
Utility theory	..	25	25	50	..
Indifference analysis	8	25	25	33	..
Replacement theory	8	25	25	33	8
Portfolio selection	..	33	42	17	8
Cashflow analysis	33	42	17	..	8
Working capital cycle	17	17	33	25	8
Ratio (financial) analysis	17	50	8	25	..

TABLE XIV--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Budgetary planning and control	83	17	..	..	..
Profit-volume ratio	17	42	25	17	..
Exponential smoothing	8	42	42	..	8
Moving averages	8	33	25	25	8
Regression analysis	8	50	33	8	..
Box/Jenkins	8	..	8	75	8
Time series analysis	8	25	42	17	8
Input-output tables	17	50	8	17	8
"Objective and task" method	8	33	17	33	8
Vendor rating	..	25	25	42	8
Preference distribution analysis	..	8	33	50	8
Queuing theory	17	50	8	17	8
S. Q. C.	67	8	8	8	8
Mathematical programming	50	42	..	8	..
Work simplification	83	17	..	..	..
Work measurement	58	33	8	..	..
Time and motion study	67	25	8	..	..
Time standards	50	17	17	17	..
Work sampling	50	17	25	8	..
Line of balance	..	33	25	33	8
Work study	58	25	..	17	..
Control charts	58	17	..	17	8
Material handling	50	25	..	17	8
Productivity bargaining	8	17	33	42	..
Learning curve theory	25	25	33	8	8
Salary progression	17	33	33	17	..
Salary surveys	17	42	33	..	8
Manpower planning	91	8	..	..	..
Critical incident technique	..	..	25	67	8

TABLE XIV--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Job rotation	50	33	..	8	8
Sensitivity training	..	17	42	33	8
Sampling method	17	33	25	17	8
Sequential analysis	8	33	17	33	8
Economic reorder quantities	..	33	50	8	8
Stock control	..	67	25	..	8
Work planning and review	25	42	17	8	8
Management audit	25	50	..	17	8
Performance apprai- sal	75	25	..	..	..
"Five-by-five" approach	..	..	17	67	17
Job analysis	67	17	..	8	8
Job evaluation	67	17	..	8	8
Job description	58	25	..	8	8
Incentive schemes	33	42	17	..	8
Programmed instructions	..	33	25	33	8
Merit rating	67	25	..	8	..
Time-span of discretion	..	8	25	58	8
Model	17	33	..	17	33
Testing	8	33	50	8	..
Managerial grid	..	50	17	33	..

*Rounded to the nearest whole number.

From the preceding table, 38 techniques could be classified as "most important;" 49 could be classified as "helpful" and 19 techniques could be classified as "unimportant" or "insignificant" to the area of Production (See Table XVII). Among the techniques classified as "most important" by the majority of the respondents are Organizational Planning, Decision Theory, Decision Trees, Reporting by Responsibility, Systems Analysis, Methods Study, Statistical Quality Control, and Work Simplification. These techniques are directly or indirectly very useful to this area and, therefore, managers of this area should have understanding of these techniques. Also, since managers are involved in other activities of the organization, they would be at an advantage if they have some understanding of 49 techniques pointed out as "helpful."

Purchasing--Particularly, managers of the Production area would be at an advantage if they have an understanding of the techniques related to the purchasing activities; indeed, purchasing activities are often integrated into the Production area.

The relative importance of each technique to the Purchasing area was indicated by 14 respondents in the survey and their responses are summarized in Table XV.

On the basis of the criteria explained earlier, 13 techniques could be classified as "most important;" 57 as "helpful," and 36 as "unimportant" or "insignificant" to the area of Purchasing. (See Table XVII). The techniques classified as "most important" by the majority of the respondents include Organizational Planning, Reporting by Responsibility, Value Analysis, Standard Operating Procedures, and Vendor Rating. In this area, the number of techniques classified as "most important" is the lowest among all the functional areas. This indicates relatively a very narrow scope of this area. As this area is relatively narrow in scope, managers do not have to know many techniques. However, they would be at an advantage if they have some understanding of the techniques pointed out as "helpful."

TABLE XV

RELATIVE IMPORTANCE OF MANAGEMENT TECHNIQUES TO
"PURCHASING" AS VIEWED BY RESPONDENTS

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Organizational planning	64	36	..	..	..
Decision theory	14	43	29	14	..
Decision trees	14	36	14	21	14
Reporting by res- ponsibility	43	29	14	7	7
Systems analysis	14	29	29	14	14
Management by exception	43	21	7	21	7
Management by objective	21	43	7	21	7
Results management	21	36	7	29	7
Management of time	29	29	14	21	7
Organization and methods	14	36	14	29	7
Motivation theory	14	21	14	43	7
Participative management	14	29	29	21	7
Matrix organization	..	7	14	71	7
Information theory	14	14	36	29	7
Information retrieval	14	43	14	21	7
EDP	14	50	14	14	7
Cybernetics	..	7	21	64	7
Economic/market indicators	29	50	14	..	7
Market research	29	43	21	..	7
Brainstorming	7	29	43	14	7
Probability theory	14	29	14	36	7
Sociometric method	..	..	21	71	7
Costing systems	14	64	14	..	7
Marginal analysis	14	29	7	43	7
Contribution analysis	14	29	..	50	7
Sensitivity analysis	7	7	21	57	7

TABLE XV--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Break-even analysis	14	43	7	29	7
PACE	29	29	14	29	..
Simulation	14	43	14	21	7
Business games	..	29	36	29	7
Role playing	..	21	36	36	7
Monte Carlo method	..	7	29	57	7
Value analysis	50	21	..	21	7
Ergonomics	..	7	21	64	7
Random observation studies	..	14	43	36	7
In-basket techniques	..	14	29	50	7
Critical path methods	14	29	14	36	7
PERT/CPM	14	36	14	29	7
PERT/cost	14	29	7	43	7
Branching networks	..	..	29	50	21
Resource allocation	14	43	..	29	14
Distribution matrix	..	7	43	43	7
Search theory	..	14	21	57	7
Method study	14	43	14	21	7
SOPs	50	21	14	7	7
Payback or payout period	7	43	21	14	14
Accounting or average rate of return	7	36	21	21	14
Time-adjusted or in- ternal rate of return	..	14	21	50	14
Net present value	7	14	29	36	14
MAPI	..	7	..	86	7
Utility theory	..	14	21	57	7
Indifference analysis	..	14	14	64	7
Replacement theory	14	14	36	29	7
Portfolio selection	..	29	43	21	7
Cashflow analysis	21	36	7	29	7
Working capital cycle Ratio (financial)	14	21	14	43	7
analysis	14	29	29	21	7

TABLE XV--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No re- sponse
	Very Imp. (A)	Helpful (B)	Unimp. (C)		
Budgetary planning and control	50	29	..	14	7
Profit-volume ratio	7	43	36	7	7
Exponential smoothing	7	29	14	43	7
Moving averages	14	29	7	36	14
Regression analysis	..	21	43	29	7
Box/Jenkins	..	..	..	86	14
Time series analysis	7	21	36	29	7
Input-output tables	7	29	14	43	7
"Objective and task" method	29	29	14	14	14
Vendor rating	57	21	7	7	7
Preference distribution analysis	7	36	29	14	14
Queuing theory	..	14	43	36	7
S. Q. C.	43	36	..	14	7
Mathematical programming	14	29	14	21	21
Work simplification	21	43	21	7	7
Work measurement	14	43	29	7	7
Time and motion study	7	29	43	14	7
Time standards	7	21	29	36	7
Work sampling	14	29	14	36	7
Line of balance	..	7	21	64	7
Work study	14	43	14	21	7
Control charts	14	29	36	14	7
Material handling	43	21	7	14	14
Productivity bargaining	..	14	29	50	7
Learning curve theory	7	36	21	29	7
Salary progression	14	43	29	..	14
Salary surveys	..	57	29	7	7
Manpower planning	29	50	7	7	7
Critical incident technique	..	14	21	57	7

TABLE XV--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqualified	No response
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Job rotation	14	43	14	21	7
Sensitivity training	7	14	29	43	7
Sampling method	14	43	14	21	7
Sequential analysis	7	21	21	43	7
Economic reorder quantities	57	21	..	14	7
Stock control	64	29	..	..	7
Work planning and review	21	21	29	21	7
Management audit	14	29	14	36	7
Performance appraisal "Five-by-five" approach	57	29	..	..	14
Job analysis	..	..	7	79	14
Job evaluation	36	29	29	..	7
Job description	29	36	29	..	7
Incentive schemes	36	43	21	..	..
Programmed instructions	14	43	36	7	..
Merit rating	..	21	43	29	7
Time-span of discretion	50	29	..	14	7
Model	..	..	29	50	21
Testing	7	29	14	7	43
Managerial grid	..	21	64	7	7
	14	43	36	..	7

*Rounded to the nearest whole number.

Research and Development--Similar to the activities of the Purchasing area, the activities of the Research and Development area are relatively specialized and narrower in scope and often they are integrated into one of the other functional areas in the organization. Because of the specialized nature of the activities of this area, it is likely that a few techniques are either very helpful or very important to this area. In the survey, only three respondents pointed out the relative importance of each technique to the area of Research and Development. Their responses are summarized in Table XVI.

On the basis of the criteria explained earlier, 15 techniques could be classified as "most important;" 33 techniques as "helpful" and 58 as "unimportant" or "insignificant" to this area (See Table XVII). Among the techniques which were classified as "most important" by the majority of the respondents are Reporting by Responsibility, Systems Analysis, Results Management, Participative Management, Information Theory, Information Retrieval, EDP, Economic Indicators, and others.

TABLE XVI

RELATIVE IMPORTANCE OF MANAGEMENT TECHNIQUES
TO "RESEARCH AND DEVELOPMENT"
AS VIEWED BY RESPONDENTS

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No respo- nse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Organizational planning	..	100	..	..	..
Decision theory	..	33	67	..	..
Decision trees	..	33	33	33	..
Reporting by respon- sibility	67	33	..	..	..
Systems analysis	67	33	..	..	..
Management by exception	33	33	33	..	..
Management by objective	67	33	..	..	..
Results management	67	33	..	..	..
Management of time	..	67	33	..	..
Organization and methods	..	33	33	33	..
Motivation theory	..	33	..	67	..
Participative management	67	..	..	33	..
Matrix organization	..	..	33	33	33
Information theory	67	33	..	..	..
Information retrieval	100	..	..	..	..
EDP	67	33	..	..	..
Cybernetics	33	33	33	..	..
Economic/market indicators	67	33	..	..	..
Market research	100	..	..	..	..
Brainstorming	67	..	..	33	..
Probability theory	33	33	..	33	..
Sociometric method	..	..	33	67	..
Costing systems	..	33	33	33	..
Marginal analysis	..	33	33	33	..
Contributive analysis	..	..	33	67	..
Sensitivity analysis	..	..	..	100	..

TABLE XVI--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No respo- nse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Break-even analysis	..	67	33	..	..
PAGE	..	33	33	33	..
Simulation	67	33	..	..	..
Business games	67	33	..
Role playing	33	67	..
Monte Carlo method	33	33	..	33	..
Value analysis	..	67	..	33	..
Ergonomics	..	67	..	33	..
Random observation studies	..	100	..	..	..
In-basket techniques	33	67	..
Critical path methods	..	67	33	..	..
PERT/CPM	33	67	..	..	..
PERT/cost	33	33	33	..	..
Branching networks	33	67	..
Resource allocation	33	67	..	..	..
Distribution matrix	33	67	..
Search theory	..	33	..	67	..
Method study	33	33	33	..	..
SOPs	..	33	33	..	33
Payback or payout period	..	33	67	..	..
Accounting or average rate of return	..	33	33	33	..
Time-adjusted or internal rate of return	..	33	33	33	..
Net present value	..	33	67	..	..
MAPI	100	..
Utility theory	33	67	..
Indifference analysis	33	67	..
Replacement theory	100	..
Portfolio selection	67	33	..
Cashflow analysis	..	33	67	..	..
Working capital cycle	33	67	..
Ratio (financial) analysis	..	33	67	..	..

TABLE XVI--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No respo- nse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Budgetary planning and control	..	67	33	..	..
Profit-volume ratio	100	..	..
Exponential smoothing	33	33	..	33	..
Moving averages	..	67	..	33	..
Regression analysis	..	67	..	33	..
Box/Jenkins	100	..
Time series analysis	..	67	..	33	..
Input-output tables	..	67	..	33	..
"Objective and task" method	33	33	..	33	..
Vendor rating	33	67	..
Preference distribution analysis	33	67	..
Queuing theory	..	33	33	33	..
S. Q. C.	..	33	33	33	..
Mathematical programming	67	33	..	..	..
Work simplification	..	33	33	33	..
Work measurement	..	33	33	..	33
Time and motion study	100	..	..
Time standards	..	33	33	33	..
Work sampling	..	33	33	33	..
Line of balance	100	..
Work study	..	33	33	33	..
Control charts	..	33	33	..	33
Material handling	33	..	67	..	..
Productivity bargaining	33	67	..
Learning curve theory	33	33	33	..	..
Salary progression	67	33	..
Salary surveys	..	67	33	..	..
Manpower planning	..	100	..	..	..
Critical incident technique	100	..

TABLE XVI--Continued

Techniques	Per cent* of respondents reporting				
	Importance			Unqua- lified	No respo- nse
	Very imp. (A)	Helpful (B)	Unimp. (C)		
Job rotation	..	33	67	..	..
Sensitivity training	..	..	33	67	..
Sampling method	67	..	..	33	..
Sequential analysis	33	33	..	33	..
Economic reorder quantities	..	..	33	67	..
Stock control	..	..	100	..	..
Work planning and review	67	33	..	..	..
Management audit	..	..	33	67	..
Performance appraisal	33	67	..	..	..
"Five-by-five" approach	..	..	..	100	..
Job analysis	..	33	67	..	..
Job evaluation	..	33	67	..	..
Job description	..	33	67	..	..
Incentive schemes	33	33	33	..	..
Programmed instructions	..	..	67	33	..
Merit rating	33	67	..	..	..
Time-span of discretion	..	..	..	100	..
Model	33	33	..	..	33
Testing	..	67	33	..	..
Managerial grid	..	67	..	33	..

*Rounded to the nearest whole number.

As this area is largely involved in activities related to the finding of new products and processes and to the improvement of existing products and processes, managers of this area should have an understanding of Market Research, Brainstorming, Economic Indicators, Information Theory and others which are most useful in the Research and Development activities; although managers do not have to know the techniques useful to other areas, they could benefit from some understanding of them.

The 81 individuals who participated in the survey seemed to vary, to a certain extent, in their opinions concerning the importance of each technique to each of the seven functional areas of business. However, on the basis of the criteria explained earlier, each technique was classified. Table XVII presents a summary of the relative importance of each technique to each of the seven functional areas.

TABLE XVII
SIGNIFICANCE* OF MANAGEMENT TECHNIQUES
IN RELATION TO THE FUNCTIONAL AREAS**

Technique	Functional Areas						
	1	2	3	4	5	6	7
Organizational planning	A	A	A	A	A	A	B
Decision theory	B	B	B	B	A	B	C
Decision trees	B	B	B	B	A	B	C
Reporting by responsibility	A	A	A	A	A	A	A
Systems analysis	B	A	A	B	A	B	A
Management by exception	A	A	A	B	A	A	B
Management by objective	A	A	A	A	A	B	A
Results management	A	A	A	A	A	B	A
Management of time	A	A	A	A	A	B	B
Organization and methods	B	A	A	A	A	B	C
Motivation theory	A	B	A	A	A	B	B
Participative management	A	A	A	A	A	B	A
Matrix organization	B	B	B	C	B	C	C
Information theory (communication theory)	A	B	B	A	B	C	A
Information retrieval (data mobilization)	B	A	B	B	B	B	A
EDP	A	A	B	B	B	B	A
Cybernetics	C	C	C	C	C	C	B
Economic/market indicators	A	B	A	B	B	B	A
Market research	B	B	A	C	B	B	A
Brainstorming	B	C	B	B	B	C	A
Probability theory	B	C	B	B	A	B	B
Sociometric methods	B	B	B	B	C	C	C
Costing systems	B	A	B	C	A	B	C
Marginal analysis	B	B	B	C	B	B	C
Contribution analysis	B	A	A	C	B	B	C
Sensitivity analysis	B	A	C	C	B	C	C
Break-even analysis	B	B	A	C	B	B	C
PACE (performance and cost evaluation)	B	B	B	C	B	B	C
Simulation	B	B	B	B	A	B	A
Business games	B	B	B	B	B	C	C

TABLE XVII--Continued

Technique	Functional Areas						
	1	2	3	4	5	6	7
Role playing	C	C	C	A	B	C	C
Monte Carlo method (random sampling or walks)	C	C	B	C	B	C	B
Value analysis (value engineering)	B	C	B	C	B	A	B
Ergonomics (human factors engineering)	C	C	C	C	B	C	B
Random observation studies	C	C	B	C	B	C	B
In-basket techniques	B	B	C	A	B	C	C
Critical path methods	B	B	B	C	A	B	B
PERT/CPM	B	B	B	C	A	B	B
PERT/cost	B	B	B	C	A	B	B
Branching networks	B	C	B	C	B	C	C
Resource allocation	A	B	B	B	B	B	B
Distributive matrix	B	B	B	C	B	C	C
Search theory	B	C	C	C	C	C	B
Method study	B	A	B	B	A	B	B
SOPs	A	A	B	B	A	A	C
Payback or payout period	A	A	B	B	B	B	C
Accounting or average rate of return	A	A	B	B	B	B	C
Time-adjusted or internal rate of return	B	A	B	C	B	C	C
Net present value	B	A	B	C	B	C	C
MAPI	C	C	C	C	C	C	C
Utility theory	B	C	C	C	C	C	C
Indifference analysis	C	C	C	C	C	C	C
Replacement theory	B	B	C	C	B	C	C
Portfolio selection	B	A	C	C	C	C	C
Cash flow analysis	A	A	B	B	B	B	C
Working capital cycle	A	A	C	C	C	B	C
Ratio (financial) analysis	A	A	C	C	B	B	C
Budgetary planning and control	A	A	A	A	A	A	B
Profit-volume ratio	A	A	A	C	B	B	C
Exponential smoothing (exponentially weighted moving average)	B	C	B	C	B	B	B

TABLE XVII--Continued

Technique	Functional Areas						
	1	2	3	4	5	6	7
Moving averages	B	B	B	C	B	B	B
Regression analysis	B	C	B	C	B	C	B
Box/Jenkins	C	C	C	C	C	C	C
Time series analysis	B	B	A	C	C	C	B
Input-output tables	C	C	B	C	B	B	B
"Objective and task" method	B	B	C	C	B	B	B
Vendor rating	B	B	B	C	C	A	C
Preference distribution analysis	C	C	B	C	C	B	C
Queuing theory (waiting line)	C	C	B	C	B	C	C
Statistical quality control	C	B	C	C	A	A	C
Mathematical programming	B	B	B	B	A	B	A
Work simplification	B	B	B	B	A	B	C
Work measurement	B	B	B	A	A	B	C
Time and motion study	B	B	B	A	A	C	C
Time standards	B	B	B	A	A	C	C
Work sampling	B	C	C	A	A	B	C
Line of balance	B	C	C	C	B	C	C
Work study	B	B	C	A	A	B	C
Control charts	B	B	B	B	A	B	C
Material handling	B	B	B	C	A	A	C
Productivity bargaining	B	C	C	A	C	C	C
Learning curve theory	B	B	C	A	B	B	B
Salary progression	B	B	B	A	B	B	C
Salary surveys	A	A	B	A	B	B	B
Manpower planning	A	A	A	A	A	B	B
Critical incident technique	B	C	C	B	C	C	C
Job rotation	B	B	B	A	A	B	C
Sensitivity training (T-group)	B	C	B	A	C	C	C
Sampling method	B	B	B	B	B	B	A
Sequential analysis	C	C	C	C	B	B	B
Economic reorder quantities	B	B	C	C	C	A	C
Stock control	B	B	C	C	B	A	C

TABLE XVII--Continued

Technique	Functional Areas						
	1	2	3	4	5	6	7
Work planning and review (WP and R)	B	A	B	A	B	B	A
Management audit	A	A	B	A	B	B	C
Performance appraisal	A	A	A	A	A	A	B
"Five-by-five" approach	C	C	C	B	C	C	C
Job analysis	B	B	B	A	A	B	C
Job evaluation (job-rating)	B	B	B	A	A	B	C
Job description	B	B	B	A	A	B	C
Incentive schemes	A	B	B	A	B	B	B
Programmed instruction (teaching machines)	B	B	B	A	B	C	C
Merit rating	A	A	B	A	A	A	B
Time-span of discretion	C	C	C	B	C	C	C
Model	B	B	B	C	B	B	B
Testing (intelligence, aptitude, personality, achievement)	B	B	C	A	C	C	B
Managerial grid	B	B	B	A	B	B	B

*"A"--very important, "B"--helpful, "C"--insignificant.

**"1"--administration, "2"--finance and accounting, "3"--marketing and sales, "4"--personnel and industrial relations, "5"--production, "6"--purchasing, "7"--research and development.

From Table XVII, the total number of techniques under each of the importance classifications for each of the areas could be determined and summarized as shown in Table XVIII.

TABLE XVIII

THE TOTAL NUMBER OF TECHNIQUES UNDER EACH CATEGORY OF IMPORTANCE FOR EACH OF THE FUNCTIONAL AREAS

Functional Areas	Importance Categories		
	Very Imp. (A)	Helpful (B)	Unimp. (C)
Administration	26	65	15
Finance and Accounting	32	47	27
Marketing and Sales	19	59	28
Personnel and Industrial Relations	35	25	46
Production	38	49	19
Purchasing	13	57	36
Research and Development	15	33	58

As shown in Table XVIII, the number of the techniques classified as "most important" was the largest in relation to the Production area; it was the minimum in relation to the area of Purchasing. The maximum number

of the techniques was classified as "unimportant" in relation to the Research and Development area, and the minimum number was in relation to the area of Administration.

