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PERSONNEL MANAGEMENT

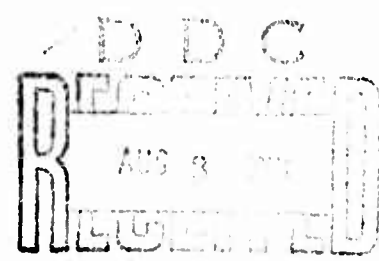
HUMAN RESOURCES RESEARCH

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13. ABSTRACT

Human resources have long been recognized by personnel psychologists and management theorists as being the most important asset of any organization. The potential value to be gained from a better understanding of the human processes and an application of this knowledge to the improved utilization of manpower resources within the organizational environment has led to a vast amount of human resources research within recent years.

This report addresses the more traditional aspects of personnel research relating primarily to the study of job factors within the work setting itself, as well as discussing the more contemporary social sciences research concerned with factors underlying human relationships and with the information technology facilitating these interrelationships within the organization. The paper traces the evolution of human resources research; addresses the meaning and need for such research; describes some of the types of research in this area; and discusses the methodologies employed, the various approaches used, and the agencies sponsoring such research. It also offers an integrative, systems approach to manpower management, describing how the research and information subsystem of the manpower management system can significantly contribute to the effective and efficient utilization of the human resources employed in attaining organizational objectives.

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Research in Personnel Management						
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Preface

I have long been aware of the importance of the personnel management function within organizations, since one of my first duties as a young lieutenant in the Air Force was to serve as assistant personnel officer of a squadron having nearly a dozen operational detachments spread completely across the continental United States. Then, and later as commander of several different operational units, I found that the great majority of organizational problems arise more from the human than from the technological factors.

Subsequently, when I had an opportunity to pursue studies for my doctoral degree, I concentrated on the areas relating to the use of human resources in organizations -- with three of my five fields of study being in management, personnel management and organizational behavior, and labor economics. My doctoral research was conducted in the area of personnel management, and I have published my dissertation, an official Air Force technical report, and a professional journal article in this subject area. Consequently, I have learned to appreciate the vital importance of manpower management and the great need for more study and research relating to the utilization of human resources within organizations. My continuing interest in this important area is evidenced not only by the writing of this report, but by my expressed preference for my next assignment being to the AFSC's Human Resources Laboratory or to the HqUSAF's Military Personnel Center.

--James L. Quinn
March 1971

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Abstract

Human resources have long been recognized by personnel psychologists and management theorists as being the most important asset of any organization. The potential value to be gained from a better understanding of the human processes and an application of this knowledge to the improved utilization of manpower resources within the organizational environment has led to a vast amount of human resources research within recent years.

This report addresses the more traditional aspects of personnel research relating primarily to the study of job factors within the work setting itself, as well as discussing the more contemporary social sciences research concerned with factors underlying human relationships and with the information technology facilitating these interrelationships within the organization.

The paper traces the evolution of human resources research; addresses the meaning and need for such research; describes some of the types of research in this area; and discusses the methodologies employed, the various approaches used, and the agencies sponsoring such research. It also offers an integrative, systems approach to manpower management, describing how the research and information subsystem of the manpower management system can significantly contribute to the effective and efficient utilization of the human resources employed in attaining organizational objectives.

PERSONNEL MANAGEMENT
HUMAN RESOURCES RESEARCH

I. INTRODUCTION

Manpower research within business and industrial organizations has traditionally been concerned with such internal tasks as performing job analyses, preparing job descriptions, and collecting personnel data on turnover and absenteeism, in order to evaluate the effectiveness of the organization's personnel programs, and with such external tasks as conducting intercompany surveys for comparative analyses of the business firm's own policies vis-a-vis the rest of the industry.

In recent years, however, increasing attention has been directed toward the development of understanding relating to the socio-psychological aspects of the individuals within their work setting and their interrelationships with others and with the organization as a whole. Behavioral scientists, organization theorists, information technologists, and many other social scientists have begun to focus their efforts on the study of these interpersonal and interorganizational relations in an attempt to improve the effectiveness of manpower utilization. Manpower research in this broader context is concerned with the factors underlying human relationships within the organization and the information flow patterns that facilitate these relationships.

The purpose of this paper is to investigate the traditional aspects of personnel research as well as the more contemporary aspects of social sciences research and information technology -- insofar as they are relevant to the utilization of human resources in the organizational environment.