It might be pointed out that some of the techniques in relation to specific functional areas were considered "unimportant" or "insignificant" in situations where most of the respondents did not specify the importance because of their lack of familiarity. There were eight such techniques with which more than 50 per cent of the respondents were not familiar--namely, MAPI, Utility Theory, Indifference Analysis, Box/Jenkins, Line of Balance, Critical Incident Technique, "Five-by-Five," and Time-span of Discretion. The participating individuals of the Purchasing area were not familiar generally with many of the techniques not related to their own area; they did, however, appear to be familiar with most of the techniques normally considered useful to their area. In general, almost all the respondents in the survey were found to be familiar with most of the techniques related to their own specific areas and they had indicated the importance on the basis of their knowledge.

As the importance of each technique in relation to each of the functional areas is determined on the basis of the views expressed by the respondents from most progressive and successful firms, this importance could be used to develop an index or a scale which would make it possible to evaluate the managerial understanding of the techniques. Based on the understanding, it would be possible to determine the extent of managerial obsolescence.

The following chapter discusses how the managerial understanding of the 106 techniques is examined and evaluated. It is largely concerned with the survey dealing with the understanding and application of the management techniques and concepts.

CHAPTER V

UNDERSTANDING AND APPLICATION OF MANAGEMENT TECHNIQUES

In the previous chapter, the significance of each management technique and concept was determined on the basis of the views expressed by the individuals belonging to the leading business organizations in Canada. The significance of each technique and concept was related to the functional activity areas of Administration, Finance and Accounting, Marketing and Sales, Production, Purchasing, Personnel and Industrial Relations, and Research and Development.

A basic premise in this research study was that the extent of management obsolescence could be determined if the level of managerial understanding of needed techniques and concepts was determined. In order to determine levels of understanding, a questionnaire was designed and used in the survey (See Appendix E). The questionnaire was developed through the initial research and the pilot study as explained in Chapter I.

Description of the Questionnaire

The questionnaire was designed in a form similar to the questionnaire discussed in the preceding chapter, which dealt with the significance of the 106 management techniques and which will be referred to as Q1 for clarity. Like Q1, the questionnaire dealing with the understanding of the techniques was also divided into two parts--Section I of the questionnaire dealt with general information and Section II with the understanding and application of the techniques. All the questions in Section I were similar to the questions in Section I of Q1.

In Section II of the questionnaire, the same techniques and concepts were included; the list was identical to that of Section II of Q1. But in this section of the questionnaire, the respondent was asked to indicate his understanding of the techniques and concepts rather than the importance of each of the techniques and concepts. The respondent was asked to indicate his understanding by circling the number 5, 4, 3, 2 or 1 in the questionnaire; 5 representing the complete understanding of the technique and 1 representing no understanding at all. In addition, the respondent was asked to indicate in terms of "Yes" or "No" application of each technique in work.

Further, he was asked to write down the sources from which he acquired knowledge about a specific technique; in order to assist him, the following sources were indicated in the questionnaire: on the job, in basic education, in seminars or conferences, in books or magazines.

The remainder of Section II of the questionnaire was similar to Section II of Q1.

In essence, the questionnaire was designed in such a manner that it could readily be understood by most of the individuals. The questions were kept as simple as possible and they were directed in such a manner that the answers could be easily checked or written out. Furthermore, the questions were so designed that they could be easily and rapidly processed and compiled by computer.

Selection of Respondents

The study of the questionnaire survey was limited to the managerial and staff personnel of 282 Canadian business firms which are listed in Appendix D. These firms were selected from 1968 Canadian Trade Index, a publication of the Canadian Manufacturers' Association. In the Index, more than 12,800 manufacturing, resource,

merchandising, mining, utilities and other types of firms were listed. However, in order to keep the research at a manageable size, the selection was limited to the Toronto, Montreal and Vancouver areas. Only those firms were chosen which had their head offices in one of these areas and which were listed as having 500 or more employees. The firms which were included in the survey dealing with the importance were not selected in studying the managerial understanding. The 282 business firms selected for the survey were believed to provide an adequate sample for the study and they were considered sufficient to achieve the aims of the research. According to a member of the Bureau of Management Consulting Services, Public Service Commission of Canada, the cities of Toronto, Montreal and Vancouver should be sufficient because they represent "the industrial belt" of Canada and these areas do have "...large corporations where management mobility (in relation to technical competence) is possible and often necessary."¹ Thus, on the basis of the preceding comment and other individual suggestions,

¹Letter from a member of Public Service Commission, Ottawa, Canada, December, 6, 1968.

the criteria for the selection of the firms were developed and on those bases 282 firms were chosen.

The president of each of the 282 firms was furnished with a supply of the questionnaire by mail; and in an enclosed letter, he was asked to distribute the questionnaire to his managerial and staff personnel. The distribution of the questionnaire was left to each president's discretion.

Data Collection and Analysis

Six hundred and seven questionnaires were received over a period of four months either directly from the respondent or from a member of his organization. Some individuals and organizations did not want to participate in the survey for various reasons and they indicated their unwillingness to the researcher by correspondence. Among the reasons which prevented their participation in the survey were lack of time, existence of labor strikes, organizational policy, failure to perceive the importance of the survey, individual doubts about the confidentiality of the reply, and vacation schedules.

The data obtained through the questionnaire were processed manually as well as electronically and were

analyzed statistically.

During the compilation process, it was found that 12 of the 607 questionnaires were only partially answered; since many of the questions were omitted by these 12 respondents, their replies had to be excluded from the analysis. Twenty other questionnaires also had to be excluded from the analysis because the respondents had failed to indicate their functional area or the area indicated was outside the seven areas selected for the study; it was important to know the respondent's area because the evaluation of his understanding of the techniques was to be determined in terms of his functional area. In short, although 607 questionnaires were returned, only 575 were used in the analysis.

Characteristics of Respondents

On the basis of the information provided by 575 different individuals, it was found that 32 per cent of them had been engaged in the activity area of Administration; 15 per cent in Finance and Accounting; 23 per cent in Marketing and Sales; 11 per cent in Production; 13 per cent in Personnel; four per cent in Purchasing, and one per cent in Research and Development.

The distribution is shown in Table XIX.

TABLE XIX
NUMBER OF RESPONDENTS BY FUNCTIONAL AREAS

Area	Number of Respondents
Administration.....	186
Finance and Accounting.....	87
Marketing and Sales.....	133
Production.....	64
Purchasing.....	22
Personnel and Industrial Relations.....	77
Research and Development.....	6
Total.....	575

Of the 575 respondents, 549 individuals together represented 61 different business organizations with total revenues for all of over \$5 billion; 26 individuals did not indicate the names of their organizations. Nineteen of the 61 firms reported individual revenues of over \$70 million per year including 15 with over \$100 million in annual revenues. There were seven firms with annual revenues of less than \$10 million each. Table XX presents the distribution of the 61 firms by their annual revenues. As the table reveals, about 49 per cent of the firms had less than or equal to \$40 million in sales.

TABLE XX

NUMBER OF FIRMS BY ANNUAL SALES REVENUES

Annual Revenues (dollars)	Number of Firms
0 - 10,000,000.....	7
10,000,001 - 20,000,000.....	13
20,000,001 - 30,000,000.....	6
30,000,001 - 40,000,000.....	4
40,000,001 - 50,000,000.....	9
50,000,001 - 60,000,000.....	3
60,000,001 - 70,000,000.....	-
Over 70,000,000.....	19
Total.....	61

Fifty-one per cent had more than \$40 million in sales, and about 22 per cent had revenues between \$10 million and \$20 million.

In relation to the number of employees, the 61 firms were reported to have altogether 176,819 employees; the average number of employees was found to be 2,734. Table XXI shows the distribution of the firms by employees.

TABLE XXI

NUMBER OF FIRMS BY APPROXIMATE NUMBER OF EMPLOYEES

Number of Employees	Number of Firms
0 - 500.....	5
501 - 1000.....	20
1001 - 1500.....	11
1501 - 2000.....	4
2001 - 2500.....	4
2501 - 3000.....	3
Over 3000.....	14
Total.....	61

Eight per cent of the firms were shown to have 500 or less employees; since the survey included only firms with 500 or more employees as reported in the 1968 Canadian Trade Index, it is believed that the firms with less than 500 employees could have been misreported in the Index, or the number of employees could have declined since the report to the Index, or the respondent could have reported the number as it related to his own division or branch. Otherwise, the Index reports about the listed firms seem relatively accurate, as 92 per cent of the firms represented in the survey had more than 500 employees. Thirty-three per cent of the firms had between 500 and 1,000 employees; this represents the largest number of firms within this particular class. Twenty-three per cent of the firms had more than 3,000 employees. The remainder of the firms had between 1,000 and 3,000 employees.

With the exception of two, all the respondents had indicated the nature of business of their organizations. Four hundred individuals indicated manufacturing as the major business of their organizations. The next largest group was involved in providing some type of services.

Table XXII presents the distribution of the respondents by nature of business. It is apparent from the table

TABLE XXII

NUMBER OF RESPONDENTS BY NATURE OF BUSINESS

Nature of Business	Number of Respondents
Manufacturing.....	400
Construction.....	15
Transportation, communication, public utilities.....	15
Mines, quarries, oil.....	40
Finance, insurance, real estate.....	13
Trade.....	30
Government.....	5
Services and others.....	55
Total.....	573*

*The total is less than 575 because two respondents did not indicate the nature of business of their firms.

that almost 70 per cent of the individuals were involved in manufacturing business, and slightly less than one per cent in government.

It is not surprising that the respondents' organizations offer a variety of products. These products were indicated by the respondents: paper and allied products; printing and related products; fabricated metals; machinery; lumber and wood products, and others.

The following table provides an insight as to the distribution of the respondents by products of their firms.

TABLE XXIII

NUMBER OF RESPONDENTS BY MAJOR PRODUCTS OF FIRMS

Major Products	Number of Respondents
Lumber and wood products.....	54
Furniture and fixtures.....	21
Stone.....	5
Clay and glass products.....	2
Primary metal industries, including blast furnaces and primary smelting and refining processes.....	37
Fabricated metals.....	75
Machinery.....	55
Electrical machinery.....	47
Transportation equipment.....	43
Instrument.....	14
Ordnance.....	2
Food and related products.....	69
Tobacco.....	45
Textile-mill products.....	34
Paper and allied products.....	82
Printing, publishing and related products.....	79
Chemicals.....	30
Petroleum and coal products.....	40
Rubber.....	--
Leather and leather products.....	--
Services and others.....	71
Total.....	805*

*The total exceeds 575 as many respondents indicated more than one product of their organizations; 23 individuals had not indicated the products of their firms.

This table shows a variety of products offered by the

organizations of the respondents. Among products not indicated by any of the respondents were rubber and leather and related products; otherwise, all other major categories of products were being offered by the firms.

In their organizations, the respondents were members of the top, middle or lower management levels or they were serving in the capacity of "staff" and specialists. The majority of the respondents were members of the middle management level; to be exact, 296 or about 51 per cent of the 575 respondents belonged to this level of their organizations. One hundred and eighty-nine of the respondents or about 33 per cent classified themselves as members of the top management level; 13 respondents or about two per cent belonged to the lower level of the organizations. There were 77 or about 13 per cent of the respondents who were staff members.

Of the 575 respondents, 557 who indicated their salary bracket had an average salary of \$20,704 per year; their annual median salary was \$19,545. The following table presents the distribution of the respondents by their annual salaries. None of the respondents had a

TABLE XXIV
NUMBER OF RESPONDENTS BY ANNUAL SALARY

Salary (\$)	Number of Respondents
Less than 5,000.....	--
5,000 - 9,999.....	27
10,000 - 14,999.....	122
15,000 - 19,999.....	143
20,000 - 24,999.....	90
25,000 - 29,999.....	82
30,000 and over.....	93
Total.....	557*

*The total is less than 575 because 18 individuals did not indicate their salaries.

salary less than \$5,000 per year; 93 individuals or about 16 per cent of the respondents had annual salaries over \$30,000. The maximum number of the respondents had salaries between \$15,000 and \$20,000; this represents the modal salary value of \$16,419. Almost 46 per cent of the respondents had salaries between \$10,000 and \$20,000 per year.

In relation to the respondent's age, the following table shows the distribution of 573 individuals; two did not report their age.

TABLE XXV
NUMBER OF RESPONDENTS BY AGE

Age (years)	Number of Respondents
0 - 24.....	9
25 - 29.....	32
30 - 34.....	55
35 - 39.....	140
40 - 44.....	126
45 - 49.....	66
50 - 54.....	65
55 - 59.....	60
60 - 64.....	19
65 and over.....	1
Total.....	573*

*Two individuals did not indicate their age.

From the table, it is obvious that 266 or about 46 per cent of the respondents were between the ages of 35 and 45. Only nine individuals were below 25 years of age, and only one was 65 or over. The average and median age of the respondents was found to be 42 years.

Since the individuals' average age was found to be 42 years, it is expected that they would have many years of practical or work experience. Table XXVI shows the number of the respondents by their practical experience.

TABLE XXVI

NUMBER OF RESPONDENTS BY PRACTICAL EXPERIENCE

Practical Experience (years)	Number of Respondents
Less than 5.....	17
5 - 9.....	73
10 - 14.....	63
15 - 19.....	123
20 - 24.....	111
25 - 29.....	66
30 and over.....	122
Total.....	575

As indicated in the table, only 17 individuals or three per cent of the respondents had less than 5 years of work experience. Fifty per cent of the respondents had between 10 and 25 years of experience. The average experience seemed to be about 21 years.

In addition to many years of practical experience, many of the respondents had education beyond high school. Of the 565 respondents who indicated their educational background, 353 had four years or more of college education; the number represents almost 61 per cent of the respondents. The distribution of the respondents by their educational background is shown in the following table. As shown in the table, 93 individuals or about 16 per cent had no college education; but 169 respondents or 29 per cent approximately had done some post-graduate studies.

TABLE XXVII
NUMBER OF RESPONDENTS BY EDUCATION

Education	Number of Respondents
High School and under.....	93
1st year college.....	45
2nd year college.....	34
3rd year college.....	40
4th year college.....	184
Graduate studies.....	169
Total.....	565*

*Ten respondents did not indicate their education.

Although 119 or about 21 per cent of the respondents had attended college, they did not seem to have completed their college training. Among those who attended college, the major fields of studies were engineering, humanities, mathematics, economics, commerce and natural sciences. Together they held about 431 diplomas, certificates and degrees.

Most of the respondents had listed one or more trade magazines and newspapers which they regularly read. Also, they indicated membership in one or more professional organizations. Thus, the respondents presented a variety of trade publications and professional organizations.

Respondents' Understanding of Techniques

In order to evaluate the respondent's understanding of the techniques and concepts listed in Section II of the questionnaire, it was necessary to measure the degree or level of understanding of each technique and to evaluate it in terms of the technique's importance to the respondent's functional area. Thus, a measuring process involving a scoring system was developed and was used to evaluate directly the respondent's understanding.

The measuring process involved the following steps for each respondent:

1. Determination of the individual's functional area as indicated in the question VII of Section I of the questionnaire;

2. Determination of the importance of each technique in relation to the individual's functional area and the assignment of points or weights to this importance. Each technique, on the basis of the importance indicated in the preceding chapter, was assigned 3 points for "A" rating of importance, 2 points for "B" rating of importance or 1 point for "C" rating of importance;

3. Determination of the individual's level of

understanding of each technique and the assignment of points or weights to his level or degree of understanding; each technique with 5, 4, 3, 2 or 1 level of understanding checked by the respondent was assigned 5, 4, 3, 2 or 1 point(s) respectively;

4. Determination of the individual's score for each technique in relation to the importance and understanding of the technique; the score was calculated by multiplying the technique's "importance points" by its "understanding points;" and finally,

5. Addition of the score for each technique and the determination of the total score for the individual; this total score represented the level of the individual's understanding of all the 106 techniques and concepts.

To further clarify the measuring process of the study, a hypothetical situation is considered here. In this situation, it is assumed that the individual is engaged in the Administration area and that there are only three techniques X, Y, and Z; these techniques have the importance, in relation to the Administration area, of A, B and C respectively. The individual's understanding of the techniques is assumed to be 5, 3 and 1 respectively. For his understanding level of 5 of X, the individual

would receive 15 points (3 points for the "A" rating times 5 points for the level 5 understanding); for his understanding level of 3 of Y technique, he would receive 6 points (2 points for the "B" rating times 3 points for the level 3 understanding); and for his understanding level of 1 of Z technique, he would receive 1 point (1 point for the "C" rating times 1 point for the level 1 understanding). The total score of the individual for his understanding of X, Y and Z techniques would be 22 points.

On the basis of the preceding measurement procedure, the understanding score for each of the 575 respondents was determined.

Understanding relative to "Administration" area--

Of the 575 respondents, 186 respondents were engaged in the functional area of Administration. These individuals' scores are summarized in the following table. Among these 186 individuals, the highest score was 943 and the lowest was 269; 25 per cent of the individuals were below 451, 25 per cent above 641 and the remaining 50 per cent were between 451 and 641. The average score

TABLE XXVIII

SCORES OF RESPONDENTS IN "ADMINISTRATION" AREA

Scores	Number of Respondents
223 - 335.....	24
336 - 446.....	20
447 - 558.....	66
559 - 669.....	45
670 - 781.....	17
782 - 892.....	12
893 - 1004.....	2
1005 - 1115.....	-
Total.....	186

of the group was 535.

If the individuals' scores were depicted on a scale ranging from 0 to 100, the average score on the Understanding Scale (U-Scale) would be approximately 35; the top 25 per cent of the respondents would be above 46 approximately and the bottom 25 per cent would be below 26 on the scale. About 17 per cent of the respondents would fall above the half-way mark of 50 on the scale and 83 per cent would be below this mark.

For the Administration area, there were 26 techniques with the significance rating of "A", 65 techniques with the rating of "B" and 15 techniques with the rating of "C".

Based on the ratings of the techniques and the scoring system used in the study, the maximum possible score for the individuals in this area was 1,115 and the minimum possible score was 223; in other words, it was possible for the individual of this area to score anywhere from 223 to 1,115. The range between the maximum and minimum possible values was, therefore, 892 and this range was used to divide the U-Scale from 0 to 100.²

Understanding relative to "Finance and Accounting" area--In the area of Finance and Accounting, there were 87 respondents whose scores are summarized in the following table. Among these 87 individuals, the highest score was 823 and the lowest was 392; the average was 625. Twenty-five per cent of the individuals scored below 503, 25 per cent above 729 and the remaining between 503 and 729.

²The U-Scale is identical for each of the seven functional areas considered in this study. The division of the scale is also identical; however, the range between the maximum and minimum possible scores on which the division of the scale is based would vary from one area to another because of the differences in the maximum and minimum possible scores in each of the areas. The maximum and minimum scores in each of the areas are based on the number of techniques with "A", "B" and "C" significance ratings. See Table XVIII in Chapter IV.

TABLE XXIX

SCORES OF RESPONDENTS IN "FINANCE AND ACCOUNTING" AREA

Scores	Number of Respondents
217 - 326.....	--
327 - 434.....	13
435 - 542.....	14
543 - 651.....	14
652 - 760.....	32
761 - 868.....	14
869 - 976.....	--
977 - 1085.....	--
Total.....	87

On the U-Scale the average score of the respondents would be approximately at 47; the top 25 per cent would be above 59 and the lower 25 per cent would be below 33 approximately; about 53 per cent of the respondents would be over the 50 mark on the scale and the remaining would be below this mark.

Understanding relative to "Marketing and Sales"
area--In the area of Marketing and Sales, there were 133 respondents. The scores of these individuals are summarized in the following table. Among these individuals, the highest score was 858 and the lowest was 274. The average score of the respondents was 505. Twenty-five

TABLE XXX

SCORES OF RESPONDENTS IN "MARKETING & SALES" AREA

Scores	Number of Respondents
203 - 304.....	6
305 - 406.....	26
407 - 507.....	34
508 - 609.....	37
610 - 711.....	28
712 - 812.....	-
813 - 913.....	2
914 - 1015.....	-
Total.....	133

per cent of the respondents had scores less than 409; 25 per cent had more than 600 and the remaining 50 per cent had between 409 and 600.

On the U-Scale, the average score would be approximately at 37. The upper 25 per cent of the respondents would be approximately above 49 and the lower 25 per cent would be below 25 on the scale. Furthermore, about 22 per cent of the individuals would be above the 50 level on the scale and the remaining 78 per cent would be below this level.

Understanding relative to "Production" area--In the area of Production, there were 64 respondents. The scores of the respondents are summarized in the following table.

TABLE XXXI
SCORES OF RESPONDENTS IN "PRODUCTION" AREA

Scores	Number of Respondents
231 - 346.....	2
347 - 462.....	22
463 - 577.....	21
578 - 693.....	6
694 - 808.....	13
809 - 924.....	-
925 - 1039.....	-
1040 - 1155.....	-
Total.....	64

Among the individuals, the highest score was 787 and the lowest score was 338. The average score was 530. Twenty-five per cent of the respondents had lower than 420; 25 per cent had over 635 and the remaining had between 420 and 635.

On the U-Scale, the average score would appear approximately at 32. The upper 25 per cent would be above 43 on the scale and the lower 25 per cent would be below

20. Only 21 per cent of the respondents were above the 50 mark on the scale, and the remaining were below this mark.

Understanding relative to "Purchasing" area--In the area of Purchasing, there were 22 respondents. Their scores are summarized in the following table. Among the respondents, the highest score was 614 and the lowest score was 275. The average score of the respondents was 357.

TABLE XXXII

SCORES OF RESPONDENTS IN "PURCHASING" AREA

Scores	Number of Respondents
189 - 283.....	9
284 - 378.....	2
379 - 472.....	9
473 - 567.....	-
568 - 661.....	2
662 - 756.....	-
757 - 850.....	-
851 - 945.....	-
Total.....	22

Twenty-five per cent of the respondents had scores lower than 246; 25 per cent had above 435, and the remaining 50 per cent were between 246 and 435.

On the U-Scale, the average score of the respondents would be at 22 approximately. The upper 25 per cent of the respondents would be above 33 and the lower 25 per cent would be below 8 on the scale. Only nine per cent of the respondents would be above the 50 mark of the scale; the remaining 91 per cent would be below this mark.

Understanding relative to "Personnel and Industrial Relations" area--In the area of Personnel and Industrial Relations, there were 77 respondents. Their scores are summarized in the following table. Among the respondents in this area, the highest score was 685 and the lowest was 302; the average score was 523. As the table indicates,

TABLE XXXIII

SCORES OF RESPONDENTS IN "PERSONNEL & INDUSTRIAL" AREA

Scores	Number of Respondents
201 - 301.....	-
302 - 402.....	14
403 - 502.....	13
503 - 603.....	33
604 - 703.....	17
704 - 804.....	-
805 - 904.....	-
905 - 1005.....	-
Total.....	77

25 per cent of the respondents had scores lower than 433; 25 per cent had scores higher than 596, and the remaining 50 per cent had scores between 433 and 596.

On the U-Scale, the average score of the respondents would be approximately at 40. The upper 25 per cent of the respondents would be above 49 on the scale; the lower 25 per cent would be below 30. Twenty-two per cent of the respondents would be above the 50 mark on the scale, and the remainder would be below this mark.

Understanding relative to "Research and Development" area--In the Research and Development area, there were only six respondents. Their scores were as follows: 398, 407, 482, 493, 513 and 533. The average score of the respondents was 471.

On the U-Scale, the average score would be approximately at 44; about 33 per cent of the respondents would be above the 50 mark and the remaining 67 per cent would be below this mark on the scale.

From the preceding discussion of the respondents' scores in each of the functional areas, it can be seen that the average score of the respondents in the area of

Finance and Accounting was 47 on the U-Scale, representing the highest average score among all the seven functional groups. Furthermore, the Finance and Accounting group had the highest number, 53 per cent, of the respondents above the 50 mark on the scale. In contrast, the Purchasing group had the lowest average score of 22 on the scale; in addition, this group had the lowest number of individuals above the 50 mark on the scale.

Among all the seven functional groups, the group in the Administration area had the highest number of individuals, 186. The group average was about 35 on the scale. This average of the group was higher than the averages of the Production and Purchasing groups but lower than the averages of the other four groups. The smallest number of individuals was in the area of Research and Development; the six individuals of this group had the average of about 44 on the U-Scale, the second highest average among all the groups.

If all the 575 respondents of all the functional areas are considered together on the U-Scale ranging from 0 to 100, the distribution of the respondents would be as shown in the following table. As shown in Table XXXIV,

TABLE XXXIV
 RANGE OF RESPONDENTS' SCORES ON
 THE UNDERSTANDING SCALE

Scale Range	Number of Respondents
0 to 12½.....	41
12½ to 25.....	97
25 to 37½.....	159
37½ to 50.....	137
50 to 62½.....	111
62½ to 75.....	26
75 to 87½.....	4
87½ to 100.....	-
Total.....	575

138 respondents or slightly less than 25 per cent were below 25 on the U-Scale, including about 7 per cent of the respondents in the lowest range of the scale; 141 respondents or about 25 per cent were above the 50 mark on the scale. About 50 per cent of the respondents were between the 25 and 50 marks on the scale. The average score of the respondents on the scale would be approximately 37. It might be noted in the table that none of the respondents was in the range of 87½ to 100 on the U-Scale--the highest range, reflecting a very high degree of understanding.

The distribution of the respondents on the scale is further illustrated in Figure 1 below.

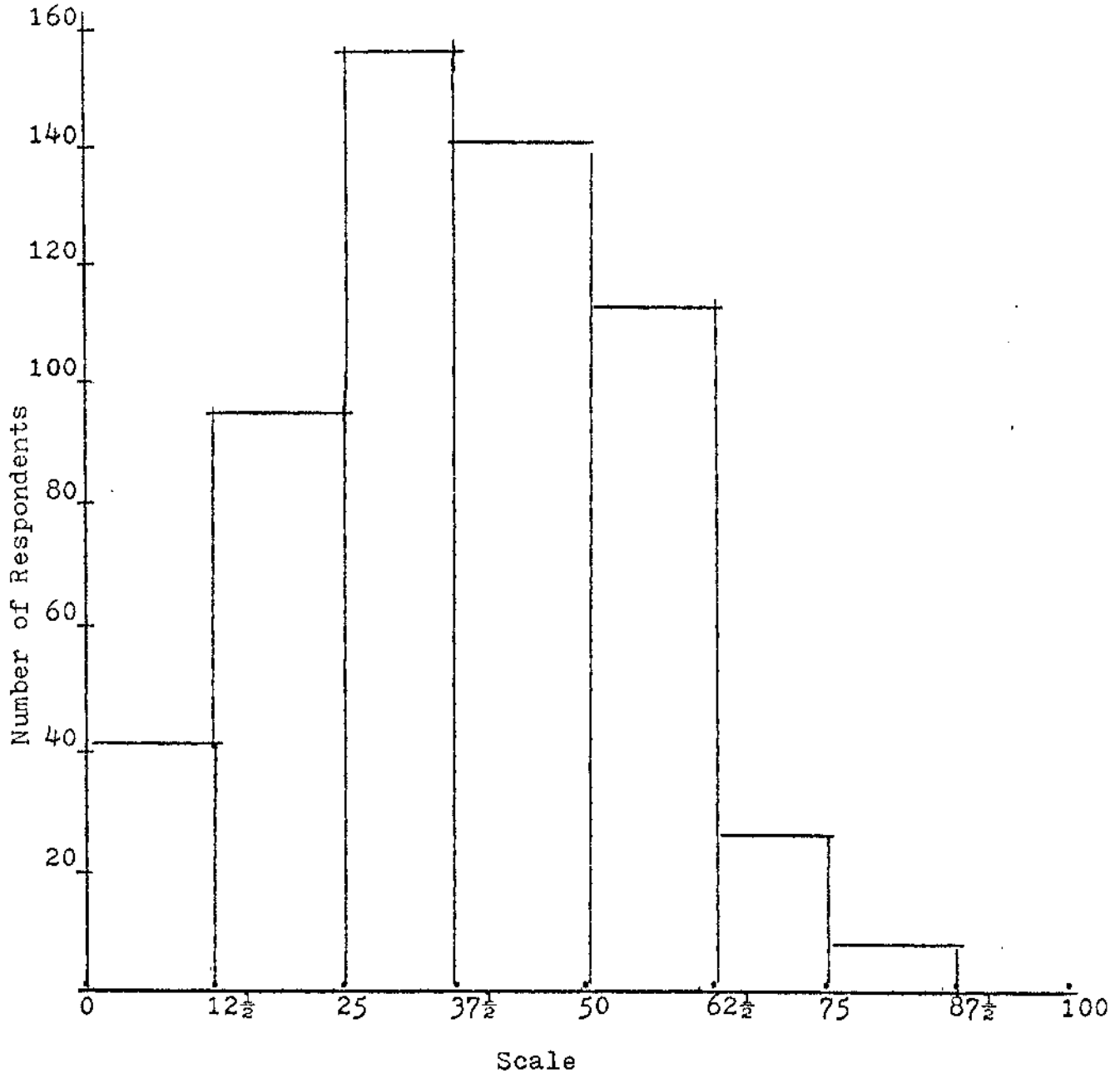


Fig. 1 --Distribution of respondents on
the Understanding Scale

Understanding relative to nature of business--Of the 575 respondents, 400 respondents had indicated the nature of business of their organizations as manufacturing. (See Table XXII) The average score of the respondents in manufacturing was approximately 36 on the U-Scale. The following table presents the average scores of respondents in relation to the nature of business of their firms.

TABLE XXXV
AVERAGE SCORES OF RESPONDENTS IN RELATION
TO NATURE OF BUSINESS

Nature of Business	Average Score *
Manufacturing.....	36
Construction.....	43
Transportation, communication, public utilities.....	41
Mines, quarries, oil.....	24
Finance, insurance, real estate.....	45
Trade.....	47
Government.....	51
Services and others.....	43

*Rounded to the nearest whole number.

As the table shows, the highest average score was in government, and the lowest score was in mines, quarries and oil. It might be noted that the number of individuals belonging to the group with the highest average was only five or slightly less than one per cent of the respondents.

As a result, the average of the group in government may not be considered very significant. In contrast, however, the number of individuals in mines, quarries and oil was 40 and this group had the lowest average of 24 which does provide some indications as to the individuals in this particular industry.

Only the groups in manufacturing and in mines, quarries and oil had lower averages than the overall average of 37 of all the respondents together. However, these two groups represented more than 75 per cent of the 575 respondents and, therefore, it is likely that they would have lower averages.

Understanding relative to managerial positions--As pointed out earlier, among the 575 respondents, 296 were members of the middle management level; 189 were members of the upper level; 13 were members of the lower level, and 77 were staff members or specialists. On the U-Scale, the respondents at the middle level had the highest average score of approximately 38; the respondents at the lower level had the lowest average score of 33. The average scores of the respondents at the top managerial level and at the "staff" level were about 36 and 37 respectively.

Understanding relative to salary--The average scores of the respondents on the U-Scale, in relation to their salary, are shown in the following table.

TABLE XXXVI
AVERAGE SCORES OF RESPONDENTS IN RELATION
TO ANNUAL SALARY

Salary (\$)	Average Score*
5,000 - 9,999.....	40
10,000 - 14,999.....	38
15,000 - 19,999.....	36
20,000 - 24,999.....	35
25,000 - 29,999.....	40
30,000 and over.....	38

*Rounded to the nearest whole number.

As the table shows, the respondents in the salary brackets of \$5,000 to \$9,999 and \$25,000 to \$29,999 had the highest average score of 40 on the U-Scale; the respondents in the salary bracket of \$20,000 to \$24,999 had the lowest average score.

Understanding relative to age--As indicated in Table XXV, with the exception of three respondents, all the respondents were below the age of 65. One who was over

65 years of age had the highest average score on the scale in terms of all the age groups. The average scores of the age groups are shown in Table XXXVII.

TABLE XXXVII

AVERAGE SCORES OF RESPONDENTS IN RELATION TO AGE

Age	Average Score*
Less than 25.....	45
25 - 29.....	36
30 - 34.....	39
35 - 39.....	42
40 - 44.....	47
45 - 49.....	36
50 - 54.....	30
55 - 59.....	35
60 - 64.....	18
65 and over.....	56

*Rounded to the nearest whole number.

As the table shows, the group with the age of 65 and over had the highest average score of 56 and the group between the ages of 60 and 64 years had the lowest average. About 62 per cent of the respondents were between the ages of 25 and 45; the average score of the groups appeared to be relatively increasing with the increasing age. But beyond the age of 45 years, the average scores seemed to be decreasing with the increasing age. In other words, about 95 per cent of the respondents were between the

ages of 25 and 60; the average scores of these groups appeared to be increasing from the ages 25 to 44 but they seemed to be relatively decreasing from the age of 45.

Understanding relative to practical experience--In relation to the practical experience of the respondents, the average scores of individuals having similar periods of experience are summarized in the following table.

TABLE XXXVIII
AVERAGE SCORES OF RESPONDENTS IN RELATION TO
PRACTICAL EXPERIENCE

Experience	Average Score*
Less than 5 years.....	43
5 - 9.....	36
10 - 14.....	35
15 - 19.....	43
20 - 24.....	39
25 - 29.....	35
30 years and over.....	32

*Rounded to the nearest whole number.

The table indicates that the individuals with less than five years of experience and the individuals with the 15 to 19 years of experience had the highest average scores on the U-Scale; but, the individuals with 30 or in excess of 30 years of experience seemed to have the lowest

average score. It might be noted that the average scores of the experience groups seemed to be decreasing as the number of years of practical experience increased from less than 5 years to 15 years; a similar phenomenon seemed to be taking place from 20 years experience to 30 years and over. It must be noted that the group with practical experience of 15 to 19 years had a higher average score than the groups with practical experience of 5 to 9 years and 10 to 14 years; the former group also had a higher average than the groups with more experience. Furthermore, it must be pointed out that about 77 per cent of the 575 respondents had 15 or more years of experience, and among these individuals the average score of the groups was found to be decreasing with the increasing years of practical experience of the groups.

Understanding relative to education--The average scores of the groups on the U-Scale, in relation to the groups' educational background, are shown in the following table. As the table shows, the highest average score among all the groups was 44 and the group with graduate studies background had this highest average on the scale.

TABLE XXLIX

AVERAGE SCORES OF RESPONDENTS IN RELATION TO EDUCATION

Education	Average Score*
High school and under.....	35
1st year college.....	33
2nd year college.....	29
3rd year college.....	30
4th year college.....	41
Graduate studies.....	44

*Rounded to the nearest whole number.

Those with the 4 years of college had the second highest average. The individuals in the groups with the two high averages, as it may be seen in Table XXVII, represented more than 60 per cent of the respondents. It might be also noted in the table above that the group with the high school or less education had a higher average score than the groups with some but less than four years of college education. The lowest average score among all the groups was that of the group with the two years of college.

Understanding relative to individual firms--It might be of some interest to consider at this point how the individuals from the same business organization did in terms of their scores on the scale. As it was indicated earlier,

549 of the 575 respondents represented 61 different business organizations; the remaining 26 individuals had failed to name their firms. If the average score of the individuals belonging to the same firm may be regarded as the score of the firm, then the scores of the 61 firms on the U-Scale could be summed up in the following table.

TABLE XL

DISTRIBUTION OF BUSINESS FIRMS BY SCORE RANGE ON U-SCALE

Score range	Number of Firms
0 to $12\frac{1}{2}$	3
$12\frac{1}{2}$ to 25	8
25 to $37\frac{1}{2}$	23
$37\frac{1}{2}$ to 50	19
50 to $62\frac{1}{2}$	5
$62\frac{1}{2}$ to 75.....	2
75 to $87\frac{1}{2}$	1
$87\frac{1}{2}$ to 100.....	-
Total.....	61

The 61 firms had an average score of about 36 on the U-Scale. Twenty-five per cent of the firms had lower than 27 score; 25 per cent had at least 45 score on the scale, and the remaining 50 per cent were between 27 and 45 approximately. On the scale, only eight firms were above the 50 mark, and 53 other firms were below this mark.

Summarizing the discussion on the respondents' understanding of the management techniques, the tables indicate that on the average, the respondents were below the 50 or half-way mark on the U-Scale in relation to their understanding; and their firms, as a result, remained below this mark.

The respondents who had some knowledge of the techniques and concepts had acquired the knowledge of the techniques and concepts from many sources such as on the job, practical experience, higher education, company sponsored programs, seminars and conferences, special management courses, readings of books and magazines, military, meetings of professional organizations, and others.

Now the question may be raised as to whether or not the respondents applied these management techniques and concepts in their daily work.

Application of Management Techniques

The question of use or application of the techniques was asked in the questionnaire, and the respondents were to indicate their answers by checking "Yes" or "No" in the questionnaire. The answers are summarized in Table XLI.

TABLE XLI

THE NUMBER OF RESPONDENTS WHO APPLY OR DO NOT
APPLY EACH OF THE MANAGEMENT TECHNIQUES

Management Technique	* Number of Individuals	
	Who Apply	Who Do Not Apply
Organizational planning	478	82
Decision theory	178	311
Decision trees	107	298
Reporting by responsibility	406	106
Systems analysis	240	179
Management by exception	287	178
Management by objective	430	118
Results management	406	101
Management of time	227	226
Organization and methods	298	130
Motivation theory	346	131
Participative management	287	202
Matrix organization	11	382
Information (communication) theory	106	262
Information retrieval	94	311
EDP	274	155
Cybernetics	12	356
Economic/market indicators	214	241
Market research	275	214
Brainstorming	274	240
Probability theory	119	370
Sociometric methods	48	368
Costing systems	394	92
Marginal analysis	191	238
Contribution analysis	202	239
Sensitivity analysis	47	370
Break-even analysis	286	143
PACE	107	323
Simulation	94	334
Business games	36	417
Role playing	154	298
Monte Carlo method	47	346
Value analysis	96	345
Ergonomics	36	336
Random observation studies	72	324
In-basket techniques	11	370
Critical path methods	286	202

TABLE XLI--Continued

Management Technique	Number of Individuals	
	Who Apply	Who Do Not Apply
PERT/CPM	215	274
PERT/Cost	194	247
Branching networks	124	269
Resource allocation	93	323
Distribution matrix	--	381
Search theory	12	358
Method study	155	263
SOPs	214	139
Payback period	251	204
Accounting or average rate of return	262	226
Internal rate of return	107	357
Net present value	208	259
MAPI	16	283
Utility theory	23	358
Indifference analysis	--	391
Replacement theory	83	322
Portfolio selection	136	257
Cash flow analysis	286	190
Working capital cycle	178	311
Ratio (financial) analysis	303	138
Budgetary planning and control	419	107
Profit-volume ratio	214	192
Exponential smoothing	131	287
Moving averages	154	262
Regression analysis	48	321
Box/Jenkins	11	358
Time series analysis	36	321
Input-output tables	12	358
"Objective and task" method	83	299
Vendor rating	72	312
Preference distribution analysis	12	358
Queuing theory	23	358
Statistical quality control	155	276
Mathematical programming	82	298
Work simplification	214	250
Work measurement	216	248
Time and motion study	238	287
Time standards	178	223
Work sampling	130	271

TABLE XLI--Continued

Management Technique	Number* of Individuals	
	Who Apply	Who Do Not Apply
Line of balance	24	369
Work study	243	210
Control charts	226	214
Material handling	310	130
Productivity bargaining	96	272
Learning curve theory	82	370
Salary progression	335	156
Salary surveys	393	120
Manpower planning	328	141
Critical incident techniques	11	381
Job rotation	298	180
Sensitivity training (T-Group)	60	381
Sampling method	106	334
Sequential analysis	71	358
Economic reorder quantities	227	238
Stock control	300	211
Work planning and review (WP & R)	226	250
Management audit	285	238
Performance appraisal	418	94
"Five-by-five" approach	47	358
Job analysis	406	107
Job evaluation	467	82
Job description	491	59
Incentive schemes	336	175
Programmed instruction	70	371
Merit rating	334	120
Time-span of discretion	23	321
Model	72	300
Testing	275	192
Managerial grid	118	286

*The total does not add up to 575 because many individuals did not indicate their answers.

As the preceding table indicates, many of the management techniques were not being used by the respondents. Two techniques, in particular, namely, Distribution Matrix and Indifference Analysis, were not being applied by any of the respondents. There were about 67 techniques which were not being utilized by more than 50 per cent of the individuals who responded to the question in relation to each of the techniques. About 26 techniques were not being utilized by more than 300 individuals; 98 techniques were not used by more than 200 respondents. There were, however, 48 techniques which were being applied by more than 200 respondents in their work; nine techniques, in particular, were being utilized by most of the respondents--namely, Organizational Planning, Reporting by Responsibility, Management by Objective, Budgetary Planning and Control, Results Management, Performance Appraisal, Job Analysis, Job Evaluation, and Job Description. Among the least utilized techniques were Matrix Organization, Cybernetics, Simulation, In-Basket Techniques, Distribution Matrix, Search Theory, Utility Theory, Indifference Analysis, Box/Jenkins, MAPI, Time Series Analysis, Input-Output Tables, Preference Distribution Analysis, Queuing Theory, Line of Balance, Critical Incident Technique, and Time-span of

discretion; these techniques were being used by less than 40 individuals or less than 10 per cent of the respondents.

In review, the results indicate that many of the 575 respondents did not show a high degree of understanding of the management techniques; this could be the major reason for many of the management techniques and concepts not being applied by the respondents in their work. It is possible, however, that some techniques may not be useful to the individual's specific work activities; because of this reason, no attempt was made to relate "understanding" and "application" of the technique for the same individual. However, it was generally found that the individual who indicated a high degree of understanding of the technique seemed to be applying it.

Since the techniques and concepts were not being fully understood and applied by many of the respondents, the question may be raised as to the competence or efficiency of the respondents. That is, one may ask the question: Are the respondents obsolete or should they be considered obsolete?

Obsolescence of Respondents

The answer has to be affirmative. In Chapter II, several meanings of obsolescence and many aspects of it were explored; on the basis of this exploration, the respondents would generally be considered obsolete although the extent of obsolescence would be different for each individual. It is evident that the understanding of management techniques was generally poor; lack of understanding is evident by the average score of the respondents on the U-Scale and by the number of techniques which were not being applied by the respondents.

This lack of understanding and application of techniques reflects the degree of their obsolescence which may be regarded as equal to 100 minus the respondent's score on the U-Scale. The extent of their obsolescence is summarized in the following table. As the table shows, it is apparent that the average degree of obsolescence is 63. Twenty-five per cent of the respondents are shown below the degree of 50, while 75 per cent are above this level including 25 per cent over the 75 degree level. The table reveals that the lowest degree of

TABLE XLII
EXTENT OF OBSOLESCENCE OF RESPONDENTS

Extent	Number of Respondents
0 to $12\frac{1}{2}$	-
$12\frac{1}{2}$ to 25	4
25 to $37\frac{1}{2}$	26
$37\frac{1}{2}$ to 50	111
50 to $62\frac{1}{2}$	137
$62\frac{1}{2}$ to 75	159
75 to $87\frac{1}{2}$	97
$87\frac{1}{2}$ to 100.....	41
Total.....	575

obsolescence is within the range from $12\frac{1}{2}$ to 25, and only four respondents are within this range. In contrast, the highest degree of obsolescence is anywhere from $87\frac{1}{2}$ to 100, or near to complete obsolescence, and 41 respondents are within this range. Most of the respondents seem to be facing the problem of managerial obsolescence.

The problem seemed to be more serious for the respondents with less education. In the survey, it was found that the individuals with less education had a higher degree of obsolescence than the individuals who had four years or more of college education. In Table XXLIX, it

was shown that the respondents with graduate studies background had the highest degree of understanding of the management techniques, and, therefore, they had the lowest degree of obsolescence, 56 (100 minus 44). The degree of obsolescence of those with four years of college was found to be 59. The respondents with less than four years of college had a higher degree of obsolescence, 65 or over.