II. HISTORICAL PERSPECTIVE

The potential value to be gained from a better understanding of the human elements which are an integral part of the organization has long been recognized by personnel psychologists and management theorists. Significant contributions to the study of human personality were made by the early psychologists; and, in the latter part of the nineteenth century and the earlier years of the twentieth, industrial psychologists drew upon this accumulation of knowledge in an attempt to improve the situation of the man on the job.² They conducted studies aimed at increasing productivity by decreasing human effort and fatigue and by improving the physical environment of the work place. In 1911, for instance, Walter Dill Scott, an eminent educator and psychologist, argued that a knowledge of the laws of psychology would enable the business manager to control and thereby raise the efficiency of every man in his employ, including his own.³

Even the early pioneers of the much maligned scientific management movement were also very much concerned with the relationship between employee productivity and financial compensation. Frederick Taylor, along with Harrington Emerson, Henry Gantt, and many other scientific management advocates, devoted substantial effort to the study of these important relationships. One of their prime concerns was to increase the productivity of the working man, with a commensurate decrease in effort, fatigue, and other factors tending to decrease productivity within the workplace.⁴

Similarly, early labor economists studied the conflicts of interest that characterized employee-management relations. They concentrated their attention on the allocation of human resources in production and the ways in which work is organized and wages are established in the various labor markets.⁵

These early human resources studies were given further impetus by the First World War and the problems associated with both industrial and military mobilization. The shortage of manpower encouraged the development and application of intelligence and trade tests for the personnel of the military services. Psychological studies of occupational requirements and personal qualifications of war industry workers were accelerated. Industrial psychologists developed tests and rating scales to select skilled workers for industry and to identify qualified candidates for officer training in the military forces. Research was conducted in Great Britain to investigate industrial accidents, employee health, fatigue, and associated problems. In Germany, the means of increasing output and improving selection procedures were investigated. And, in the United States, research efforts included experimentation with job analysis, work simplification, and fatigue, along with studies of costs of living and real wages.⁶

Following the war, in the early 1920's, experimentation was continued on further refinement of selection and training procedures. Larger business organizations used the psychological tests and rating scales developed during the war to perfect newer selection and training programs. Similar investigations were sponsored by the government

to improve the selection of its civilian employees and by the newly established university research organizations to further perfect the testing and selection techniques for industry.

Later in the decade of the 1920's, the area of personnel research was broadened to the study of the adjustment of the worker to his job and to his work environment. This more comprehensive approach is perhaps best illustrated by the detailed studies conducted by G. Elton Mayo and his associates, beginning in 1927, at the Hawthorne (Illinois) plant of the Western Electric Company. Originally intended to determine the effect upon the individual worker in varying his physical working conditions, the studies found that the psychological and social factors of his work environment played even a greater role than did the physical conditions. The Hawthorne studies provided the first positive correlation between worker productivity and his participation in the decisions that affected him and his work. The factory was found to be a social system in which the informal groupings vitally affected the human behavior of the workers.⁷

As a result of these now-famous experiments, the research emphasis shifted to the study of the attitudes of the worker toward his job and company, and to the study of the relations between the worker and his associates and supervisors.⁸ Subsequent research in industrial relations was directed toward the social-psychological aspects of the worker as a human being and of his interrelationships in the social environment in which he was employed. Such human behavioral factors as needs, desires, sentiments, attitudes, aspirations, and motivation were

studied by the social-psychologists to help explain these interrelationships between people and groups in the work environment. These studies disclosed:⁹

- (1) that workers are not only motivated by economic forces but have many needs and aspirations,
- (2) that attitudes constitute an important factor in determining individual and group behavior,
- (3) that supervision plays a key role in determining worker attitudes and morale,
- (4) that industrial relations research must be concerned not only with the individual but also with formal and informal groups,
- (5) that fears, desires, and sentiments are important factors in shaping individual and group attitudes and action, and
- (6) that effective communication is essential for harmonious employee-employer relations.

With the commencement of the Second World War, the emphasis on human resources research was again directed, as it had been in World War I, to the study of the means of best using the limited manpower available to achieve the maximum utility. The greatly expanded production necessary to supply the goods of war, coupled with the vast numbers of able-bodied men needed by the armed forces, created a severe manpower shortage which encouraged the study of means of increasing the productivity and efficiency of the relatively limited manpower resources. Attention was focused primarily upon the problems of selection, training, development, utilization, and compensation of personnel. The demands of war resulted in the retraining and reallocation of approximately one-third of the nation's labor force.¹⁰

The War Manpower Commission was established to facilitate the effective use of the available manpower. Its Bureau of Manpower Utilization developed the Training-Within-Industry Program to help create the skills needed for industrial production. Programs were designed to retain workers in essential industries and to encourage shifts into critically needed occupations. Studies were made to improve the mobility of manpower. Research was conducted to foster manpower productivity and efficiency. Studies of the relation between morale and military efficiency were conducted by the armed forces. Studies of the effects of varying working hours resulted in the establishment of a Minimum Wartime Workload. Studies by the War Production Board found significant variations in productivity between workers in similar jobs using similar equipment. Studies by Elton Mayo of the absenteeism rate of metal working companies on the East Coast and the rate of turnover in aircraft companies on the West Coast found them to be directly related to supervisory practices affecting the worker relationships.¹¹

Immediately following the Second World War, the industrial scene became one of violent turmoil. The transition from a wartime to a peacetime economy -- characterized by readjustments in industrial production, the flooding of the labor market with millions of workers released from war production and of veterans returned from the armed forces, and the extensive demands of the labor unions which had been largely curtailed during the war years -- resulted in substantial industrial strife and disturbance. This general unrest led to the recognition by the leaders of industry and government that labor-management relations were a crucial factor affecting the

success of business enterprise and the development of the economy as a whole. For example, Henry Ford II said in 1946:¹²

If we can solve the problem of human relations in industrial production, we can make as much progress toward lower costs in the next ten years as we made during the past quarter century through the development of machinery of mass production.

The Committee for Economic Development launched a detailed study of the causes of friction between labor and management in an attempt to develop a constructive labor relations policy for the nation. Substantial funds were appropriated for research studies by outstanding human relations experts to delve into the labor-management problems and report their findings and recommendations to guide public policy determinations.¹³

Indicative of the postwar emphasis on labor-management relations was a 1949 conference which outlined a series of twelve determinants of industrial relations research, including: (1) attitudes of union and management officials toward each other, (2) relative ability of employer and union to attain major objectives, (3) the area of collective bargaining, (4) the scope of collective bargaining, (5) ability of union officials to control and satisfy employees, (6) effective intra-management communications, (7) economic ability of the employer to meet employee demands, (8) effectiveness of grievance procedures, (9) management programs and actions directed toward employees through channels other than the union, (10) strength and activity of informal groups, (11) community mores and attitudes, and (12) extent of control by management and union officials outside the community.¹⁴

In the succeeding years following the postwar strife and turmoil, personnel research emphasis once again shifted to the sociological and psychological aspects of the worker and his job. Industrial relations research expanded rapidly within the universities; and many industrial relations research divisions, centers, and institutes were established. These organizations focused their studies (1) on the problems of labor-marketing processes, including employment, selection and placement, compensation, vocational counseling and career guidance, training and development; and (2) on social problems and the role of the government in employment relationships, including unemployment, labor immobility, low wages and long hours, unionism imbalances in union-management relations, collective bargaining, contract administration, and similar areas of concern.¹⁵

III. RESEARCH EFFORTS

A vast amount of effort has been devoted to broadening the understanding of the human processes and applying this knowledge to improving the utilization of the human resources which are such an important factor in any organization. It is the purpose of human resources research to apply what we already know and to explore what is yet unknown.

A better perspective of this very important area of research can be gained by looking into the very nature of research itself and considering the types, purpose, need, and methodology of human resources research -- along with the general areas with which research in manpower management has traditionally been concerned and the direction in which it is now oriented, the agencies conducting human resources research, and the criticisms, limitations, and suggestions for its improvement. This simply means that we should know what is research, how it is used in the management of human resources, and how it may be improved.

Nature of Research

Research is systematic investigation designed to seek answers to questions or solutions for problems. Although the word itself suggests a re-examination or repeated search, the following provides a better understanding of its meaning:¹⁶

What, then, is research? It is not mere RE-search (although plenty of that has to be done); it is more than hashing over the work of others. It is re-SEARCH, fresh inquiry into

and seeking for something new and perhaps better, despite the fact that "better" is a value-word, and therefore tabu in some academic mores. Here originality comes in.