Based on this finding, lack of education could be one of the causes of obsolescence.

In addition to lack of education or neglect of education, advancing age of the individual could increase his obsolescence. In the survey, on the basis of Tables XXV and XXXVII, it was found that about 36 per cent of the respondents were between the ages of 45 and 64, and these individuals seemed to have relatively a higher degree of obsolescence than the rest of the respondents. In his study, Haas found no definite trend of obsolescence in relation to age; however, most of the participating business firms reported that the problem was serious for individuals who were around 50 years of age or over.³

³Frederick C. Haas, Executive Obsolescence, The American Management Association Research Study Number 90 (New York, 1968), pp. 11-13.

The same seemed to be true about the respondents of this study. The degree of obsolescence was relatively high among the individuals over 50 years of age in comparison with the other age groups.

Although most of the respondents seemed to be facing the problem of obsolescence, it was found that very few efforts were being made by the respondents or their organizations to broaden the respondents' knowledge in the field of management. For instance, only 158 of the 575 respondents were engaged in some type of training at the time of this study and 417 were not involved in any educational and training programs. Lack of efforts by the individuals or their organizations could result from lack of individual or organizational awareness of the problem. As indicated by Haas, the individual generally is not aware of the problem; or if he is aware of the problem, he refuses to do anything about it; there are, however, some individuals who do undertake efforts if they become aware of the problem.⁴ On the basis of

⁴Ibid., p. 12.

this survey, most of the respondents were either unaware of the problem or if they were aware, they refused to do anything about it.

Based on lack of understanding and application of the techniques and concepts and of efforts by the respondents, it can be concluded that most of the respondents were not sophisticated in the profession of management. The findings of the study indicate the absence of managerial know-how in most cases; they further point out the absence of managerial efforts in most instances to acquire new skills and knowledge most essential in the current economic environment. The problem of obsolescence seems to be very serious for most of the respondents.

How serious this problem is in the Canadian economy is hard to determine because of lack of sufficient data on other Canadian managers. It would be difficult to infer from this study about other managers as there may be differences in characteristics of the universe and those of the available sample in this study.

It seems, however, that there may be many managers in Canada who are facing the similar problem of obsolescence and lack of sophistication in the profession. This is apparent in the following paragraphs taken from a report of the Economic Council of Canada:

In the context of the industrial development of the Canadian economy, the recognition of new technological opportunities, and the organization of the processes required to bring them to the market, are functions of management. So also is the adoption of "best-practice" techniques. No amount of scientific excellence or increased expenditure for R & D will improve economic performance if management is unskilled in these tasks. The management of innovation and technological change requires a willingness to assume risks, along with creative imagination, entrepreneurial drive, and organizational skills of a high order.

. . . Canada appears to be particularly far behind the United States in the relative scale of resources devoted to the field of university business education and related research in this field have been woefully inadequate in Canada, and that this is a field which requires considerable strengthening in a way that meets Canadian business requirements.

. . . New knowledge must exist in the minds of men before it can be embodied in new skills, new machinery, new products and new processes. In order to maintain a high potential for technological change, Canada must have an adequate supply of scientific and technical manpower to serve as a basic source of invention and innovation.⁵

⁵Economic Council of Canada, The Challenge of Growth and Change, Fifth Annual Review (Ottawa, September 1968), pp. 43-44.

If the problem is serious throughout the economy, then many questions may be raised about the future of Canada: Can Canada maintain standards of living for long in the absence of competent managerial personnel? Can she succeed in the world market against her competitors such as the United States? Will she be able to realize benefits of her abundant natural resources? As a significant portion of the economy is owned and controlled by foreigners, will she be able to maintain her social, political and cultural independence? And what about the Canadians who are discontented with their dependence on foreign capital and ownership in order to maintain high standards of living?

It is evident that many Canadians resent foreign involvement in the Canadian economy. In his book, Canada's Last Chance, Harris outlines Canada's dependence on other economies and stresses that Canada is losing her political independence; because of this, he demands that Canada reduce the degree of dependence and gain her economic independence.⁶

⁶W. Eric Harris, Canada's Last Chance (Toronto, 1970).

It is unlikely that foreign involvement in the Canadian economy would be reduced unless the Canadian enterprises are able to compete successfully with their foreign counterparts in the economy. As Brownridge indicates, Canada has all the necessary resources to succeed with the exception of competent individuals and managers.⁷

Lack of competent managers makes the problem of obsolescence significant for Canada. This research study reveals the existence of the problem, particularly in reference to 575 managers and 61 organizations represented by these managers. It is possible that a similar problem may be faced by other organizations in Canada. If this is so, sufficient efforts must be undertaken by the individual, the organization, and the government to overcome the problem. The cost of failure would ultimately be too high, because knowledge or lack of it

reaches deeply into every area of economic life, affecting the skills of the labour force, the efficiency of plant and equipment, the capabilities of management, and the quality of the institutional framework which serves society.⁸

⁷E. K. Brownridge, "The Challenge to Canadian Management," Advanced Management Journal, XXX (July, 1965), 74-87.

⁸Economic Council of Canada, op. cit., p. 45.

CHAPTER VI

SUMMARY, FINDINGS AND IMPLICATIONS

Summary

The main purpose of this research study was to make an exploratory investigation of the problem of managerial obsolescence in Canada. In the study, managerial obsolescence was considered in reference to managerial technical competence. A basic premise of the study was that the manager would be unable to perform efficiently and effectively if he had failed to acquire knowledge about management techniques and concepts which are most needed in the current economic environment.

Based on this premise, a depth study of published literature was made. In the literature, functions carried out by a manager in the business enterprise were studied. Managerial activities were studied particularly in reference to the functional areas of Administration, Finance and Accounting, Marketing and Sales, Production, Purchasing, Personnel and Industrial Relations, and Research and Development. In addition, management techniques and concepts useful to these seven functional areas were

investigated. Also, the literature on the subject of obsolescence was studied; meanings, causes, characteristics, preventive measures, consequences, and related aspects of obsolescence were investigated.

Literature was available in books, newspapers, periodicals, dissertations, research reports, and other sources. Material on managerial obsolescence was very limited. There were very few articles which dealt with the subject in terms of the existing situation in business organizations. No specific ways to measure obsolescence were found even though indirect references were made in some articles concerning the problem of measurement and identification.

Similarly, the literature on management techniques and concepts applicable to the functional areas of business was considered in general terms. The relative importance assigned to management techniques and concepts was found to vary from one writer to another. Difficulties were encountered in determining the techniques and concepts which may be considered most essential because the number of techniques and concepts presented in the literature was extremely large.

The study of the literature did point out the need for empirical investigations, and it did provide some guidelines for such investigations. On the basis of the literature and on the basis of the correspondence with selected individuals and organizations, it was concluded that the extent of managerial obsolescence could be measured approximately if the importance of management techniques and concepts were determined and if managerial understanding and application were evaluated.

Based on this conclusion, 106 management techniques and concepts were chosen for the empirical part of this study. Although the selection of the 106 techniques was somewhat arbitrary and had to be based on some value judgments, it did involve a systematic approach. The selection process was as follows:

- 1) Listing of techniques and concepts noted by Argenti and Rope in the April and September 1967 issues of Management Today;

- 2) Listing of techniques and concepts pointed out by George in The History of Management Thought;

- 3) Listing of techniques and concepts discussed in The Encyclopedia of Management, edited by Heyel;

4) Listing of techniques and concepts discussed in several prominent textbooks on management, production, purchasing, finance, accounting, personnel, marketing, and related fields of business;

5) Listing of techniques and concepts discussed in selected magazines and other periodicals in the field of business; and

6) Selection of 106 techniques from the compiled listings, necessitating some value judgments. The selection was based primarily on the emphasis given each technique in the literature. An effort was made to include techniques and concepts which were considered useful to at least one of the seven functional areas of business.

The 106 techniques and concepts were included in two different questionnaires which were designed for two separate mail surveys. One of the questionnaires was utilized to establish the importance of the techniques, while the other was aimed to evaluate managerial understanding and application of the techniques.

Mail surveys were used because of the need to include a wide variety of managers, organizations and industries across Canada.

The questionnaires were developed following the initial study of literature on managerial obsolescence, personal correspondence by the researcher with business executives and consultants, a pilot study in the Moncton area, and informal discussions with professional colleagues.

Each of the questionnaires was divided into two sections. Section I of each questionnaire was identical, and it had questions concerning information about the respondent and his organization. In Section II of each questionnaire, there were 106 management techniques and concepts; the techniques and concepts in each questionnaire were identical. The only difference between the two questionnaires was in Section II, where one questionnaire dealt with the significance of the techniques, while the other questionnaire dealt with the manager's understanding and application of techniques and concepts.

The importance of each technique in the questionnaire was classified as "very important," "useful" and "insignificant." The respondent was asked to indicate the importance of the technique as it related to a specific business functional area.

Sixty-six different firms in Canada were included in the survey to establish the importance of particular techniques. These firms were either largest in terms of assets, sales or net profits in Canada or they were engaged in providing management consulting services. It was assumed in the study that the managers of these firms were qualified to indicate the significance simply because of the characteristics of their organizations. In other words, it was assumed that the outstanding success and growth of the organizations and the nature of business of management consulting firms did indicate that the managers of these firms were competent and qualified; otherwise, the organizations could not remain at the top or in the business of providing managerial services.

Each of the 66 firms was sent copies of the questionnaire and was asked to have one member of the organization specialized in each of the functional areas fill in the questionnaire. A total of 81 copies of the questionnaire were returned, representing about 31 per cent of the firms. Each questionnaire which was returned indicated the importance of the techniques to one of the seven functional areas. Based on the views expressed by the respondents,

the importance of each technique to each of the areas was determined. The importance of the techniques was discussed in Chapter IV of this study. The importance of each technique to each of the areas was summarized in Table XVII. Table XVIII summarized the total number of techniques under each category of importance for each of the areas.

A supply of copies of the questionnaire related to the understanding and application of management techniques was made available to the president of each of the 282 business firms selected from 1968 Canadian Trade Index. Six hundred and seven copies of the questionnaire were returned. However, only 575 questionnaires were included in the analysis; incomplete questionnaires and those completed by a respondent not engaged in one of the seven functional areas were excluded from the analysis.

Based on the importance of each technique to the specific functional area in which the respondent was engaged, each respondent's understanding was graded and his level of obsolescence was approximately determined.

The measuring process was as follows:

1. Determination of the respondent's functional area;
2. Assignment of 3, 2 or 1 point to each technique on the basis of the technique's importance to the respondent's area;
3. Assignment of 5, 4, 3, 2 or 1 point to each technique in relation to the respondent's level of understanding of the technique;
4. Determination of the respondent's score for each technique through multiplication of "importance points" by "understanding points";
5. Determination of the respondent's total understanding score based on the addition of the respondent's score for each technique;
6. Determination of the respondent's position on the Understanding Scale, or U-Scale, ranging from 0 to 100--0 being the minimum level of understanding and the minimum possible score for the functional area and 100 being the highest level of understanding and the maximum possible score in the area; and
7. Determination of the respondent's extent of obsolescence measured by subtracting the respondent's score on the scale from 100. That is, if the respondent

was found to be at 100 on the scale, his level of obsolescence would be zero or he would not be considered obsolete at all; but if he were at the zero on the scale, he would be considered completely obsolete.

Findings

The measurement of the extent of obsolescence revealed that the average score of the 575 respondents was 37 on the U-Scale and therefore their average level of obsolescence was found to be 63. Similarly, the obsolescence scores of 25 per cent of the respondents were found to be over 75, and the obsolescence scores of about 50 per cent of the respondents ranged from 50 to 75.

The average level of obsolescence of the respondents in relation to their functional areas was as follows: Administration, 65; Finance and Accounting, 53; Marketing and Sales, 63; Production, 68; Purchasing, 78; Personnel and Industrial Relations, 60; and Research and Development, 56. Thus, the average level of obsolescence was lowest in Finance and Accounting and it was highest in Purchasing.

The extent of obsolescence of the respondents with less than four years of college education was found to be higher than that of respondents with higher education. Furthermore, it was found that the individuals over 50 years of age represented relatively a higher degree of obsolescence than those who were under 50 years of age. The individuals who were in manufacturing, mines, quarries and oil businesses showed relatively a higher degree of obsolescence than those of other types of business.

The study also revealed that most of the management techniques and concepts were not being applied extensively by the respondents in their daily business activities.

Finally, the survey indicated that only limited efforts were being made by the respondents or by their organizations to update managerial knowledge. It was found that only 158 of the 575 respondents were engaged in some type of training; the remaining were not engaged in any such programs.

Although no efforts were made to investigate causes, cures and consequences of obsolescence in the empirical survey, the available literature on the subjects was thoroughly investigated. According to the literature, personal and organizational elements are the major causes

of obsolescence. Among the personal factors are lack of education and training, neglect of education beyond the formal schooling and initial training, advancing age, lack of enthusiasm and ambition, inflexibility, negative attitudes, indecisiveness, and egotism. The major organizational elements which contribute to the problem are insensitive leadership, autocratic management, lack of communication, fear, complacency, insufficient or inequitable financial rewards, and others.

In order to overcome the problem of obsolescence, many suggestions are made by different educators and writers. As most writers see it, the major responsibility of undertaking preventive measures is that of the organization although the individual must share this responsibility. The organization, in order to combat the problem, must change many of the traditional practices of management, and it must develop an atmosphere which would prevent physical and mental deterioration. Among the most frequently mentioned measures available to the organization are development of open communication, active involvement of individuals in problem-solving and decision-making, job rotation, continuous education and training of individuals, and emphasis on creativity and innovation.

Implications

Failure or inability of the individual or the organization to resolve the problem of obsolescence may have many consequences. For instance, the individual might experience physical and mental deterioration and his productivity would be less than satisfactory. The organization may experience inefficiency and ineffectiveness, and there may be higher costs and lower profits which may ultimately threaten its existence. And the society in general may have poor standards of living, and thereby it may have unhappy citizens. Finally, lack of suitable standards of living may bring about economic, social and political unrest in the nation.

There is certainly economic, political and social unrest in Canada. One major explanation lies in the fact that many businesses in Canada are owned by foreigners who, because of their managerial knowledge and capital strength, become very successful and influential in the Canadian economy. Foreigners become strong competitors in a very short period and largely succeed in the Canadian market. Because of their role in the Canadian economy, non-Canadian businesses frequently are able to exert social and political pressures and thereby influence

the Canadian way of life. Canadians in general are aware of this fact and they resent it; they are afraid of losing their "Canadian identity." But at the same time, they are aware that the economic growth and well-being of Canada depends on the foreign involvement in the economy.

Canada has almost all necessary economic resources to compete with her counterpart in the economy as well as in the world market. Yet it seems that the Canadian businessman has not learned how to compete successfully with the foreign firms. Successful competition requires managerial know-how: new ideas, skills, techniques, concepts, tools and knowledge.

The 575 respondents, in general, revealed inadequate understanding and application of many management techniques and concepts. The study found lack of sophistication in the profession of management among the participating individuals. Furthermore, the study found inadequate efforts by the respondents or by their organizations to update knowledge in the field of business management.

From this study, it is difficult to determine how serious this problem is in other organizations and throughout Canada. This is due to many factors. First,

it is possible that there may be differences in the characteristics of the sample of this study and those of the universe representing managers across Canada. Second, it is difficult to determine the number of managers in the universe at any given time. Third, the size of the sample for the areas of Purchasing and Research and Development is quite small relative to that of other functional areas. Fourth, this study was dealing with a new and complex area of management; as a result, it had to use some value judgments particularly in selecting management techniques and concepts. Fifth, because of financial limitations, it was impossible to follow the mail surveys with personal interviews. Sixth, the need for sophistication in the profession of management would vary from one organization to another and from one industry to another, thus making it difficult to determine the seriousness of the problem of obsolescence.

Although the study is unable to provide a complete picture on the problem of obsolescence throughout Canada, it does demonstrate the seriousness of the problem for the respondents and their 61 different business organizations which are relatively large in Canada and which have

need for competent managers.

Perhaps more importantly, the study suggests an approach which could be used by the individual or by the organization to detect and explore the problem of obsolescence; the approach could be used in making decisions concerning placement, promotion, training and development, and other managerial needs.

Based on the study, the following recommendations are made:

1. The subject of managerial obsolescence is both significant and highly complex, and hence it justifies much further research.

2. The importance of management techniques and concepts needs to be determined as exactly as possible, with less reliance on individual value judgments than was necessary in this study.

3. A separate research study for each of the functional areas of business should be made so that possible obsolescence in each area can be thoroughly investigated.

4. Research studies need to be undertaken to find alternate ways of detecting the problem of obsolescence and of measuring the level of obsolescence.

5. Future research studies must accommodate continuously evolving knowledge in the field of management.

6. The individual, the organization, the government, and the society in general should give more attention to the problem of obsolescence and should develop effective ways of countering it.

APPENDIX A

THE QUESTIONNAIRE USED IN THE SURVEY OF
1967 IN THE DALLAS-FT.WORTH AREA

Dear Sir:

This questionnaire is designed to survey your business practices. The survey is being taken to fulfil requirements of a doctoral course in Business Administration at North Texas State University. All information sources will be kept strictly confidential.

Therefore, YOUR COOPERATION IS EARNESTLY SOLICITED.
Thank you.

1. Size of your company or division: (whichever you are closest to)

_____ approximate number of employees

_____ approximate annual dollar sales

2. The type of product or service you are concerned with:
(Check as many as necessary)

- industrial
- consumer
- government
- technical
- non-technical
- high-volume standard product
- low-volume made to order product
- high unit cost
- low unit cost

3. Your present title _____

4. Age (Check one)

- 25 and under 26-30 31-35 36-40
- 41-45 46-50 51-55 56 and over.

5. Your educational background: (circle the highest level you attended)

High School: 9, 10, 11, 12

College: 1, 2, 3, 4, Major _____

M. S. Major _____ Undergraduate Major _____

M. A. Major _____ Undergraduate Major _____

MBA Major _____ Undergraduate Major _____

APPENDIX A -- Continued

PhD Major _____ Undergraduate Major _____
 DBA Major _____ Undergraduate Major _____

6. Are you currently attending any formal classroom training?

() yes
 () no

7. You are asked to grade yourself on your familiarity with a list of quantitative management techniques. Numbers 4, 3, 2, 1 precede each technique. Circle the number that grades your familiarity most accurately, with 4 being completely familiar and 1 being completely unfamiliar.

4 3 2 1	Decision theory	4 3 2 1	Data processing
4 3 2 1	Economic indicators	4 3 2 1	Input-Output tables
4 3 2 1	Corporate planning	4 3 2 1	Regression analysis
4 3 2 1	Organization and Methods	4 3 2 1	PERT/cost
4 3 2 1	Management by exception	4 3 2 1	Resource allocation
4 3 2 1	Market research	4 3 2 1	Portfolio selection
4 3 2 1	Time series analysis	4 3 2 1	Decision trees
4 3 2 1	Replacement theory	4 3 2 1	Branching networks
4 3 2 1	CPM and PERT	4 3 2 1	Teaching machines (Programmed instruction)
4 3 2 1	Discounted cash flow (internal rate of return)	4 3 2 1	Moving average
4 3 2 1	Net present value	4 3 2 1	Value analysis (value engineering)
4 3 2 1	Manpower planning	4 3 2 1	Models
4 3 2 1	Exponential smoothing (exponentially weighted moving average)	4 3 2 1	Simulation

APPENDIX A -- Continued

4 3 2 1	Brainstorming	4 3 2 1	Queuing Theory (waiting Line)
4 3 2 1	Systems analysis	4 3 2 1	Monte Carlo method (random sampling or walks)
4 3 2 1	Method study		
4 3 2 1	Job description	4 3 2 1	Ergonometics (human factors engineering)
4 3 2 1	Game theory		
4 3 2 1	Profit-volume ratio	4 3 2 1	Aptitude testing
4 3 2 1	Breakeven analysis	4 3 2 1	Job evaluation (job rating)
4 3 2 1	Stock control		
4 3 2 1	Costing systems	4 3 2 1	Business Games
4 3 2 1	Sampling method	4 3 2 1	Merit rating (employee appraisal)
4 3 2 1	Salary progression	4 3 2 1	Statistical Quality control
4 3 2 1	Contribution Analysis	4 3 2 1	Marginal analysis
4 3 2 1	Economic reorder quantity	4 3 2 1	Quality protection
4 3 2 1	Random observation	4 3 2 1	Sequential analysis
4 3 2 1	Information retrieval (data mobilization)	4 3 2 1	Information theory
4 3 2 1	Mathematical pro- gramming	4 3 2 1	Cybernetics
4 3 2 1	Incentive schemes	4 3 2 1	Time-span of dis- cretion

APPENDIX B

THE LIST OF ORGANIZATIONS CONTACTED IN THE INITIAL INQUIRY FOR THIS RESEARCH STUDY

The Canada Council
Economic Council of Canada
Atlantic Provinces Economic Council
Industrial Relations Counselors, Inc.
Center for Continuing Studies in Marketing, The University
of Waterloo
Nova Scotia Voluntary Planning Board
Applied Arts & Technology Branch and Management Development
Division of Ontario Department of Education
Atlantic Region Work Study Centre
International Labour Office
Bureau of Management Consulting Services of Public Service
Commission (of Canada)
The Manitoba Institute of Management, Inc.
American Management Association, Inc.
Canadian Management Center
Canadian Association of Management Consultants
American Arbitration Association
National Office Management Association
Labor Research Organization
Dartnell Corporation
National Industrial Conference Board
Industrial Relations Research Association
Division of Executive Development, York University
The Society for the Advancement of Management
Institute for Quantitative Research in Economics and
Management, Purdue University
The Canadian Manufacturers' Association

APPENDIX C

THE LIST OF BUSINESS ORGANIZATIONS INCLUDED IN THE SURVEY TO DETERMINE THE SIGNIFICANCE OF MANAGEMENT TECHNIQUES AND CONCEPTS

Bell Canada
Canadian Pacific Railway Company
Alcan Aluminium Limited
Imperial Oil Limited
The International Nickel Company of Canada, Limited
Distillers Corporation- Seagrams Limited
Massey-Ferguson Limited
Gulf Oil Canada Limited
International Utilities Corporation
The Steel Company of Canada, Limited
Shell Canada Limited
Ford Motor Company of Canada, Limited
Noranda Mines Limited
Dominion Foundries and Steel, Limited
Pacific Petroleum Limited
Hiram Walker-Gooderham & Worts Limited
The Algoma Steel Corporation, Limited
George Weston Limited
Calgary Power Limited
The Price Company Limited
Hudson's Bay Oil and Gas Company Limited
Hudson's Bay Company
Union Gas of Canada, Limited
The Alberta Gas Trunk Line Company Limited
Home Oil Company Limited
Polymer Corporation Limited
Husky Oil Limited
Canada Packers Limited
Canada Safeway Limited
Steep Rock Iron Mines Limited
Maritime Telegraph and Telephone Company, Limited
Nova Scotia Light and Power Company Limited
Hudson Bay Mining and Smelting Co., Limited
Irving Oil Company Limited

APPENDIX C--Continued

Anglo-Canadian Pulp and Paper Mills, Limited
Canadian Westinghouse Company Limited
The New Brunswick Telephone Company, Limited
International Harvester Co. of Canada, Limited
Union Oil Company of Canada Limited
Federal Grain, Limited
Dome Petroleum Limited
Triad Oil Co., Limited
John Labatt Limited
United Grain Growers Limited
Fraser Companies, Limited
The Royal Bank of Canada
Canadian Imperial Bank of Commerce
Bank of Montreal
Sun Life Assurance Company of Canada
The Manufacturers Life Insurance Company
Royal Trust Company
P. S. Ross & Partners
Richard L. Hooey & Associates Limited
Willson Associates Limited
Gordon Bryson & Co., Limited
Technical Service Council
Woods, Gordon & Co.
McDonald, Nicholson & Co.
M. A. Miles & Associates Limited
Price Waterhouse Associates Center
Inbucon Services Limited
Stevenson & Kellogg Limited
Urwick, Currie & Partners, Limited
Simpson, Riddell, Stead & Partners
The Thorne Group Limited
DCF Systems Limited

APPENDIX D

A LIST OF THE SELECTED CANADIAN BUSINESS FIRMS FOR THE SURVEY RELATED TO THE UNDERSTANDING AND APPLICATION OF MANAGEMENT TECHNIQUES AND CONCEPTS

Abex Industries of Canada, Limited
Abitibi Paper Company Limited
Addressograph-Multigraph of Canada Limited
Aluminum Company of Canada, Limited
American Can of Canada Limited
American Standard Products (Canada) Limited
Anaconda American Brass, Limited
Anthes Imperial Limited
Armstrong Cork Canada Limited
Asbestos Corporation, Limited
Associated Textiles of Canada Limited
Atlas Asbestos Company
Atlas Construction Co., Limited
Aviation Electric Limited
Ayers Limited
Barber-Ellis of Canada, Limited
Bata Shoe Company of Canada, Limited
Beardmore & Co., Limited
Benson & Hedges (Canada) Limited
Best Foods (Canadian) Limited
Borden Company, Limited, The.
Boyles Industries Limited
Bristol Aeoplane Company of Canada Limited
British American Oil Company, Limited, The.
British Columbia Forest Products Limited
British Columbia Hydro and Power Authority
Brooke Bond Canada Limited
Brown's Bread Division, Inter City Baking Co. Limited
Bruck Mills Limited
Building Products of Canada Limited
Burrard Dry Dock Co., Limited
Burroughs Business Machines Limited
Butterfield Division, UTD Corporation

APPENDIX D--Continued

Campbell Soup Company Limited
Canada Bread Company Limited
Canada Cement Company, Limited
Canada Starch Co., Limited, The
Canada Steamship Lines, Limited
Canada Wire & Cable Co., Limited
Canadian Acme Screw & Gear Limited, A division of Levy
Industries Limited
Canadian Allis-Chalmers, Limited
Canadian Breweries Limited
Canadian British Aluminum Company Limited
Canadian Celanese Company, A Division of Chemcell Limited
Canadian Chemical Company, A Division of Chemcell Limited
Canadian Children's Wear, Limited
Canadian Chromalox Company
Canadian Coleman Company, Limited, The
Canadian Fishing Co., Limited, The
Canadian Food Products Sales Limited
Canadian Forest Products Limited
Canadian General Electric Company Limited
Canadian Helmitin Company Limited, The
Canadian Industries Limited
Canadian International Paper Company
Canadian Kenworth Limited
Canadian Kodak Company Limited
Canadian Lady Corset Company Limited
Canadian Liquid Air Limited
Canadian Marconi Company
Canadian Petrofina Limited
Canadian Pittsburgh Industries Limited
Canadian Refractories Limited
Canadian Salt Company Limited, The
Canadian Steel Foundries, Division of Hawker Siddeley Ca-
nada, NADA Limited
Canadian Vickers Industries Limited
Canadian Vickers Limited
Canadian Vickers Shipyards Limited
Carron Limited, Eastern Structural Division
Cape, E. G. M., & Co. Limited

APPENDIX D--Continued

Carnation Company Limited
Carrier, J. D., Shoe Company Limited
Chemcell Limited
Clairtone Sound Corporation Limited
Cluett, Peabody & Company of Canada, Limited
Coats, J. & P., (Canada) Limited
Colgate-Palmolive Limited
Collins Radio Company of Canada Limited
Collins & Aikman, Limited
Columbia Cellulose Company, Limited
Combustion Engineering-Superheater Limited
Cominco Limited
Connaught Medical Research Laboratories
Consolidated Bathurst Limited
Consolidated-Bathurst Packaging Limited, Container Division
Consolidated Textiles Limited
Consumers' Gas Company, The
Consumers Glass Company, Limited
Continental Can Company of Canada Limited
Cooperative Federee de Quebec
Coutts, Hallmark Cards
Crane Canada Limited
Crestbrook Forest Industries Limited
Crown Zellerbach Canada Limited
Crush Beverages Limited
Crush International Limited
Davie Shipbuilding Limited
de Havilland Aircraft of Canada, Limited, The
Delnor Frozen Foods Limited, Division of Royal City Foods,
Limited
Denison Mines Limited
Dominion Bridge Company, Limited
Dominion Construction Company Limited, The
Dominion Dairies, Limited
Dominion Engineering Works Limited
Dominion Forge Company, A Division of Canadian Corporate,
Management Company Limited
Dominion Glass Company Limited

APPENDIX D--Continued

Dominion Magnesium Limited
Dominion Textile Company Limited
Domtar Limited
Domtar Construction Materials Limited
Domtar Newsprint Limited
Domtar Packaging Limited
Douglas Brothers Division of The Robert Mitchell Company Limited
Dover Corporation (Canada) Limited
Dow Brewery Limited
Duplate Canada, Limited
Du Pont of Canada Limited
ESB Canada Limited
Eddy Match Company, Limited
Electric Reduction Company of Canada, Limited
Falconbridge Nickel Mines Limited
Federal Pacific Electric of Canada Limited
Ferranti-Packard Electric Limited
Fiberglas Canada, Limited
Fleetwood Corporation
Flintkote Company of Canada Limited, The
Foresteel Industries Limited
Foundation Company of Canada Limited, The
Foundation of Canada Engineering Corporation Limited
Francon (1966) Limitee
Fraser-Brace Engineering Company, Limited
Fraser Valley Milk Producers' Association
Freedman Company Limited, The
Frigidaire Products of Canada Limited
Frosst, Charles E., & Company
Gage, W. J. Limited
Garrett Manufacturing Limited
Gazette Printing Company (Limited)
General Bakeries Limited
General Cigar Company, Limited
General Foods, Limited
General Steel Wares, Limited
General Tire & Rubber Company of Canada, Limited, The
Globe and Mail Limited, The
Goodyear Tire & Rubber Company of Canada, Limited, The

APPENDIX D--Continued

Grinnell Company of Canada, Limited
Hawker Siddeley Canada Limited
Hepburn, John T., Limited
Hersey of Canada Inc.
Hilroy Envelopes & Stationery Limited
Honeywell Controls Limited
Horton Steel Works Limited
Howden, James, & Parsons of Canada Limited
Hyde Park Clothes, Limited
Hydro-Electric Power Commission of Ontario, The
ITT Canada Limited
Imperial Optical Company Limited
Imperial Tobacco Company of Canada Limited
Inglis, John, Company Limited
International Business Machines Company, Limited
International Minerals and Chemical Corporation (Canada) Limited
Johl, B. K., Inc.
Johnson Matthey & Mallory Limited
Johnson & Johnson, Limited
Kendall Company (Canada) Limited, The
Kimberly-Clark of Canada Limited
Kimberly-Clark Pulp and Paper Company Limited
Kraft Foods Limited
Kruger Pulp and Paper Limited
Kruger Pulp and Paper Limited, Newsprint Division
Labatt's Ontario Breweries Limited
La Brasserie Labatt Limitee
La Compagnie de Publication de "La Presse", Limitee
Lamaque Mining Company, Limited
Lambert, Alfred, Inc.
Laura Secord Candy Shops, Limited
Lenkurt Electric Company of Canada, Limited
Link-Belt Limited, Division FMC Corp.
Lipton, Thomas J., Limited
Liquid Carbonic Canadian Corporation, Limited
Litton Systems (Canada) Limited
Mack Trucks Manufacturing Company of Canada Limited

APPENDIX D--Continued

Maclean-Hunter Publishing Company Limited
MacMillan Bloedel Limited
Main Knitting Mills Limited
Maple Leaf Mills Limited
Marine Industries, Limited
McGavin Toastmaster Limited
McIntyre Porcupine Mines Limited
Miron Company Limited
Mitchell, Robert, Company, Limited, The
Moffats Limited
Monsanto Canada Limited
Montreal Locomotive Works, Limited
Montreal Star Company, Limited, The
Moore Business Forms Limited
Moore Corporation Limited
Moose River Mills Limited
Morse, Robert, Corporation Limited
National Cash Register Company of Canada, Limited, The
National Drug and Chemical Company of Canada, Limited
Neilson, William, Limited
Nelson Bros. Fisheries, Limited
Neon Products of Canada, Limited
Noranda Copper Mills Limited
Northern Electric Company, Limited
Ocean Cement Limited
Ocean Maid Foods Limited
Ogilvie Flour Mills Company, Limited, The
Olivetti Underwood Limited
Ontario Steel Products Company Limited
Orenda Limited
Pacific Press Limited
Pepsi-Cola Canada Limited
Philco-Ford of Canada Limited
Philips Electronics Industries Limited
Pilkington Brothers (Canada) Limited
Procter & Gamble Company of Canada, Limited
Quebec Natural Gas Corporation
RCA Victor Company Limited
Radio Engineering Products Limited

APPENDIX D--Continued

Rapid Grip & Batten, Limited
Rayonier Canada (B.C.) Limited
Rayonier Canada (B.C.) Limited, (Cellulose Division)
Regent Knitting Mills, Limited, The
Reliable Toy Company, Limited
Reynolds Aluminum Company of Canada Limited
Rio Algom Mines Limited
Robin Hood Flour Mills, Limited
Robinson, E.S. & A., (Canada) Limited
Rolls-Royce of Canada Limited
Rolph-Clark-Stone, Limited
Rothmans of Pall Mall Canada Limited
Rowntree Company, Limited, The
Rubin Bros. Clothiers Limited
Ryerson Press, The
SCM (Canada) Limited
Sainthill-Levine & Company, Limited
Salada Foods Limited
Sangamo Company Limited
Scott Paper Limited
Seagram, Joseph E., & Sons, Limited
Seiberling Rubber Company of Canada, Limited
Sherritt Gordon Mines Limited
Sherwin-Williams Company of Canada, Limited
Sicard Inc.
Simmons, Limited
Simon Cigar Company Limited
Singer Company of Canada Limited
Smith & Stone, Limited
Sogemines Limited
Spruce Falls Power & Paper Company, Limited
Square D Company Canada Limited
Standard Oil Company of British Columbia Limited
Sun Oil Company Limited
Sunshine Office Equipment Limited
Swift Canadian Company, Limited
Sylvania Electric (Canada) Limited
Tahsis Company Limited
Taylor Woodrow of Canada Limited

APPENDIX D--Continued

Telegram Publishing Company Limited
Texaco Canada Limited
Thomson Newspapers Limited
Tip-Top Tailors Limited
Toronto Hydro-Electric System
Toronto Iron Works, Limited, The
Toronto Star Limited
Trane Company of Canada, Limited
Union Carbide Canada Limited
Uniroyal Limited
Versafood Services Limited
Wabasso Limited
Warner-Lambert Canada Limited
Warren Bituminous Paving Company, Limited
Weldwood of Canada Limited
Westeel-Rosco Limited
Weston Bakeries Limited
Wonder Bakeries, Limited
Wood, John, Company Limited
York Farms, Division of Canada Packers Limited
York Gears Limited, A Division of Levy Industries Limited

APPENDIX E

THE QUESTIONNAIRE USED IN THE SURVEY TO DETERMINE UNDERSTANDING AND APPLICATION OF MANAGEMENT TECHNIQUES AND CONCEPTS

PURPOSE

This questionnaire is part of the research which is being undertaken to fulfil the requirements for the Ph. D. degree in Business Administration at North Texas State University.

The main objective of the research is to study the Canadian businessman's understanding of management techniques.

TO WHOM IS THIS QUESTIONNAIRE ADDRESSED?

The questionnaire is designed for managers and staff members of selected business firms across Canada.

TIME REQUIRED TO ANSWER THE QUESTIONNAIRE

The questionnaire should take less than 30 minutes.

HOW ARE THE REPLIES GOING TO BE USED?

All the replies will be kept in strict confidence and will be used only for the academic purposes.

TO WHOM SHOULD THE QUESTIONNAIRE BE RETURNED?

After the questionnaire has been completed, it should be returned to Professor Vinay Kothari, School of Business, University of Moncton, Moncton, N. B.

APPENDIX E--ContinuedSECTION I

GENERAL INFORMATION

In this section you are asked to provide general information about yourself and your organization.

- I. Name of your organization: _____
 II. Size of your organization: _____
 (approximate number of employees)

- _____ (approximate annual \$ revenues)
 III. Nature of your business (Circle as many as necessary):

- | | |
|-------------------------|-----------------------------|
| a. manufacturing | e. finance, insurance, real |
| b. construction | estate |
| c. transportation, | f. trade |
| communication, | g. government |
| public utilities | h. services and others |
| d. mines, quarries, oil | |

- IV. Major products of your organization (Circle as many as necessary):

- | | |
|---|--|
| a. lumber and wood products | k. ordance (military weapons) |
| b. furniture and fixtures | l. food and related products |
| c. stone | m. tobacco |
| d. clay and glass products | n. textile-mill products |
| e. primary metal industries, including blast furnaces and primary smelting and refining processes | o. paper and allied products |
| f. fabricated metals | p. printing, publishing & related products |
| g. machinery | q. chemicals |
| h. electrical machinery | r. petroleum & coal products |
| i. transportation equipment | s. rubber |
| j. instrument | t. leather & leather products |
| | u. services & others |

APPENDIX E -- Continued

- V. Your present title(s): _____
- VI. Circle one of the following groups which best describes your position in your organization:
- a. a member of top management (e.g. president, executive vice president)
 - b. a member of middle management (e.g. operating or divisional manager)
 - c. a member of lower management (e.g. supervisors, foremen)
 - d. a "staff" member or a specialist (e.g. experts or advisors)
- VII. Circle one of the following in which you spend most of your working hours:
- a. administration, planning & policy-making for the whole organization
 - b. financial & accounting matters
 - c. marketing and sales
 - d. production
 - e. purchasing
 - f. personnel and industrial relations
 - g. research and development
 - h. others
- VIII. Number of persons who report to you: _____
- IX. How many years have you been with this organization? _____
- X. Your salary (Circle one):
- a. less than \$5,000 per year
 - b. \$5,000 - \$9,999
 - c. \$10,000 - \$14,999
 - d. \$15,000 - \$19,999
 - e. \$20,000 - \$24,999
 - f. \$25,000 - \$29,999
 - g. \$30,000 & over
- XI. Your age (Circle one):
- a. under 25 years
 - b. 25 - 29
 - c. 30 - 34
 - d. 35 - 39
 - e. 40 - 44
 - f. 45 - 49
 - g. 50 - 54
 - h. 55 - 59
 - i. 60 - 64
 - j. 65 & Over
- XII. Your educational background (Circle the highest level attended):
- a. High school & under
 - b. 1st year college
 - c. 2nd year college
 - d. 3rd year college
 - e. 4th year college
 - f. graduate studies

APPENDIX E -- Continued

- XIII. Indicate diplomas, certificates and/or degrees you hold. _____
- XIV. If you have attended college, indicate your fields of concentration. _____
- a. undergraduate level: _____
- b. graduate level: _____
- XV. Your practical (work) experience (Circle one):
- a. less than 5 years e. 20 - 24 years
- b. 5 - 9 years f. 25 - 29 years
- c. 10 - 14 years g. 30 years and over
- d. 15 - 19 years
- XVI. Are you currently engaged in any type of training program?
- a. yes b. no
- XVII. If you are engaged in any type of training programs, indicate the nature of your programs. _____
- XVIII. List the names of trade magazines and newspapers which you regularly read.
- _____
- _____
- XIX. List the names of professional organizations of which you are a member.
- _____
- _____
- _____
- _____
- XX. Any other information about yourself or your organization which may be useful to this research:
- _____
- _____
- _____
- _____

APPENDIX E--ContinuedSECTION II

UNDERSTANDING & APPLICATION OF MANAGEMENT TECHNIQUES

In this part you are asked to indicate your familiarity with different management techniques and concepts. Numbers 5, 4, 3, 2, and 1 follow each of the techniques. You should circle the number which indicates your understanding most accurately. On the scale, the number 5 represents complete understanding and the number 1 represents no understanding at all.

Also, you are asked to indicate whether or not you apply or use these techniques in your business activities and the place where you learned each technique-- the places such as On the Job, In Basic Education, In Seminars or Conferences, In Books or Magazines, and so on.

MANAGEMENT TECHNIQUE	YOUR UNDERSTANDING					Do you		Where did you learn this technique?
	(5) complete				(1) none	apply this technique?	Yes		No
001 Organizational Planning	5	4	3	2	1	_____	_____	_____
002 Decision Theory	5	4	3	2	1	_____	_____	_____
003 Decision Trees	5	4	3	2	1	_____	_____	_____
004 Reporting by Responsibility	5	4	3	2	1	_____	_____	_____
005 Systems Analysis	5	4	3	2	1	_____	_____	_____
006 Management by Exception	5	4	3	2	1	_____	_____	_____
007 Management by Objective	5	4	3	2	1	_____	_____	_____
008 Results Management	5	4	3	2	1	_____	_____	_____
009 Management of Time	5	4	3	2	1	_____	_____	_____
010 Organization & Methods	5	4	3	2	1	_____	_____	_____
011 Motivation Theory	5	4	3	2	1	_____	_____	_____
012 Participative Management	5	4	3	2	1	_____	_____	_____
013 Matrix Organization	5	4	3	2	1	_____	_____	_____
014 Information Theory (Communication theory)	5	4	3	2	1	_____	_____	_____

APPENDIX E -- Continued

015	Information Retrieval (data mobilization)	5	4	3	2	1	—	—	—
016	EDP	5	4	3	2	1	—	—	—
017	Cybernetics	5	4	3	2	1	—	—	—
018	Economic/Market Indicators	5	4	3	2	1	—	—	—
019	Market Research	5	4	3	2	1	—	—	—
020	Brainstorming	5	4	3	2	1	—	—	—
021	Probability Theory	5	4	3	2	1	—	—	—
022	Sociometric Methods	5	4	3	2	1	—	—	—
023	Costing Systems	5	4	3	2	1	—	—	—
024	Marginal Analysis	5	4	3	2	1	—	—	—
025	Contribution Analysis	5	4	3	2	1	—	—	—
026	Sensitivity Analysis	5	4	3	2	1	—	—	—
027	Break-even Analysis	5	4	3	2	1	—	—	—
028	PACE (Performance & Cost Evaluation)	5	4	3	2	1	—	—	—
029	Simulation	5	4	3	2	1	—	—	—
030	Business Games	5	4	3	2	1	—	—	—
031	Role Playing	5	4	3	2	1	—	—	—
032	Monte Carlo Method (random sampling or walks)	5	4	3	2	1	—	—	—
033	Value Analysis (value engineering)	5	4	3	2	1	—	—	—
034	Ergonomics (human factors engineering)	5	4	3	2	1	—	—	—
035	Random Observation Studies	5	4	3	2	1	—	—	—
036	In-Basket Techniques	5	4	3	2	1	—	—	—
037	Critical Path Methods	5	4	3	2	1	—	—	—
038	PERT/CPM	5	4	3	2	1	—	—	—
039	PERT/COST	5	4	3	2	1	—	—	—
040	Branching Networks	5	4	3	2	1	—	—	—
041	Resource Allocation	5	4	3	2	1	—	—	—
042	Distribution Matrix	5	4	3	2	1	—	—	—
043	Search Theory	5	4	3	2	1	—	—	—
044	Method Study	5	4	3	2	1	—	—	—
045	SOPs (standard oper- ating procedures)	5	4	3	2	1	—	—	—
046	Payback or Payout Period	5	4	3	2	1	—	—	—
047	Accounting or Average Rate of Return	5	4	3	2	1	—	—	—