Research then is purposeful, objective and systematic analysis, distinguishable from informal observation by its conceptual methodology. The research method is purposive, for it is the planned seeking of answers to specific questions or problems. It is objective, for it minimizes bias and prejudice in its processes. It is systematic, for it is carried out step-by-step to follow a well-defined plan. And it is analytical, for it reports conclusions based upon the principles of logic rather than a summary of unclassified facts.¹⁷

General Categories

Research may be broadly categorized as pure, basic, and applied research. Pure research is fundamental research. It is largely an end in itself, gathering facts for the simple reason that facts are worth gathering, and unconcerned whether or not the facts are of immediate use in solving an existing problem. Pure research simply seeks to add to the accumulation of knowledge and understanding by providing answers to general inquiries. Basic research, on the other hand, investigates broad questions, and seeks to provide answers that may be applicable to many and varied practical problems. Although its findings are generalized, they may be practically applied to various situations. Applied or operational research differs from basic research only in its specificity of investigation. It is used to study a specific question or problem area (which may be either simple or

complex) in order to provide solutions which have immediate and practical applicability.¹⁸

Human Resources Research

Human resources research is merely the application of general research methodology to the investigation of problems associated with human resources. It, too, may be pure, basic, or applied research.

Categories

Pure human resources research is normally of the type conducted by the clinical sciences -- psychiatry, clinical psychology, and physiology -- to accumulate knowledge and to further understanding of the human being, the factors of his personality, and his physical adjustment to the demands of life and his environment. Basic human resources research is typically of the type conducted by the social sciences -- sociology, social psychology, social anthropology, and, even, political science and economics -- concerned with the study of humans and their interrelationships in order to provide knowledge that may be applied to a variety of human and social problems. And, applied human resources research is that conducted by social engineers -- industrial psychologists, industrial sociologists, and human factors engineers -- which seeks immediate and practical solutions to specific problems concerned with improving human behavior relationships.¹⁹

A somewhat different categorization of research techniques and approaches is provided by Rensis Likert, who is widely known for his human resources research efforts:²⁰

These range from "basic" studies of human perception, motivation, and behavior, through "field" studies of limited concepts and theories, to large-scale "integration" studies allowing the examination of many concepts of interaction, and finally to "developmental" research aimed at translating research findings into effective and efficient administrative practices.

It is a mark of the maturity of personnel research that there is an increasing amount of the latter two kinds. From the personnel administrator's viewpoint, these are the "payoff" points, where the re-search can be expected to provide information which can be utilized with considerable confidence.

Likert's "basic" research corresponds to our definition of "pure" research, his "integrative" corresponds to our "basic" research, and his "developmental" to our "applied."

Although Likert cites the increasing use of basic and applied research because of its "payoff" value, all categories of research are needed for the management of human resources, since each contributes to improvement of understanding and practice. Though more importance may be placed on one type over another in a given time or place, advancement in human resources research can easily be retarded if one type is emphasized to the detriment of another. All are interrelated and support one another; pure research often reveals new facets of understanding that have important implications in the solution of practical problems, and applied research frequently provides essential data which opens up new vistas for pure research inquiries. Thus, all types of human resources research are needed and must be jointly conducted if progress in the management of human resources is to be achieved.²¹

Purpose and Meaning

Human resources research -- variously referred to as human relations research, employment relations research, industrial relations research, manpower management research, or personnel research -- is concerned with devising means for the more efficient utilization of the human resources and manpower assets of organizations. Its purpose and meaning have been variously defined as:

... research ... to question intelligently whether things should be done the way many of us take for granted. --Justin J. Condon²²

... the development and evaluation of methods for managing employees and related problems... --Roger Bellows²³

... the application of scientific methods to personnel relations problems, for the purpose of improving management procedures and employee effectiveness and happiness. --Jack E. Walters²⁴

... research ... its purposes the improvement of productivity and of personal satisfaction and well-being in the employment relationship. --John W. Reigel²⁵

... all research efforts ... that are aimed at improving worker productivity, satisfaction, and service. --Cecil E. Goode²⁶

... systematic inquiry into any aspect of the broad question of how the recruitment, selection, and utilization of human resources by and within the enterprise might be made more effective. In short ... an inquiry into how personnel management can more effectively contribute to the goals of the enterprise. --Wendell French²⁷

Need and Value

The need for inquiry and investigation in the human resources area is widely recognized. The potential value

of research that leads to improved management and utilization of manpower resources has been appreciated by many researchers and practitioners alike:

Solutions to industrial relations problems come about through chance trial and error, experience, and research. Of these, research offers the most promising solutions. Research results can be demonstrated, checked by others, and can form the basis for genuine understanding. --Herbert G. Heneman and John G. Turnbull²⁸