APPENDIX E -- Continued

048	Time-adjusted or Internal Rate of Return	5	4	3	2	1	---	---	-----
049	Net Present Value	5	4	3	2	1	---	---	-----
050	MAPI	5	4	3	2	1	---	---	-----
051	Utility Theory	5	4	3	2	1	---	---	-----
052	Indifference Analysis	5	4	3	2	1	---	---	-----
053	Replacement Theory	5	4	3	2	1	---	---	-----
054	Portfolio Selection	5	4	3	2	1	---	---	-----
055	Cash flow Analysis	5	4	3	2	1	---	---	-----
056	Working Capital Cycle	5	4	3	2	1	---	---	-----
057	Ratio (financial) analysis	5	4	3	2	1	---	---	-----
058	Budgetary Planning & Control	5	4	3	2	1	---	---	-----
059	Profit-volume Ratio	5	4	3	2	1	---	---	-----
060	Exponential Smoothing (exponentially weighted moving average)	5	4	3	2	1	---	---	-----
061	Moving Averages	5	4	3	2	1	---	---	-----
062	Regression Analysis	5	4	3	2	1	---	---	-----
063	Box/Jenkins	5	4	3	2	1	---	---	-----
064	Time series analysis	5	4	3	2	1	---	---	-----
065	Input-output tables	5	4	3	2	1	---	---	-----
066	"Objective & Task" Method	5	4	3	2	1	---	---	-----
067	Vendor Rating	5	4	3	2	1	---	---	-----
068	Preference Distribution Analysis	5	4	3	2	1	---	---	-----
069	Queuing Theory (waiting line)	5	4	3	2	1	---	---	-----
070	Statistical Quality Control	5	4	3	2	1	---	---	-----
071	Mathematical Programming	5	4	3	2	1	---	---	-----
072	Work Simplification	5	4	3	2	1	---	---	-----
073	Work Measurement	5	4	3	2	1	---	---	-----
074	Time & Motion Study	5	4	3	2	1	---	---	-----
075	Time Standards	5	4	3	2	1	---	---	-----
076	Work Sampling	5	4	3	2	1	---	---	-----
077	Line of Balance	5	4	3	2	1	---	---	-----
078	Work Study	5	4	3	2	1	---	---	-----
079	Control Charts	5	4	3	2	1	---	---	-----
080	Material Handling	5	4	3	2	1	---	---	-----

APPENDIX E -- Continued

081	Productivity Bargaining	5	4	3	2	1	---	---	---
082	Learning Curve Theory	5	4	3	2	1	---	---	---
083	Salary Progression	5	4	3	2	1	---	---	---
084	Salary Surveys	5	4	3	2	1	---	---	---
085	Manpower Planning	5	4	3	2	1	---	---	---
086	Critical Incident Tech- nique	5	4	3	2	1	---	---	---
087	Job Rotation	5	4	3	2	1	---	---	---
088	Sensitivity Training (T-Group)	5	4	3	2	1	---	---	---
089	Sampling Method	5	4	3	2	1	---	---	---
090	Sequential Analysis	5	4	3	2	1	---	---	---
091	Economic Reorder Quan- tities	5	4	3	2	1	---	---	---
092	Stock Control	5	4	3	2	1	---	---	---
093	Work Planning & Review (WP & R)	5	4	3	2	1	---	---	---
094	Management Audit	5	4	3	2	1	---	---	---
095	Performance Appraisal	5	4	3	2	1	---	---	---
096	"Five-by-Five" approach	5	4	3	2	1	---	---	---
097	Job Analysis	5	4	3	2	1	---	---	---
098	Job Evaluation (job-rating)	5	4	3	2	1	---	---	---
099	Job Description	5	4	3	2	1	---	---	---
100	Incentive Schemes	5	4	3	2	1	---	---	---
101	Programmed instruction (teaching machines)	5	4	3	2	1	---	---	---
102	Merit Rating	5	4	3	2	1	---	---	---
103	Time-span of discretion	5	4	3	2	1	---	---	---
104	Model	5	4	3	2	1	---	---	---
105	Testing (intelligence, aptitude, personality, achievement)	5	4	3	2	1	---	---	---
106	Managerial Grid	5	4	3	2	1	---	---	---

(PLEASE INDICATE BELOW ANY OTHER MANAGEMENT TECHNIQUES WHICH YOU MAY KNOW AND ARE APPLYING IN YOUR WORK.)

5 4 3 2 1

APPENDIX E -- Continued

_____	5 4 3 2 1	_____	_____	_____
_____	5 4 3 2 1	_____	_____	_____
_____	5 4 3 2 1	_____	_____	_____

Any Additional Remarks: _____

In the event there is a need for personal interview, would you be willing to spare some of your time for such interview?

- a. yes
- b. no

If yes, please state your name and address. _____

THANK YOU VERY MUCH FOR YOUR KIND COOPERATION.

Please return the questionnaire to: Vinay Kothari
University of Moncton
Moncton, N. B.

APPENDIX F

THE QUESTIONNAIRE USED IN THE SURVEY TO DETERMINE THE SIGNIFICANCE OF MANAGEMENT TECHNIQUES AND CONCEPTS

PURPOSE

This questionnaire is part of the research which is being undertaken to fulfil the requirements for the Ph. D. degree in Business Administration at North Texas State University.

The main objective of the research is to study the Canadian businessman's understanding of management techniques.

TO WHOM IS THIS QUESTIONNAIRE ADDRESSED?

The questionnaire is designed for managers and staff members of selected business firms across Canada.

TIME REQUIRED TO ANSWER THE QUESTIONNAIRE

The questionnaire should take less than 30 minutes.

HOW ARE THE REPLIES GOING TO BE USED?

All the replies will be kept in strict confidence and will be used only for the academic purposes.

TO WHOM SHOULD THE QUESTIONNAIRE BE RETURNED?

After the questionnaire has been completed, it should be returned to Professor Vinay Kothari, School of Business, University of Moncton, Moncton, N. B.

APPENDIX F--ContinuedSECTION I

GENERAL INFORMATION

In this section you are asked to provide general information about yourself and your organization.

I. Name of your organization: _____

II. Size of your organization: _____
(approximate number of employees)

(approximate annual \$ revenues)

III. Nature of your business (Circle as many as necessary):

- | | |
|--|------------------------------------|
| a. manufacturing | e. finance, insurance, real estate |
| b. construction | f. trade |
| c. transportation, communication, public utilities | g. government |
| d. mines, quarries, oil | h. services and others |

IV. Major products of your organization (Circle as many as necessary):

- | | |
|---|--|
| a. lumber and wood products | i. transportation equipment |
| b. furniture and fixtures | j. instrument |
| c. stone | k. ordance (military weapons) |
| d. clay and glass products | l. food and related products |
| e. primary metal industries, including blast furnaces and primary smelting and refining processes | m. tobacco |
| f. fabricated metals | n. textile-mill products |
| g. machinery | o. paper and allied products |
| h. electrical machinery | p. printing, publishing & related products |
| | q. chemicals |
| | r. petroleum & coal products |
| | s. rubber |
| | t. leather & leather products |
| | u. services & others |

APPENDIX F -- Continued

- V. Your present title(s): _____
- VI. Circle one of the following groups which best describes your position in your organization:
- a. a member of top management (e. g. president, executive vice president)
 - b. a member of middle management (e.g. operating or divisional manager)
 - c. a member of lower management (e.g. supervisors, foremen)
 - d. a "staff" member or a specialist (e.g. experts or advisors)
- VII. Circle one of the following in which you spend most of your working hours:
- | | |
|---|---|
| <ol style="list-style-type: none"> a. administration, planning & policy-making for the whole organization b. financial & accounting matters c. marketing and sales d. production e. purchasing | <ol style="list-style-type: none"> f. personnel and industrial relations g. research and development h. others |
|---|---|
- VIII. Number of persons who report to you: _____
- IX. How many years have you been with this organization?

- X. Your salary (Circle one):
- | | |
|---|--|
| <ol style="list-style-type: none"> a. less than \$5,000 per year b. \$5,000 - \$9,999 c. \$10,000 - \$14,999 d. \$15,000 - \$19,999 | <ol style="list-style-type: none"> e. \$20,000 - \$24,999 f. \$25,000 - \$29,999 g. \$30,000 & over |
|---|--|
- XI. Your age (Circle one):
- | | | |
|---|--|--|
| <ol style="list-style-type: none"> a. under 25 years b. 25 - 29 c. 30 - 34 d. 35 - 39 | <ol style="list-style-type: none"> e. 40 - 44 f. 45 - 49 g. 50 - 54 h. 55 - 59 | <ol style="list-style-type: none"> i. 60 - 64 j. 65 & Over |
|---|--|--|

APPENDIX F -- Continued

- XII. Your educational background (Circle the highest level attended):
- | | |
|------------------------|---------------------|
| a. High school & under | d. 3rd year college |
| b. 1st year college | e. 4th year college |
| c. 2nd year college | f. graduate studies |
- XIII. Indicate diplomas, certificates and/or degrees you hold. _____
- XIV. If you have attended college, indicate your fields of concentration.
- | |
|-------------------------------|
| a. undergraduate level: _____ |
| b. graduate level: _____ |
- XV. Your practical (work) experience (Circle one):
- | | |
|----------------------|----------------------|
| a. less than 5 years | e. 20 - 24 years |
| b. 5 - 9 years | f. 25 - 29 years |
| c. 10 - 14 years | g. 30 years and over |
| d. 15 - 19 years | |
- XVI. Are you currently engaged in any type of training program?
- | | |
|--------|-------|
| a. yes | b. no |
|--------|-------|
- XVII. If you are engaged in any type of training programs, indicate the nature of your programs. _____
- XVIII. List the names of trade magazines and newspapers which you regularly read.

- XIX. List the names of professional organizations of which you are a member. _____
- XX. Any other information about yourself or your organization which may be useful to this research: _____

APPENDIX F -- ContinuedSECTION II

SIGNIFICANCE OF MANAGEMENT TECHNIQUES

In this section you are asked to classify management techniques or concepts in terms of their importance to various business functions such as finance, accounting, personnel, production, marketing and so forth.

You may indicate your opinion by circling (A), (B), (C), or (D) which are the symbols used in the succeeding pages for the following classes:

(A). This technique is very important to this particular area of business. The persons who are in charge of this functional area must have some basic understanding of this technique and must be at least familiar with the applications, advantages and limitations of this technique.

(B). Although this technique is not directly related to this particular functional area of business, basic understanding of the technique's applications, advantages and limitations can be very helpful to the persons involved in this area.

(C). This technique is not relevant to this functional area of business. Any understanding of the technique's applications, advantages and limitations is very insignificant.

(D). This technique is not familiar to me. As a result I am not qualified to indicate the technique's importance.

In other words, you are asked to indicate how important it is, for example, for the financial manager to know this technique's applications, limitations and advantages.

You may note that the importance is to be considered in terms of basic understanding or knowledge of the technique, not its very detailed mechanics.

APPENDIX F--Continued

Indicate by circling A, B, C, or D the importance of the following management techniques and concepts to the area(s) of
 of

MANAGEMENT TECHNIQUE				MANAGEMENT TECHNIQUE							
001	Organizational Planning	A	B	C	D	022	Sociometric Methods	A	B	C	D
002	Decision Theory	A	B	C	D	023	Costing Systems	A	B	C	D
003	Decision Trees	A	B	C	D	024	Marginal Analysis	A	B	C	D
004	Reporting by Responsibility	A	B	C	D	025	Contribution Analysis	A	B	C	D
005	Systems Analysis	A	B	C	D	026	Sensitivity Analysis	A	B	C	D
006	Management by Exception	A	B	C	D	027	Break-even Analysis	A	B	C	D
007	Management by Objective	A	B	C	D	028	PACE (performance & cost evaluation)	A	B	C	D
008	Results Management	A	B	C	D	029	Simulation	A	B	C	D
009	Management of Time	A	B	C	D	030	Business Games	A	B	C	D
010	Organization & Methods	A	B	C	D	031	Role Playing	A	B	C	D
011	Motivation Theory	A	B	C	D	032	Monte Carlo Method (random sampling or walks)	A	B	C	D
012	Participative Management	A	B	C	D	033	Value Analysis (value engineering)	A	B	C	D
013	Matrix Organization	A	B	C	D	034	Ergonomics (human factors engineering)	A	B	C	D
014	Information Theory (communication theory)	A	B	C	D	035	Random Observation Studies	A	B	C	D
015	Information Retrieval (data mobilization)	A	B	C	D	036	In-Basket Techniques	A	B	C	D
016	EDP	A	B	C	D	037	Critical Path Methods	A	B	C	D
017	Cybernetics	A	B	C	D	038	PERT/CPM	A	B	C	D
018	Economic/Market Indicators	A	B	C	D	039	PERT/COST	A	B	C	D
019	Market Research	A	B	C	D	040	Branching Networks	A	B	C	D
020	Brainstorming	A	B	C	D	041	Resource Allocation	A	B	C	D
021	Probability Theory	A	B	C	D						

APPENDIX F -- Continued

MANAGEMENT TECHNIQUE		MANAGEMENT TECHNIQUE			
042	Distribution Matrix	A B C D	065	Input-Output tables	A B C D
043	Search Theory	A B C D	066	"Objective & Task" method	A B C D
044	Method Study	A B C D	067	Vendor Rating	A B C D
045	SOPs (standard operating procedures)	A B C D	068	Preference distribution analysis	A B C D
046	Payback or Payout Period	A B C D	069	Queuing Theory (waiting line)	A B C D
047	Accounting or Average Rate of Return	A B C D	070	S. Q. C. (statistical quality control)	A B C D
048	Time-adjusted or Internal Rate of Return	A B C D	071	Mathematical Programming	A B C D
049	Net Present Value	A B C D	072	Work simplification	A B C D
050	MAPI	A B C D	073	Work Measurement	A B C D
051	Utility Theory	A B C D	074	Time & Motion study	A B C D
052	Indifference Analysis	A B C D	075	Time Standards	A B C D
053	Replacement Theory	A B C D	076	Work Sampling	A B C D
054	Portfolio Selection	A B C D	077	Line of Balance	A B C D
055	Cash flow Analysis	A B C D	078	Work study	A B C D
056	Working Capital Cycle	A B C D	079	Control Charts	A B C D
057	Ratio (financial) analysis	A B C D	080	Material Handling	A B C D
058	Budgetary Planning & Control	A B C D	081	Productivity Bargaining	A B C D
059	Profit-volume Ratio	A B C D	082	Learning Curve theory	A B C D
060	Exponential Smoothing (exponentially weighted moving average)	A B C D	083	Salary Progression	A B C D
061	Moving Averages	A B C D	084	Salary surveys	A B C D
062	Regression Analysis	A B C D			
063	Box/Jenkins	A B C D			
064	Time series analysis	A B C D			

APPENDIX F -- Continued

MANAGEMENT TECHNIQUE		MANAGEMENT TECHNIQUE		
085	Manpower Planning	A B C D	(PLEASE INDICATE BELOW AND CLASSIFY MANAGEMENT TECHNIQUES WHICH YOU BELIEVE ARE IMPORTANT BUT NOT INCLUDED IN THE LIST ABOVE.)	
086	Critical Incident technique	A B C D		
087	Job Rotation	A B C D		
088	Sensitivity Training (T-Group)	A B C D		
089	Sampling Method	A B C D		
090	Sequential Analysis	A B C D		
091	Economic Reorder Quantities			_____ A B C D
092	Stock Control	A B C D		_____ A B C D
093	Work Planning & Review (WP & R)	A B C D		_____ A B C D
094	Management Audit	A B C D		_____ A B C D
095	Performance appraisal	A B C D	_____ A B C D	
096	"Five-by-Five" approach	A B C D	_____ A B C D	
097	Job Analysis	A B C D	_____ A B C D	
098	Job Evaluation (job-rating)	A B C D	_____ A B C D	
099	Job Description	A B C D	_____ A B C D	
100	Incentive Schemes	A B C D	_____ A B C D	
101	Programmed instruction (teaching machines)	A B C D	_____ A B C D	
102	Merit Rating	A B C D	_____ A B C D	
103	Time-span of discretion	A B C D	_____ A B C D	
104	Model	A B C D	_____ A B C D	
105	Testing (intelligence, aptitude, personality, achievement)	A B C D	_____ A B C D	
106	Managerial Grid	A B C D	_____ A B C D	

Any Additional Remarks: _____

APPENDIX F--Continued

In the event there is a need for personal interview, would you be willing to spare some of your time for such interview?

- a. yes
- b. no

If yes, please state your name and address. _____

THANK YOU VERY MUCH FOR YOUR KIND COOPERATION.

Please return the questionnaire to: Vinay Kothari
University of Moncton
Moncton, New-Brunswick

***In the blank space, one of the seven functional areas was specifically indicated. These areas were: Administration, Finance and Accounting, Marketing and Sales, Production, Purchasing, Personnel and Industrial Relations, and Research and Development.

APPENDIX G

BRIEF DESCRIPTION OF MANAGEMENT TECHNIQUES

Organizational planning--Organizational planning is normally referred to the establishment of goals and objectives of the organization in terms of one-year, five-year, ten-year, twenty-year and perhaps a longer period. The goals and objectives are based usually on a scientific study of the company's past performance, present strength of the firm, and economic trends; the goals and objectives are determined after every aspect of the business is thoroughly analyzed. Future requirements to achieve the goals are then determined and the present activities and efforts are accordingly directed.^{1, 2}

Decision theory--Decision theory is a scientific technique useful to business decision-making under

¹William E. Hill and C. H. Granger, "Long-range Corporate Planning," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 446-453.

²G. A. Steiner, "Long-range Planning: Concept and Implementation," Financial Executive, XXXIV (July, 1966), 54.

conditions of uncertainty and risk. Under this method, mathematical concepts are widely used and the courses of action or the alternatives are identified and quantified in terms of costs, probabilities, profits, or any other criteria. The quantified alternatives indicate the best course of action for the manager.^{3, 4}

Decision trees--This technique is very useful when the manager is faced with more than one decision. Decisions are laid out as a branching tree and they are displayed with their probabilities; the branching network shows the relationship of the decision at one hand and all decisions subsequent to chance events. From this array of decisions, the manager can easily evaluate the best action.⁵

Reporting by responsibility--According to this managerial concept, each member or unit of the organization should be assigned specific responsibilities.

³G. Sciarrino, "Decision Theory and Scientific Method; Present, Past and Future," Management International Review, VII (2-3, 1966), 59-93.

⁴L. Harris, "Decision Theoretic Approach on Deciding When A Sophisticated Forecasting Technique is needed," Management Science, XIII (October, 1966), B66-B69.

⁵J. F. Magee, "Decision Trees for Decision Making," Harvard Business Review, XLII (July-September, 1964), 127.

Axelson stresses observance of the following important principles:

- (1) every necessary function is assigned to a unit of the organization;
- (2) the assignment of responsibilities is specific and understood;
- (3) overlapping of responsibilities must not exist;
- (4) each position of an organization reports to one and only one supervisor; and
- (5) a supervisory position over each logical grouping... of activities at each management level must be assigned.^{6, 7}

Systems analysis--Based on the concept of systems, the organization is looked upon as a set of interrelated objects and activities centered around a common objective. In the analysis of a system, each part of the whole system is systematically investigated and is studied in terms of its relationships to the whole.^{8, 9}

Management by exception--According to this concept, routine decisions should be delegated to subordinates who

⁶K. S. Axelson, "Responsibility Reporting," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 823-826.

⁷R. W. Holmes, "Executive Views Responsibility Reporting," Financial Executive, XXXVI (August, 1968), 39-42.

⁸R. W. Krueger, "Systems Analysis, Computers, and the Future of Professional Services," Computers and Automation, XVII (July, 1968), 34-36.

⁹T. B. Glans and others, Management Systems (New York, 1968).

must be given responsibility to see that routines and procedures are closely followed. As long as the activities and events are within the boundaries of the set standards or expectations, the manager does not need to be bothered. But, if there is any deviation in planned results or activities, the matter is brought to the managerial attention for review and correction.^{10, 11}

Management by Objective--This managerial concept suggests that the top management should determine the overall objectives of the firm, but that the managers at the middle and lower levels should set objectives for their individual units. Furthermore, the concept suggests that every unit or activity must have responsibility to attain certain results. The results are constantly measured against the established objectives.^{12, 13}

¹⁰R. A. Kaimann, "Management by Exception Hierarchically," Data Processing Magazine, VIII (July, 1966), 40-44.

¹¹W. W. Haynes and J. L. Massie, Management: Analysis, Concepts and Cases, 2nd Edition, (Englewood Cliffs, N. J., 1969), p. 107.

¹²Dan M. Krausse, "Results Management," An Address to Dallas Management Association, March 1, 1967.

¹³Peter F. Drucker, The Practice of Management (New York, 1954).

Results management--Same as management by objective.

Management of time--Under this technique, time is considered a precious economic resource--irrecoverable, irreplaceable, irreversible and costly. The technique includes: analysis of time in terms of each managerial activity; analysis of activities in terms of the need for the managerial attention; elimination or delegation of the activities not requiring personal managerial attention; budgeting of time; planning and scheduling time for future activities.^{14, 15}

Organization and methods--According to this technique, procedures and methods in the organization should be systematic and simplified for the clerical staff and other employees. They should be consistent with the characteristics and needs of the organization; overall, the routine activities should be standardized and they should be periodically evaluated to check their efficiency

¹⁴F. D. Barrett, "The Management of Time," The Business Quarterly (Spring, 1969), 56-64.

¹⁵H. B. Maynard, Editor, Top Management Handbook (New York, 1960), pp. 30-33, 104-106.

and effectiveness.¹⁶

Motivation theory--In recent years, behavioral scientists have pointed out many factors which can be utilized by the manager to motivate people. These factors include: money, good fringe benefits, better working conditions, security, and opportunities for self-actualization and creativity. All these factors are indicated by major prevailing theories on motivation, such as Maslow's Hierarchy of Needs, McGregor's Theory Y, Herzberg's Satisfiers and Dissatisfiers theory, and McClelland's Achievement theory.^{17, 18}

Participative management--This approach to management encourages individual participation in the determination of objectives, policies, work schedules, programs, and other aspects of business. Participation can be achieved through team-work, committees, conferences, suggestion systems, and consultations.¹⁹

¹⁶Henry H. Albers, Principles of Management (New York, 1969), pp. 363-369.

¹⁷W. J. Bowles, "Management of Motivation--A Company-wide Program," Personnel, XLIII (July, 1966), 16-26.

¹⁸L. C. Megginson, Personnel: A Behavioral Approach to Administration (Homewood, Ill., 1967), Chapter 24.

¹⁹W. W. Haynes and J. L. Massie, op. cit., pp. 330-331.

Matrix organization--This technique is specifically useful to organizations which are customer or project oriented. The matrix organization, as explained by Weimer, is one in which

a typical arrangement is for a project manager to be appointed for a major effort. He sets up a line or line-and-staff organization for this specific project and draws on the regularly established line functions for support. Through this support he is able to secure the personnel and other resources best adapted to the purposes of the specific project. Thus, a special group of production facilities may be drawn from the resources of the company, a special engineering and research group may be set up drawing on the regular engineering and research departments, and so on.²⁰

Information theory--Information in the business organization is transmitted by words, charts, actions, pictures, and numbers. Sometimes the information received is misunderstood or is meaningless because of the difficulties involved in the communication processes. As a result, the reliability of the information is diminished every time the information changes hands and the probability of an intended event or activity happening is lowered. This probability function of information,

²⁰Arthur Weimer, Business Administration: An Introductory Management Approach (Homewood, Ill., 1966), pp. 330-331.

according to the information theorists, can be quantified and through the use of mathematics the problems of communication can be generally overcome.^{21, 22}

Information retrieval--Information retrieval or data mobilization deals with the problem of storage and retrieval. Abundant information available to the firm should be stored and processed in such a manner that the right information is made available at the right time and at the right place and to the right person. In order to expedite the information retrieval function, irrelevant information must be eliminated and relevant information should be processed through tools such as computers, photographic processes, magnetic recordings.^{23, 24}

EDP--Electronic data processing utilizes electronic equipments to store, communicate and analyze available

²¹J. A. Caspari, "Fundamental Concepts of Information Theory," Management Accounting, XLIX (June, 1968), 8-10.

²²H. H. Albers, op. cit., pp. 419-551.

²³P. W. Sherwood, "Information Retrieval and Good Housekeeping Pay Dividends to Management," Public Utilities Fortnightly, LXVI (May 26, 1966), 35-41.

²⁴R. M. Hayes, "Information Retrieval," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 353-358.

data. The system includes functions such as data recording, data communicating, data storage and filing, data retrieval, data processing and reporting. These functions are carried out by computers to save time and money.²⁵

Cybernetics--Cybernetics refers to the study of control systems in man and machine and to the relationships between them. It involves feedback and control in all types of business systems. The two important control principles of cybernetics are already in use--namely, the error-actuated-feedback and homeostatis--in automation. Although the concept is highly complex and requires sophisticated knowledge in mathematics, it is most useful in communication problems.^{26, 27}

Economic/Market indicators--The study of economic or market indicators is useful in determining and planning future business activities. Economic indicators, such as

²⁵Roger L. Sisson, "Electronic Data Processing," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 173-181.

²⁶Eric Duckworth, A Guide to Operational Research (London, 1962), p. 15.

²⁷William G. Scott, "Organization Theory: An Overview and An Appraisal," The Nature and Scope of Management, edited by Maneck S. Wadia (Chicago, 1966), pp. 96-108.

construction contracts awarded, personal income, automobile production, farm income, employment level, consumer prices, and wholesale prices indicate the nation's economic health and highlight economic trends.^{28, 29}

Market research--Market research refers to the systematic investigation through gathering and recording of pertinent data, of problems related to the marketing of goods and services. The most commonly used approaches and techniques of investigation are study of the historical data, controlled experiments, observations, and surveys. They are generally related to the product, the market, and the process of marketing the product.^{30, 31}

Brainstorming--This technique is useful in generating new ideas related to business activities. Brainstorming

²⁸H. S. Hodges, "Performance Data: Some Aspects of Intertemporal Comparison," Economic Record, XLIV (March, 1968), 15-25.

²⁹Ya-Lun Chou, "Business Forecasting," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 64-76.

³⁰T. N. Beckman and W. R. Davidson, Marketing, 8th Edition (New York, 1967), pp. 760-789.

³¹D. C. Wright, "Marketing Research," Management Review, LV (May, 1966), 37-46.

essentially is a group activity which encourages individual participation. In a brainstorming session, a chairman is usually present and he outlines to the group the problem and its limitations; ideas are invited from the participants and are recorded by one of the members. The emphasis during the session is on the quantity of ideas, not the quality; in fact, no evaluation should be made on the ideas by other members.³²

Probability theory--This operational research technique deals with the possibility of occurrence of certain events. The possibility or the probability is determined through the use of mathematical and statistical concepts. The theory is based on the assumption that a large number of past events can predict, or at least point out, future events.^{33, 34}

Sociometric method--This technique is useful in

³²John W. Haefele, "Brainstorming," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 53-56.

³³H. A. Latane and D. L. Tuttle, "Framework for Forming Probability Beliefs," Financial Analysts Journal, XXIV (July, 1968), 51-61.

³⁴L. W. Hein, The Quantitative Approach to Managerial Decisions (Englewood Cliffs, N. J., 1967), pp. 114-136.

determining preferences of workers for each other so that individuals may be placed in situations where they will derive the greatest satisfaction. One of the most common forms of determining preferences is the questionnaire survey which asks each individual to indicate his preference for individuals in a certain business activity; this information can be used to develop a group or team.^{35, 36}

Costing systems--In any business, elaborate costing systems are mandatory to achieve control over cost and to increase efficiency in the organization. The main purpose of the systems should be to attach costs to all the business activities as accurately as possible and there should be sufficient utilization of economic and accounting concepts. The systems should enable the manager to compare the actual costs with the standard or budgeted costs so that he can take necessary measures to improve the

³⁵B. J. Speroff, "Sociometry--A Tool of Leadership and Clique Identification," Personnel Journal, XLV (November, 1966), 618-619.

³⁶Paul M. Dauten, Jr., Current Issues and Emerging Concepts in Management (Boston, 1962), p. 238.

performance.^{37, 38}

Marginal analysis--This technique is based on the economic principles and is also known by other names such as marginal cost or income analysis, incremental cost, or profit analysis. The main purpose of the analysis is to identify the effect on the total costs and revenues of a given activity; often the analysis is made in terms of each additional unit of production or each additional activity.³⁹

Contribution analysis--This technique is similar to marginal analysis and to break-even analysis. Its purpose is to determine the excess of revenue over variable cost which could result from altering sales volume or adding a new product or product line or from altering some business activities. This excess of revenue over variable

³⁷F. S. Luh, "Controlled Cost: An Operational Concept and Statistical Approach to Standard Costing," The Accounting Review, XLIII (January, 1968), 123-132.

³⁸A. Matz, O. J. Curry and G. Frank, Cost Accounting (Cincinnati, 1962).

³⁹John D. Simmons, "Cost-Volume-Profit Analysis," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 127-128.

cost can be considered as a recovery of fixed cost or as profit.^{40, 41}

Sensitivity analysis--Basically, this technique is similar to marginal analysis, contribution analysis and break-even analysis. Essentially, the analysis attempts to determine the sensitivity of costs and revenues to a particular business action or activity. In other words, the sensitivity of costs and revenues to different inputs is measured by this analysis.^{42, 43}

Break-even analysis--This technique, as defined by Spencer and Siegelman, is a "graphic device . . . for integrating costs, revenues, and output of the firm so as to illustrate the probable effects of alternative courses of action upon net profits."⁴⁴ Thus, fixed

⁴⁰C. T. Horngren, "Contribution Margin Approach to the Analysis of Capacity Utilization," The Accounting Review, XLII (April, 1967), 254-264.

⁴¹Keith Shwayder, "A Note on a Contribution Margin Approach to the Analysis of Capacity Utilization," The Accounting Review, XLIII (January, 1968), 101-104.

⁴²Alfred Rappaport, "Sensitivity Analysis in Decision Making," The Accounting Review, XLII (July, 1967), 441-456.

⁴³R. E. Jensen, "Sensitivity Analysis and Integer Linear Programming," The Accounting Review, XLIII (July, 1968), 425-445.

⁴⁴M. Spencer and L. Siegelman, Managerial Economics (Homewood, Ill., 1959), p. 109.

costs, variable costs and revenues are normally presented and shown on graphs; the break-even point is that where the total revenue and cost are equal.^{45, 46}

PACE--Performance and cost evaluation technique is designed to improve group efforts and to eliminate idle time frequently encountered by employees due to delay in parts, tools, instructions, or to inadequate planning. PACE is basically a statistical technique. It has two aspects--PACE measurement and PACE program. The PACE measurement involves the development of an index based on individuals assigned to the job, individuals who are idle, individuals out of the job area, and the group effort rating; the PACE program includes the analysis of the measurement index and five other related indices such as personnel requirements, budget realization, scheduling, quality control and parts shortages.⁴⁷

⁴⁵G. L. Battista and G. R. Crowningshield, "Cost Behavior and Breakeven Analysis: A Different Approach," Management Accounting, XLVIII (October, 1966), 3-15.

⁴⁶David Solomons, "Breakeven Analysis Under Absorption Costing," The Accounting Review, XLIII (July, 1968), 447-452.

⁴⁷L. W. Hein, op. cit., pp. 261-287.

Simulation--Simulation may be regarded as an imitation of an operation or an event which is tested and retested for validity and reliability prior to actual performance. In simulation, characteristics of the actual operation or event are preserved, and experiments are carried out to determine the outcome in a real situation. The process of simulation begins with the development of models from available data; the models are tested for validity and are modified according to results; they are tested until desired results are obtained.^{48, 49}

Business games--This technique of training managers and other personnel is basically a simulated process. The technique is similar to those of other games; there are many participants and the objective is to win. In the game, usually a business situation is created which requires the participants to make decisions on price, production, capital expenditure, product selection, plant

⁴⁸I. M. Kay, "Executive's Primer on Simulation," Data Processing Magazine, VIII (October, 1966), 52-57.

⁴⁹William McGehee and Paul Thayer, Training in Business and Industry (New York, 1961), pp. 221-223.

layout, work schedules, and many other areas of business. After the game is played, the performance of each participant is critically evaluated and the winner is picked by the designated umpires.⁵⁰

Role playing--This is also a simulated technique useful in training and developing managers. In this approach, 10 to 15 participants are selected and they are assigned a specific role by the leader. Each participant receives instructions about his role from the leader; after the role has been explained, the participant is required to play it out while another participant serves as an analyst. After the roles have been played, they are critically evaluated. Throughout this process, the emphasis is placed on the actual role playing rather than mere thinking of it.⁵¹

Monte Carlo method--This technique is based on the laws of probability and is useful in situations where

⁵⁰G. R. Andlinger, "Business Games--Play One," Business Policy: A Management Audit Approach, edited by William T. Greenwood (New York, 1967), pp. 638-651.

⁵¹John B. Miner, Personnel and Industrial Relations: A Managerial Approach (New York, 1969), p. 332.

significant activities or events may occur according to some known pattern or at random. Basically, this technique simply consists of figuring out the odds as a gambler does. This technique is known also as random walks or random sampling.^{52, 53}

Value analysis--Value analysis or value engineering basically involves the identification of the function or activity, the assignment of value for that function or activity and the determination of ways to provide that function at the lowest possible cost. This scientific approach usually has six steps: 1. the determination of the item and its functions; 2. the evaluation of the item and its elements according to costs and functions; 3. the development of alternative items which would serve similar functions; 4. the determination of the cost of the alternative items and their reliability; 5. the selection of the best alternative items in terms of the costs, and 6. the implementation of the alternative

⁵²J. G. Laski, "On Time Structure in (Monte Carlo) Simulation," Operational Research Quarterly, XVI (September, 1965), 329-339.

⁵³Clayton J. Thomas, "Operational Gaming and Monte Carlo Simulation," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 607-612.

items.^{54, 55}

Ergonomics--Ergonomics, human engineering or human factor engineering is primarily concerned with ways of designing machines, operations and work situations in such a way that they match human capabilities and limitations. The purpose is the reduction of error or inefficiency which may be caused by characteristics of a machine, operation or working condition. In order to develop better relationships between man and machine, studies related to their relationships are carried out by psychologists, mathematicians, sociologists, engineers, physicians and other specialists.⁵⁶

Random observation studies--This technique suggests that observation can be made at random intervals to determine patterns and phenomena that may be taking place in business. Under this approach, samples must be drawn in such a manner that each item with similar characteristics has equal chance for selection and there is no

⁵⁴A. R. Tocco, "Value Engineering (Value Analysis)," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 1025-1028.

⁵⁵A. Cirtin, "Value Analysis: A New Tool for Cost Control," Journal of Accountancy, CXXII (October, 1966), 54-58.

apparent order or connection between them.^{57, 58}

In basket techniques--This technique is essentially similar to role playing, business games and other simulated methods of training and developing management personnel. In this approach, a job for which the individuals are being considered is simulated including all the features, functions, responsibilities and problems of the job. Each participant is required to carry out exercises assigned to him within a specified time; the performance in these exercises is later on critically evaluated.^{59, 60}

Critical path methods--This technique is based on the network principle and it provides information to the manager as it relates to the actual and potential problems which may develop in the completion of a project.

⁵⁷Edward N. Dubois, Essential Methods in Business Statistics (New York, 1964), pp. 69-139.

⁵⁸L. W. Hein, op. cit., pp. 242-258.

⁵⁹J. B. Miner, op. cit., pp. 303-304.

⁶⁰Burt Nanus, "Management Development Techniques," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 470-473.

There are five major elements involved in this technique: network of events and activities; resource allocation; time and cost considerations; network paths, and critical paths. Time and resources requirements are presented in an activity, and the network shown are the requirements to proceed from one event to the next.⁶¹

PERT/CPM--Program evaluation review technique is almost similar to the critical path method analysis. The only difference is that in PERT the project time is expressed in a range of optimistic, pessimistic and most likely; in CPM, project time is expressed on the basis of the past experience.⁶²

PERT/Cost--This is an additional version of the PERT and CPM techniques. The emphasis of this technique is on actual costs as they relate to actual progress. Based on the available cost information, the activities are often altered or modified and some changes are made in resource allocation.⁶³

⁶¹R. R. Mayer, Production Management (New York, 1968), pp. 343-362.

⁶²L. W. Hein, op. cit., pp. 289-325.

⁶³W. R. Ross, "Accounting Aspects of PERT/Cost," Management Accounting, XLVIII (April, 1967), 47-51.

Branching networks--As a project can be completed in many different ways, each alternative is presented in the form of branching networks. The network shows the relationship between the alternatives, possible decisions involved at each point on the network, and the best alternative at a particular point. This technique warns the decision maker ahead of time about the approaching decisions and the best choice of its possible alternatives. The technique is almost similar to decision trees, PERT and CPM.⁶⁴

Resource allocation--Resource allocation is an extension of the cost function of CPM and PERT/Cost. Cost of each activity is determined in terms of time; the activity cost is composed of costs of labor, machines, capital. The purpose is to determine how much cost can be cut if the time is extended and changes are made in resources. Theoretically, the resources should be allocated in such a manner that the marginal efficiency of all resources is equal.⁶⁵

⁶⁴A. Battersby, Network Analysis for Planning and Control (New York, 1966).

⁶⁵Richard Leftwich, The Price System and Resource Allocation (New York, 1964), pp. 320-337.

Distribution Matrix--To cope with the problems of distribution and transportation, the mathematical concept of matrix can be utilized by the manager. The technique of distribution matrix is particularly useful when several locations are available from where goods can be shipped. Since the basic purpose is to minimize the cost of distribution, the matrix solution to the problem can point out how the goods ought to be distributed.^{66, 67}

Search theory--This theory is useful in seeking information necessary to overcome many of the business problems. Information may be gathered from many sources and through research and development activities. It is, however, important to remember that search is generally referred to in connection with consumer shopping in its application to business.⁶⁸

Methods study--This technique involves the analysis

⁶⁶P. S. Dwyer, "Direct Solution of the Transportation Problem with Reduced Matrices," Management Science, XIII (September, 1966), 77-96.

⁶⁷F. H. Mossman and M. L. Worrell, "Analytical Methods of Measuring Marketing Profitability--A Matrix Approach," Business Topics, XIV (Autumn, 1966), 35-45.

⁶⁸T. N. Beckman and W. R. Davidson, Marketing (New York, 1967), pp. 187-188.

of an operation to discover the inadequacy or inefficiency in the operation and to study various features of the operation. The technique begins with the analysis of the operation which may include the use of a stop-watch; in the analysis, each aspect of the operation is carefully evaluated in terms of its importance to the whole operation and many concepts related to time and motion are utilized. The technique is largely useful in routine operations of business.^{69, 70}

SOPs--Standard operating procedures are most useful to activities which occur very frequently in the organization. When activities and operations are more frequent, they can be standardized and set procedures can be established. Standardized activities and procedures are based on scientific studies, helpful to individuals if they are specifically written out in detail from the beginning to the end.^{71, 72}

⁶⁹R. R. Mayer, op. cit., pp. 483-532.

⁷⁰Phil Carroll, "Method Improvement," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 545-548.

⁷¹Ernest Dale, Management Theory and Practice (New York, 1965), pp. 168-175.

⁷²H. B. Maynard, Top Management Handbook (New York, 1960), pp. 435-438.

Payback period--The payback or payout period is a capital budgeting technique and is useful in problems related to capital outlay projects. Basically, the technique determines the number of years necessary to recover the original capital outlay. This technique does not indicate the rate of return on capital, nor does it state the profitability of a project.^{73, 74, 75}

Accounting or average rate of return--This capital budgeting technique is directed to measure the rate of return on investment which is usually figured on the average, total or yearly basis and is expressed as a percentage. The practice of this technique varies from one firm to another depending on the firm's accounting methods.^{76, 77, 78}

⁷³J. Fred Weston and E. F. Brigham, Managerial Finance (New York, 1966), pp. 138-182.

⁷⁴Ezra Soloman, "The Arithmetic of Capital-budgeting Decisions," Journal of Business, XXIX (April, 1956), 124-129.

⁷⁵Harold Bierman, Jr., and Seymour Smidt, The Capital Budgeting Decision (New York, 1960).

⁷⁶Ibid.

⁷⁷Weston and Brigham, op. cit.

⁷⁸E. Soloman, op. cit.

Time-adjusted or internal rate of return--This capital budgeting technique takes into account the time concept of money. In this technique, the cash proceeds and outlays resulting from a project are studied in terms of their present value, and by the process of trial and error and with the assistance of the present value tables, the rate of return is determined which equates the present value of cash proceeds with the present value of cash outlays.^{79, 80, 81}

Net present value--This capital budgeting technique is almost similar to the internal rate of return method. However, it differs from it in the sense that this method uses the cost of capital as a discount rate and there is no need for the trial and error process to determine the rate. The net present value is considered to be the excess of the present value of the cash inflows

⁷⁹Bierman and Smidt, op. cit.

⁸⁰E. Solomon, op. cit.

⁸¹Weston and Brigham, op. cit.

over the present value of the cash outflows.^{82, 83, 84}

MAPI--This capital budgeting technique, designed by the Machinery and Allied Products Institute, basically is concerned with two questions: 1. What is the advantage of the project for the next year? 2. What is the merit of the investment project in terms of the rate of return? These questions are analyzed with the aid of forms and charts. In the analysis, five elements are largely evaluated: net investment (NI), next year operating advantage (OA), next year capital consumption avoided (CA), next year capital consumption incurred (CI), and income tax adjustments for the next year (IT). Following the analysis, the rate is determined with the use of the following formula:

$$R = \frac{OA + CA - CI - IT}{NI}$$

⁸²Ibid.

⁸³Bierman and Smidt, op. cit.

⁸⁴E. Solomon, op. cit.

Essentially, the formula enables the management to compare the overall rate of return with the rate of return without the project under consideration.^{85,86}

Utility theory--The utility theory is basically the same as value analysis discussed earlier. This technique suggests that the importance of business activities and operations may be measured in terms of the utilities they provide. Generally, business operations provide form, place, possession and time utilities; these utilities can be measured in relation to value added at every stage of production or the productive process which is usually expressed in terms of exchange price.^{87,88,89}

Indifference analysis--This economic analysis is very useful to the problems related to the allocation of economic resources, the production level, the capital

⁸⁵George Terborgh, "MAPI Investment-Policy Formula," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 491-502.

⁸⁶A. Matz, O. J. Curry and G. Frank, Cost Accounting (Cincinnati, 1962), p. 824.

⁸⁷M. Weitzman, "Utility Analysis and Group Behavior: An Empirical Study," Journal of Political Economy, LXXIII (February, 1965), pp. 18-26.

⁸⁸P. C. Fishburn, "Methods of Estimating Additive Utilities," Management Science, XIII (March, 1967) pp. 435-453.

⁸⁹Richard Leftwich, The Price System and Resource Allocation (New York, 1964) pp. 49-68.

expenditure. Basically, the analysis involves the graphic presentation of different alternatives and preferences; the indifferent curves are drawn to show the combination of various alternatives which would yield equivalent satisfaction.^{90, 91}

Replacement theory--This theory refers to the replacement of an existing item, such as machine or plant, with a new or better item; the main purpose of the analysis is to determine any cost savings possible from the replacement of the item. The analysis involves the economic feasibility study and includes the study of factors such as disposable value of the existing item, tax implication, repair and breakdown costs, rate of output, depreciation, and life of the item.⁹²

Portfolio selection--Developed by Markovitz, this concept of investments suggests that investment projects

⁹⁰P. N. Mathur, "Approximate Determination of Indifference Surfaces from Family Budget Data," International Economic Review, V (September, 1964), 294-303.

⁹¹R. H. Leftwich, op. cit., pp. 69-94.

⁹²L. S. Rosen, "Replacement-Value Accounting," The Accounting Review, XLII (January, 1967), 106-113.

should be selected in such a manner that the return on investment is maximized and the risk, instability and uncertainty are minimized. This concept is most useful in selecting stocks and bonds. A selection of portfolio of stocks and bonds should be based on the investor's weighted value of two objectives--the desire for returns and the desire for the certainty, dependability and stability of the returns.^{93, 94}

Cashflow analysis--This simple financial analysis is basically concerned with the analysis of cash or funds generated as a result of company's normal operations. In the analysis, the net income from operations is considered and adjustments are made in revenues and expenses which had no effect on working capital. The analysis is carried out through the study of various elements of the balance sheet.^{95, 96}

⁹³H. Markowitz, Portfolio Selection: Efficient Diversification of Investments (New York, 1965).