One of the most important responsibilities of personnel men is to conduct constant research. --Lawrence A. Appley²⁹

If personnel management is to improve as it should, and solve more effectively the problems with which it is faced, constant research is essential. --John F. Mee³⁰

Quantitative, systematic research... is substituted for practitioner judgment in providing the foundations upon which the art of management is based. --Rensis Likert³¹

... unhurried careful research in personnel within the organization is a path to real and lasting gains in knowledge and ultimately in practice. --Richard P. Calhoon³²

Just as research is essential to industrial progress and the advancement of science, so is research indispensable to the field of industrial personnel relations. Along this line there is urgent need for the establishment of real facts on which to base decisions. The only way to secure such data is through research. --Jack E. Walters³³

A review of these comments finds them to be primarily concerned with the gains which will accrue to an organization and its management from research in human resources utilization.³⁴ The following two comments, although equally appreciative of the value to the organization of such research, additionally point out the gain which may be realized by society as a whole:

The present state of our industrial civilization requires research in human relations which will yield results of immediate practical value to the responsible administrator. This research must also provide the data necessary to develop in the long run an understanding of the basic forces at work in our society. --George F. F. Lombard³⁵

Research that would enable management to utilize the knowledge, capacities, energies, and wills of people more intelligently would pay for itself many times and provide employees with noneconomic as well as financial satisfactions and rewards. Moreover, it would enable management to meet its social responsibility to society more effectively. --Waldo W. Fisher³⁶

An even broader view of the importance of improving the utilization of our manpower resources and, by inference, of conducting the research that leads to such improved use, is reflected in the following two commentaries, the first by an executive of one of the nation's largest corporations and the second by a government agency in a report on the manpower challenge of the past decade:

Our productive resources can be used to capacity only as we develop the manpower to use them. Future expansion of the economy... may be delayed because of lack of manpower just as surely as by lack of facilities, lack of materials, or lack of space. Other nations have more manpower than we do. To meet this challenge, then, we must find ways to utilize the manpower we do have at the highest possible skills. The way we are wasting manpower today is a national disgrace. --Thomas R. Reid³⁷

As a nation, we are advancing in technology and scientific knowhow at a tremendous rate. How well we shall realize the potential of this advance depends on how effectively our people, as individuals, are able to use the

necessary tools at hand If our manpower capacities are to be developed to the full, management must: (1) Improve individual competence, present and prospective, across the board.

(2) Use all available manpower resources without regard to race, sex, age or physical handicap.

(3) Strive to place every worker in a job that best fits his talents and then press for full use of these talents on the job. (4) Help every worker to develop a sense of purpose and pride in his job. (5) Prepare now for new and changing manpower needs within the total work force.

(6) Develop jobs for all kinds of worker capabilities. (7) Plan on full use of better quality as well as increasing quantity of manpower.

--Department of Labor ³⁸

Research Methodology

For management to achieve effective use of the manpower under its direction, substantial data and information are needed. John C. Flanagan of the American Institute for Research has listed the following three types of information required for the efficient use of human resources: ³⁹

(1) Knowledge of the procedures for defining, identifying, and describing the abilities, limitations, and potentialities of available personnel,

(2) Knowledge of the possible patterns of organization, methods, and management needed to accomplish the goals of the enterprise, and

(3) Knowledge of how the available human resources can be most effectively combined with these patterns.

Human resources research is the means of obtaining this required information. The research normally follows a certain pattern, procedure, or phasing of steps to accomplish its purposes, and it employs various methods of investigation, as described in the following sections.

Procedure

The normal phasing of steps taken in conducting the research project are the following: determining the overall objective; defining and stating the specific problem; developing the general hypothesis and working or operational hypotheses; searching and reviewing the relevant literature; designing the study by selecting the method, techniques, and devices to be used in the study and the criteria against which the results will be measured and evaluated; conducting dry-runs or pre-tests with dummy tables, pilot studies, and/or simulated models; fact-finding and collecting unbiased and objective data; measuring and analyzing the data collected; evaluating and interpreting the refined data and testing the hypotheses; summarizing and reporting the findings and conclusions, and the assessments of their applicability.⁴⁰

Approaches

Any number of techniques or combinations of methods may be used by researchers in seeking answers to questions and solutions to problems.⁴¹ Most questions and problems encountered in human resources research are not so unique that there is only one method of analysis that can be applied; rather, the researchers usually have a choice available as to which method they may use in the pursuit of their inquiries. The alternative chosen depends on many factors, ranging from the nature of the problem to the competence of the researchers. For a given problem, some research method may be distinctly superior in some respects to another. Methods may vary as to their speed and ease of use, their certainty and dependability; and

their cost in assimilating the data required. The particular method or approach chosen will usually be a result of trade-offs between these various factors, with the law of parsimony dictating choice of the method involving the minimum effort, time, and cost, and obtaining the necessary adequacy and quality of results.