⁹⁴H. Markowitz, "Portfolio Selection," Journal of Finance (March, 1952), 77-91.

⁹⁵B. Graham, D. L. Dodd and S. Cottle, Security Analysis, 4th edition (New York, 1962), pp. 172-183.

⁹⁶H. R. Brock, C. E. Palmer and F. C. Archer, College Accounting--Intermediate/Advanced (New York, 1966), pp. 393-430.

Working capital cycle--The working capital or operating cycle refers to the cycle beginning with the cash purchase or purchase of materials on account followed by the conversion of materials into finished goods and the sale of finished goods on account or cash. Thus, the analysis of the working capital cycle normally is limited to the study of various elements of current assets and current liabilities, and the basic purpose is to study various patterns of these elements.^{97, 98}

Ratio (financial) analysis--Ratio analysis refers to the analysis of the financial statements. Generally, there are four major categories of financial ratios: liquidity, leverage, activity and profitability. Ratios, such as current ratio, quick ratio, inventory to working capital, debt to total assets, and times interest earned suggest the ability of the firm to meet its obligations and indicate the firm's earning ability.^{99, 100}

⁹⁷Weston and Brigham, op. cit., pp. 327-345.

⁹⁸Jules I. Bogen, Editor, Financial Handbook (New York, 1965), pp. 16.1-16.33.

⁹⁹Weston and Brigham, op. cit., pp. 67-98.

¹⁰⁰William E. Westerdahl, "Comparing the Company with Its Industry by Ratios," Business Policy: A Management Audit Approach, edited by W. T. Greenwood (New York, 1967), pp. 131-142.

Budgetary planning and control--Budgeting refers to the establishment of specific future objectives for an activity or a department; often these objectives are translated into monetary terms and are specifically written out. These written statements are generally referred to as budget. These budgets may be for sales, production, operating expenses, cash, or any other particular activity or element. Periodically the budgets are studied against the actual results and if necessary, changes are made or actions are taken.¹⁰¹

Profit-volume ratio--This technique shows the relationship between profits and sales volume. The relationship is frequently presented in a graph. The ratio indicates the percentage of each sales dollar which contributes towards the recovery of the fixed costs or towards profits.¹⁰²

Exponential smoothing--This technique is based on statistical concepts and is useful particularly in sales forecasting. The technique analyzes the historical data

¹⁰¹Ernest Dale, Management Theory and Practice (New York, 1965), pp. 366-369; 491-495.

¹⁰²See the sources listed for marginal analysis, contribution analysis, breakeven analysis and ratio analysis. Also, C. R. Niswonger and P. E. Fess, Accounting Principles (Cincinnati, 1965), pp. 633-634.

by assigning different weights to available data in relation to time; more weight is assigned to recent data and lower weight is given to data not so recent. The basic assumption is that the information becomes less and less significant as it becomes older. This technique is known also as exponentially weighted moving average.^{103,104}

Moving averages--This technique is similar to exponential smoothing, but in this technique the same weight is used for all data. The average of a series of data is determined progressively by adding and eliminating a part of a series at a time.¹⁰⁵

Regression analysis--Regression analysis is a statistical technique and it attempts to study the pattern of relationship between two variables and the closeness of the relationship between the variables. The technique is very useful in sales forecasting.¹⁰⁶

Box/Jenkins--This sales forecasting technique is

¹⁰³James H. Greene, Production Control (Homewood, Ill., 1965).

¹⁰⁴J. Argenti and C. Rope, "Glossary of Management Techniques," Management Today, (September, 1966), p. 79.

¹⁰⁵See the footnotes: 103 and 104.

¹⁰⁶E. N. Dubois, Essential Methods in Business Statistics (New York, 1964), pp. 140-159.

particularly useful when possible errors are anticipated in time series and regression analyses because this technique takes into account these errors. It is "particularly useful when errors in sales forecasts . . . are complementary; for example, a month of low demand followed by a high one, and vice versa."¹⁰⁷

Time series analysis--This statistical technique studies the historical data and points out seasonal patterns and trends. From these patterns and trends, the future business activities and operations can be anticipated.¹⁰⁸

Input-output tables--The input-output tables are useful in forecasting future demand for goods and services. The tables basically show how ". . . the demands from households, governments, and other users of finished goods and services become reflected in the flows of raw materials, semifinished products, and services among producing industries."¹⁰⁹

¹⁰⁷Argenti and Rope, op. cit., 79.

¹⁰⁸Dubois, op. cit., pp. 160-189.

¹⁰⁹Beckman and Davidson, op. cit., p. 104.

Since the tables show the interdependence of various industries in terms of inputs and outputs, the analysis of the tables is very useful in planning future activities.¹¹⁰

"Objective & task" method--This technique is usually referred to in connection with advertising and promotional programs. This approach suggests that the quality and quantity of business activities must be based on the objectives they are trying to attain. Thus, advertising and promotional budgets must be determined on the basis of their purposes, such as sales volume which can be anticipated by the promotional efforts.¹¹¹

Vendor rating--This technique of evaluating suppliers is very useful to the purchasing and production areas. As a purchaser expects from his suppliers a low price, high quality of goods, prompt services, convenience and reliability, the purchaser should evaluate each supplier in terms of these and many other elements. If each vendor is listed on the basis of different factors, a list can be compiled and constantly used as a guide for purchases.^{112,113}

¹¹⁰Ibid., pp. 103-116.

¹¹¹Beckman and Davidson, op. cit., pp. 582-583.

¹¹²A. V. Feigenbaum, "Vendor Rating," The Encyclopedia of Management, edited by Carl Heyl (New York, 1963), pp. 1029-1030.

¹¹³Beckman and Davidson, op. cit., p. 553.

Preference distribution analysis--This technique is useful in determining the distribution channels for goods and services. All the channels of distribution are systematically analyzed in terms of the location of buyers and sellers, the demand for goods, the supply of goods, the cost of distribution, the competition, and the transportation systems. Based on the analysis, preferences are established as to the place or location from where the goods may be manufactured and/or distributed.¹¹⁴

Queuing theory--Also known as the waiting-line theory, this technique's basic purpose is to eliminate the bottlenecks or idle time in production processes and operations. The queuing theory basically deals with processes or stations where the arrival of items is random. The analysis of arrival time and service time for each item is made to increase efficiency.^{115, 116}

¹¹⁴Beckman and Davidson, op. cit., pp. 223-244.

¹¹⁵L. W. Hein, op. cit., pp. 174-200.

¹¹⁶H. H. Peterson, "Waiting Line Theory," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 1034-1038.

Statistical quality control--In order to determine whether or not goods being manufactured or finished goods meet the quality standards, many statistical principles of sampling can be useful. The basic purpose of SQC is to minimize the cost of inspection and that of poor quality. The inspection of items can be made at random intervals and the findings may be shown in charts and quality curves.^{117, 118}

Mathematical programming--There are many mathematical programming techniques such as linear programming, integer programming, and quadratic programming. These mathematical concepts with the assistance of computers can solve many business problems. Requirements necessary for problem-solving by mathematical programming include existence of goals and objectives, presence of restraining factors or variables, interrelationships between the variables or factors, and more than one action to achieve

¹¹⁷R. R. Mayer, op. cit., pp. 363-482.

¹¹⁸George R. Foster, "Quality Control," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 796-805.

the objective; furthermore, the problem must be expressible in mathematical equations.^{119,120}

Work simplification--This technique is applied in the industrial situation to find ways of doing work that will permit an increase in productivity. The technique refers to a systematic investigation of business activities and operations, particularly tasks and methods; in the investigation, three major questions are largely studied--what activity or an operation really is, why it is being performed or carried out, and what can be done to simplify it in order to improve productivity.¹²¹

Work measurement--Work measurement concerns with the measurement of time necessary to perform tasks under specified conditions. Time is measured for every step involved in the operation. Many devices are used to study the operation and to measure time; however, a stop-watch and a camera are frequently used devices. The work is usually studied by a trained person and all

¹¹⁹Thomas C. Cattrall, Jr., "Mathematical Programming," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 796-805.

¹²⁰L. W. Hein, op. cit., pp. 46-89.

¹²¹W. Clements Zinck, "Work Simplification," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 1053-1059.

the normal conditions of the work are maintained during the study.¹²²

Time and motion study--See work measurement.

Time standards--See work measurement.

Work sampling--Work sampling is also known as ratio-delay and task inventory. This technique analyzes activities and operations through accumulation of information about the worker's activities and machines; the information is accumulated either by the analyst or the worker himself on the basis of random observations. The observations are recorded and analyzed. Basically, this technique is almost similar to work measurement.^{123,124,125}

Line of balance--This technique uses the concept of management by exception and enables the management to ascertain and maintain a balance in the production processes. The technique involves a study at a point in time to

¹²²R. R. Mayer, Production Management (New York, 1968), pp. 537-606.

¹²³Carl Heyel, op. cit., p. 807.

¹²⁴Frank M. Knox, "Office Work Sampling," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 592-597.

¹²⁵R. R. Mayer, op. cit., pp. 570-577.

determine where all the phases of production are and where they ought to be. If any differences are found in the planned and actual production phases, necessary corrective actions are taken to bring them in harmony. The analysis indicates what must be done to bring all factors of production into balance at a point in time so that future objectives can be ascertained.^{126, 127}

Work study--See methods study, work sampling, work measurement, and work simplification.

Control charts--Control charts are useful in quality control; they provide statistical tools to measure the quality of products based on the random sampling principle. In the charts, the predetermined quality limits are pointed out and the findings of sample's quality are plotted on the charts; if the indications are that the quality is not within the established limits, then the corrections are made.^{128, 129}

¹²⁶G. T. Mundorff, "Line of Balance (LOB)," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 420-428.

¹²⁷Hein, op. cit., pp. 329-348.

¹²⁸Hein, op. cit., pp. 201-236.

¹²⁹R. R. Mayer, op. cit., pp. 363-464.

Material handling--Material handling systems in the organization must be so designed that the materials flow in the organization rapidly, smoothly and efficiently. To develop efficient handling, systems studies must be undertaken to investigate various factors such as the cost of handling, the time involved, the nature of materials, the required path of travel, the space requirements, and the handling capacity.^{130, 131}

Productivity bargaining--In collective bargaining, wage settlement should be largely based on productivity. The concept of productivity bargaining suggests that wages should be in proportion to the productivity of workers and that workers should receive an increase in wages if their productivity is increased. Thus, the increment in wages in the contract should be in accordance with productivity increases.^{132, 133, 134.}

¹³⁰H. B. Maynard, "Materials Handling," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 522-524.

¹³¹Mayer, op. cit., pp. 120-144.

¹³²D. Schwartzman, "Contribution of Education to the Quality of Labor, 1929-1963," American Economic Review, LVIII (June, 1968), pp. 508-514.

¹³³L. C. Megginson, op. cit., pp. 394-414.

¹³⁴R. W. Rosen, "Problems of Applying Productivity Guidelines," Personnel, XLI (November-December, 1964), 22-26.

Learning curve theory--This theory suggests that through experience or learning, individuals are able to increase their output; they are able to increase the quality of output and they are able to produce at a lower cost. With the use of the learning curve technique, the gradual reduction in cost and time resulting from increasing experience or learning can be calculated and this calculation can be used to determine the cost of future projects. This technique is most useful when bidding for new projects, and it is largely utilized by manufacturing and construction firms.¹³⁵

Salary progression--An individual in the organization is generally compensated in accordance with his abilities. As the individual's ability increases presumably in relation to time and experience, his salary should accordingly increase or progress. The increment in salary can be projected graphically on the salary progression curve, and from these curves it can be determined how rapidly the individual is developing in the organization; the comparison of the curves of different individuals can show the level of equity in the salary structure in

¹³⁵L. W. Hein, op. cit., pp. 90-110.

the organization.^{136, 137, 138}

Salary surveys--Frequently, business firms make surveys of salary and wages offered by their competitors, other firms in the industry and the firms outside the industry to determine the quality in salary and wages. The information related to salary and wages of other firms is usually available in several sources, such as reports published by the Chamber of Commerce, the Department of Labor and other private and public agencies.¹³⁹

Manpower planning--This technique refers to the determination of future organizational needs for workers and managers. Manpower planning is generally carried out through personnel audit; based on that audit, plans are worked out either to acquire needed human skills from outside the organization or to develop such skills within the organization. The technique is similar

¹³⁶Argenti and Rope, op. cit.

¹³⁷J. B. Miner, op. cit., pp. 365-396.

¹³⁸R. A. Kulberg, "Relating Maturity Curve Data to Job Level and Performance," Personnel, XLI (March-April, 1964), 45-50.

¹³⁹Miner, op. cit., pp. 365-396.

to planning for any economic resources.¹⁴⁰

Critical incident technique--This training technique refers to the collection of unusual incidents or anecdotes and the analysis of the individual behavior in terms of its effectiveness under the situation. From several incidents and anecdotes, basic types of behavior are figured out and are used in training individuals.¹⁴¹

Job-rotation--This is a simple training technique. In order to develop or train the individual, the individual is given different periodic assignments and responsibilities; he is moved from one job to another and is expected to perform every task of each job or position. The basic purpose is to give practical experience to the individual. During the rotation period, the individual is closely supervised and guided and his performance is also evaluated.^{142,143}

Sensitivity training--Sensitivity training or T-Group is a training technique and is based on the principles of

¹⁴⁰Megginson, op. cit., pp. 251-267.

¹⁴¹William McGehee and P. W. Thayer, Training in Business and Industry (New York, 1961), pp. 81-82; 117-118.

¹⁴²John Miner, op. cit., pp. 337-338.

¹⁴³William McGehee and P. W. Thayer, op. cit., pp. 184-192.

group dynamics. The main purpose is to increase the individual's human relations skills. This approach to training assumes that by making the individual aware of his own personality, likings and dislikings, he can easily interpret and diagnose human problems in a better way. And the group experience is believed to make the individual aware of himself.^{144, 145}

Sampling method--Sampling is useful in many areas, particularly in quality control. Sampling may be random sampling or sequential sampling. In the selection of samples, the main purposes are to save time and money and to achieve a high degree of reliability and accuracy. Samples are selected on the basis of convenience, judgment of an expert, or some type of probability.^{146, 147}

Sequential Analysis--Sequential analysis is useful in determining whether or not the available samples are

¹⁴⁴McGehee and Thayer, op. cit., pp. 204-207.

¹⁴⁵L. P. Bradford and D. J. Mial, "Sensitivity Training," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 884-888.

¹⁴⁶R. Heiland and W. Richardson, Work Sampling (New York, 1957), p. 22.

¹⁴⁷Dubois, op. cit., pp. 69-139.

adequate to achieve reliability and accuracy. In general, the analysis "...calls for inspection on an item-by-item basis and making a decision after each item is inspected concerning whether the lot should be accepted or rejected or sampling continued."¹⁴⁸

Economic reorder quantities--This technique is based on economic principles and it points out the number of units to be ordered at a time to keep the order cost and carrying cost minimum. The order cost includes the costs of postage, telephone, bookkeeping, employee salary, and other related expenses; the carrying cost includes the costs resulting from storage, obsolescence, deterioration, interest, tax, insurance and others. The quantity to be ordered may be determined by the popular economic reorder quantity formula.^{149,150}

Stock control--Stock or inventory control in business is very important; and, therefore, systems must be designed which would control inventory efficiently and effectively. The system of control should be such that the material is available whenever it is desired, and no production

¹⁴⁸ R. R. Mayer, op. cit., p. 477.

¹⁴⁹ R. R. Mayer, op. cit., pp. 213-241.

¹⁵⁰ Nyles V. Reinfeld, "Inventory Control," The Encyclopedia of Management, edited by C. Heyel (New York, 1963), pp. 739-748.

processes have to be stopped or delayed because of the shortage of materials. Furthermore, the systems should be able to keep the carrying cost at the lowest possible point.^{151,152}

Work planning and review--Essentially, WP & R involves periodic meetings between an individual and his manager concerning his work activities and responsibilities. In the meeting, progress on established goals is reviewed and new activities and goals are set which are expected to be accomplished prior to the next meeting. The emphasis is placed on work to be accomplished between two meetings by the individual and his subordinates, not on the individual personality or his attitudes.¹⁵³

Management audit--Management audit refers to an evaluation or appraisal of management. Although there are many methods to appraise managers, most methods basically involve a systematic gathering of data related to the managerial performance, skills, abilities, accomplishments. The data is analyzed and the emphasis is placed on managerial strengths, weaknesses and

¹⁵¹R. R. Mayer, op. cit., pp. 201-288.

¹⁵²Nyles Reinfeld, op. cit., pp. 739-748.

¹⁵³Edgar F. Huse, "Performance Appraisal--A New Look," Personnel Administration, XXX (March-April, 1967), pp. 3-5; 16-19.

potentials.^{154, 155}

Performance appraisal--In the organization, individual performance must be evaluated constantly to measure his efficiency and effectiveness in his job. Performance may be appraised by the individual himself, his superior, his subordinates, some other members of the organization, or by outsiders. Appraisal of performance should be as objective as possible and it must be based on the individual's abilities and achievements.^{156, 157}

"Five-by-Five" approach--This approach is largely useful in the selection of individuals for training and development. In this approach, a list of prospective candidates is compiled in terms of their potentials for higher positions, their abilities to learn, and their needs for training and development. If the list is long and if time and money do not permit to include all, the individuals in the top five and bottom five of the list are eliminated for training and development

¹⁵⁴Jackson Martindell, "Management Audit," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 461-466.

¹⁵⁵Greenwood, op. cit.

¹⁵⁶Miner, op. cit., pp. 415-440.

¹⁵⁷Megginson, op. cit., pp. 420-429.

purposes.¹⁵⁸

Job analysis--Job analysis refers to the analysis of job in terms of its duties, responsibilities, working conditions, necessary skills and qualifications, abilities, experiences, and so on. In the analysis, every aspect of the job is recorded and analyzed in detail. Also, in the analysis, the relationships between the job and other jobs are established and specified.

When the characteristics of the job are written out in a report form, the job analysis results in a job description. When the report is modified to include the necessary skills, qualifications and experiences, then it is referred to as job specifications. And when the importance of the job is established in relation to other jobs, it is referred to as job evaluation.^{159,160}

Job evaluation--See job analysis.

Job description--See job analysis.

Incentive schemes--In order to motivate workers to work hard, many incentives should be provided by the

¹⁵⁸ John Miner, op. cit., pp. 313-364.

¹⁵⁹ L. C. Megginson, op. cit., pp. 394-414.

¹⁶⁰ J. B. Miner, op. cit., pp. 157-179.

organization. The incentive schemes may include financial rewards, extra holidays, recognition, discount on goods and services, stock ownership, special privileges, promotion, and other tangible and intangible benefits. The basic purpose of the schemes is to increase productivity and worker's satisfaction.^{161, 162, 163}

Programmed instructions--Since individual abilities to learn differ, programmed instructions are frequently better than other teaching tools. In this approach, the individual learns gradually on his own, starting with simple principles and concepts and progressing towards the harder ones. This technique uses the learning principles of reinforcement, continuous involvement, guidance, knowledge of the progress and purpose.^{164, 165}

Merit rating--See performance appraisal.

¹⁶¹William K. Hodson, "Incentive Systems," The Encyclopedia of Management, edited by Carl Heyel (New York, 1963), pp. 292-297.

¹⁶²Miner, op. cit., pp. 365-396.

¹⁶³Meggison, op. cit., pp. 536-561.

¹⁶⁴Ibid., pp. 322-323.

¹⁶⁵Miner, op. cit., pp. 357-358.

Time-span of discretion--This technique suggests that the employee should be paid on the basis of supervision required by his job. If the need for supervision is less because of the characteristics of the job and the job occupant, then the job should be rated high in wages and the worker should be paid accordingly. But if the job requires continuous attention of the supervisor, then that job should be rated lower. Based on this time-span, it is possible to set wages and salaries for certain jobs and certain individuals.^{166,167,168}

Models--Basically, model is a representation or an abstraction of an object, an activity or a situation. Through the use of simulation and programming techniques, models can be built and used to analyze situations and make decisions. With the use of models, very expensive projects can be experimented before they are actually undertaken. Often many problems which were not expected can be encountered in the experiments and can be dealt with successfully.¹⁶⁹

¹⁶⁶ Argenti and Rope, op. cit.

¹⁶⁷ B. Contini, "Value of Time in Bargaining Negotiations: Some Experimental Evidence," American Economic Review, LVIII (June, 1968), pp. 374-393.

¹⁶⁸ J. Dearden, "Time-span in Management Control," Financial Executive, XXXVI (August, 1968), pp. 23-24.

¹⁶⁹ Arthur M. Weimer, Business Administration--An Introductory Management Approach (Homewood, Ill., 1966), pp. 597-598.

Testing--Testing is commonly used in the selection of personnel for certain jobs and positions. There are many types of tests, but most of them are designed to measure a person's intelligence, his personality, his aptitudes and his achievements. With the use of various psychological and other types of tests, individuals and jobs can be matched successfully.^{170, 171}

Managerial grid--Managerial grid is a useful technique to develop managers in the organization. Actually, the grid is a description of various approaches of management and it points out managerial styles, beliefs, assumptions and effectiveness. The grid represents a chart which explains each managerial style in terms of concern for people and concern for production. Through the study of this chart, an individual manager can visualize his own style, beliefs, assumptions; based on this visualization, he can determine his needs to improve his position on the grid.^{172, 173}

¹⁷⁰Megginson, op. cit., pp. 277-282.

¹⁷¹Miner, op. cit., pp. 281-310.

¹⁷²R. R. Blake and J. S. Mouton, "Grid Organization Development," Personnel Administration, XXX (January, 1967), 6-14.

¹⁷³R. R. Blacke and J. S. Mouton, The Managerial Grid (Houston, 1964).

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