The importance of selection of the particular method to be employed in conducting research was emphasized by William F. Whyte:⁴²

The methods we use to do our research determine the types of data we gather and thus also to some extent the substantive conclusions we reach with the theories we build. Unless we understand the impact of research methods upon theory, we cannot hope to achieve much ... progress toward an integrated body of knowledge and theory in our field.

Various methods of conducting research include the use of logical and deductive studies, historical studies, case studies, surveys, statistical and quantitative studies, and experimental studies, each of which is briefly discussed in the following sections.

Deductive Studies.--Often called "armchair research," deductive studies involve the use of logical thinking processes in the systematic application of laws or accepted generalizations to arrive at a reasoned answer to a question. This thinking-through process can often solve problems, but it is usually a preliminary step in some other research method.

Historical Studies.--Historical studies involve the detailed and structured investigation of past events and activities through the use of records, documents, interview of surviving observers, and similar techniques, in

an attempt to identify the factors and relationships which affected the evolution of the problem area with which the research is concerned. They are often used in the social sciences to provide a longitudinal analysis of a particular problem, and they frequently are used as one of the steps of some other research method.⁴³

Case Studies.--Case studies, or clinical studies as they are sometimes known, involve in-depth observation and data gathering and analysis in a systematic investigation of the details and relationships in a single situation. Although a case study may provide a great amount of data through intensive investigation of a given situation, its focus is sharply defined and limited, so that no generalizations can be made from a single study. However, a case study may provide the groundwork for additional studies, and a series of similarly structured case studies may suggest general hypotheses which may be tested by more extensive analysis. Case studies are one of the basic tools of some of the social sciences, such as sociology and anthropology, and are often used in the study of industrial and business practices.⁴⁴

Surveys.--Surveys are planned and comprehensive collections of data and relevant information from many different sources. Surveys facilitate the accumulation of voluminous data which may be of value in checking hypotheses or tentative conclusions; however, their purpose may be nothing but the accumulation of information about a given subject to determine what is the consensus or aggregate practice. Surveys may seek full coverage in their inquiry or may involve sampling and other techniques to arrive at their conclusions. Surveys are very

widely used in industry and business, examples being wage and salary, working hours, contract provisions, and other intercompany surveys of a comparative nature. Perhaps the most emphasis in recent years has been on the use of attitude surveys to assess morale levels within a department or plant and to ascertain employee attitudes toward supervision, wages, and a myriad of other items which might affect their productive utilization.⁴⁵

Statistical Studies.--Quantitative or statistical studies use methods of quantification, statistical inference and manipulation, to measure and analyze collected and classified data. The studies typically use samples from which averages, dispersions, trends, correlations and other aggregative measures are obtained to evaluate probabilities and interpret the significance of the relationships studied. Quantification is receiving more and more emphasis in human resources research, and the introduction of electronic computers and associated data processing equipment has greatly facilitated the use of statistical methods methods of analysis. Much more effort is being devoted to improving the data of the personnel records system so that it is easily quantifiable and is readily acceptable to statistical study methods.⁴⁶

Experimental Studies.--Experimental studies are characterized by conditions of control imposed on the variables of the situation or problem being studied. Through manipulation of the various factors, varying some while holding others constant, the investigator attempts to determine causal or resultant relationships between the factors and variables. Even in instances where cause-effect relationships cannot be found, the existence of a

significant correlation between changed variables may be highly useful in promoting understanding of the subject being investigated. Experimental studies, although often thought to be limited to the laboratory, are being increasingly used in the "field" to study "live" organizations. Experimental methods, through statistical manipulation to simulate controlled conditions, offer great promise to investigation of human resources and to social sciences research in general.⁴⁷

Trends

In a survey of the extent of research activities leading toward improved personnel management, Cecil Goode noted five discernible trends in behavioral science research methods:⁴⁸

1. The use of many disciplines in the solution of human problems is gaining in practice... In this way broad social problems can be attacked from the standpoints of several disciplines and the research methods of several disciplines can be employed.
2. There is a growing acceptance and use of the observation and case study techniques used commonly by sociologists and anthropologists. These techniques ... can encompass all factors of an actual life situation, not attempting to isolate one or a few factors ...
3. Techniques are being developed for the manipulation of multiple factors through the use of computer technology.... The new computer techniques show promise of revolutionizing psychometrics through factor analysis as well as the study of complex social and human situations.
4. There is a growing recognition of the need for clinical or psychoanalytic procedures in studying human motivations and reactions.... It is through that ... participative, group-therapeutic training ... will be effective in

increasing understanding of one's own behavior and ... future performance with others....

5. A significant trend in research methods is the development of skill and techniques for conducting actual experiments (as contrasted with surveys or observations) on "live" organizations. Recent years have seen an important growth in controlled field experimentation in which work groups, departments, or entire organizations are subjected to purposeful change, with measurement of results....

Various Research Approaches

The nature and scope of human resources research was originally much more limited when it was known as personnel, human relations, or industrial relations research. "In earlier years, the predominant approach ... was the descriptive and institutional 'labor problems' text, organized around welfare concepts, scattered government statistics, and a wide range of problems."⁴⁹ What little research there was, was speculative and unrealistic. By the early 1940's, the approach centered on wage studies, job analyses, and other traditional aspects of personnel management.

Traditional Approach

The traditional focus of personnel research is typified by the following listing of the functions of a personnel research division within an organization, published in 1941 by the Industrial Relations Section of Princeton University:⁵⁰

Job analysis, specifications, and classification;
 (in consultation with supervisors and line executives).
 Wage studies; "going" rates; cost of living; wage payment systems.

Preparation of standard instructions; revisions of employment forms; employee ratings, employee handbook (in consultation with personnel staff and line executives).
Other specific research.

A similar approach to personnel research was proposed in 1943 by Blair K. Schwartz of the Detroit Edison Company, in describing the various functions of a personnel research division within a company:⁵¹

General - Perform studies and research in all phases of human relations including methods of selecting and promoting employees, methods of job and supervisory training, salary and wage planning, old age and retirement problems, individual and group employer/employee relations problems.

Applications of Research - Apply the research method to all assigned personnel problems, and stimulate, help and train members of the bureau and other departments increasingly to inquire about and to use the research method in their personnel problems; devise and experiment with improved selection methods, such as personnel interviews, tests and questionnaires; supervise the administration of pre-employee tests and record keeping; initiate and improve, at the request of other departments, organized training programs, both job training and supervisory training...; cooperate in discussing or organizing courses of instruction for employee groups or interviewing representatives of education institutions; develop plans ... for analyzing, classifying, grading and setting wage range guides for all positions...; keep familiar with policy and practices of employer/employee labor relations, unions...; keep familiar with theory and practices of industrial pension plans...; keep familiar with local, state and Federal labor activities and legislation...

Periodic and Special Surveys - Be familiar with the bureau's policies and routines; formulate written statements setting forth current personnel policies by suggesting revisions...; supervise

and make periodic surveys ...[of] wages, statistics, hours, etc...; conduct a study ...[of] improved methods, office routines, forms...; supervise and conduct research ...[on] food allowances, lay-off, accident proneness...; help in selection and training of new engineering college graduates...

Relations with Outside Organizations - Conduct weekly ... course in personnel management...; maintain division research library....

From these two listings of the functions of a personnel research division within an organization or company, it is seen that the traditional approach to personnel research was one primarily concerned with the routine, albeit necessary, factors of personnel administration. However, there was a growing recognition that the social sciences might have much to offer the programs in industrial relations research. Thus a more extended approach to human resources research began to evolve.

Extended Approach

A broader, more extended approach to research was reflected in a 1943 American Management Association report by Forrest H. Kirkpatrick. Although he first cited the more traditional functional areas of personnel research--relating to forms and job titles, training methods, job evaluation, accident proneness, selection and placement techniques, channels and techniques for cooperative relationship between labor and management--Kirkpatrick also asked "What is on the worker's mind?" especially in the areas of motivation and work satisfaction. He suggested fifteen problems in the latter area for which research might achieve or "hold promise of lasting benefits:"⁵²

1. Discovery and development of promising supervisory and executive talent.
2. Pattern for most efficient work schedule -- daily and weekly. (From standpoint of physiology, family relations, social adjustments, attendance, work productivity, and turnover.)
3. Means for communicating ideas and purposes to workers. This involves techniques for understanding of the symbols, sentiments, and word-content of workers in a particular group or plant.
4. Vocational guidance and occupational readjustment for those not fitted by talent or temperament to the job assigned.
5. Rehabilitation and utilization of handicapped and atypical workers.
6. Relation of wage-and-salary structure to tenure, job evaluation, changes in work process, and personal satisfaction and motivation.
7. Values and goals for industrial recreation and the use of special-interest or hobby groups in terms of use of leisure time, social maturity, and group solidarity.
8. Studies of human interaction and evaluation of human behavior -- in terms of total situation and social conditioning.
9. Understanding and utilization of the social phenomena and social structure of the factory.
10. Means for increasing the stability and society of the work force, perhaps providing continuous employment or an "annual wage" for all employees.
11. Development of methods and motivation of workers toward more objective and comprehensive self evaluation.
12. Longitudinal, as opposed to cross-sectional, studies of worker attitudes and opinions.
13. Development of skills and techniques for dealing with cooperative phenomena at all levels, in varied situations, and under different social pressures.
14. Relationship between new products, processes, and services to the individual worker's adjustment and growth, i.e., the impact of technical change.

15. Analysis of the patterns of abilities and competencies of successful personnel workers with relation to the situations in which they are functioning.

This increasing awareness of the potential benefits offered by the social sciences was indicated in a proposal by Dwight L. Palmer in 1944:⁵³

A successful program for industrial relations research will be characterized by the following traits: It will make full use of the knowledge and methodology of each of the social sciences, such as, psychology, anthropology, group behavior and even economics....

If industry relations research is a new profession... its definition might well be, "The Social Sciences applied jointly to the solving of problems of human relations within industry."

Social science research expanded rapidly both during and after the war and began to find increasingly more applications in the industrial and business setting. Leeds and Smith provided a concise description of the uses of social science knowledge in business and industry in the following commentary:⁵⁴

Social science can be roughly described as composed of two types of knowledge: (1) partially verified theories, concepts, and modes of thought about human behavior, and (2) a body of substantive findings which describe the behavior that has ensued under specified conditions and techniques for studying human behavior. Both aspects of social science are intimately related, each contributing to the development of the other; both, if properly used, can be of value to business and industry. Social science theory and concepts provide the businessman with a systematic frame of reference for thinking about his human resources. Many substantive findings of social science having analogues in business and industry can suggest to the businessman what the locus of a particular problem is. Techniques for studying human behavior can provide the businessman with specific data describing behavior in his company.

The important relationship between corporate profits and social sciences research was emphasized by Hollis W. Peter, in the Advanced Management Journal:⁵⁵

... in the areas of personnel, industrial relations, and administration, a good part of the manager's knowledge and skills must come from social and behavioral research, added to experience. Improved systems and effective solutions of people-problems have the same positive impact on profits -- though often not as immediate -- as new product development or improved technology.

As a result of the considerable emphasis placed upon the contributions that the social sciences can make to industrial enterprises, human resources research has been broadened to include the following areas described by Waldo E. Fisher, in a bulletin of the Industrial Relations Center of the California Institute of Technology:⁵⁶

- (1) the study of the nature, structure, and functions of formal and informal groups, the impact of the group on the individual, and the roles played by individuals in the group,
- (2) the factory as a social system,
- (3) non-economic aspects of the organization of work, the work environment, and interpersonal relations within it,
- (4) the impact of culture on individuals and of individuals on their culture,
- (5) the origin, nature, and the process by which change occurs in both the individual and the cultural group itself,
- (6) the appropriate sphere of action of the state, and the social control exercised over labor-management relations and union administration, as well as
- (7) motivation, participation, communication, and other phases of human relations related to the functioning of economic institutions and groups.

Interdisciplinary Approach

The expanded areas of human relations research cited in the previous section emphasize the fact that the investigative inquiries have so broadened in nature and scope that they extend beyond the competence, interest, training, and knowledge of researchers within any single social science discipline. Obviously, an interdisciplinary or co-disciplinary approach is needed to cope with the expanded requirements.

Today, human resources research is carried on, both individually and jointly, by mathematicians, business and public administrators, economists, political scientists, social anthropologists, sociologists, social psychologists, industrial sociologists and psychologists, human engineers, physiologists, clinical psychologists, and psychiatrists.⁵⁷

One study revealed that of the twenty resident scientists at the Center for Advanced Study in the Behavioral Sciences, "3 have a primary background in psychology, 1 in anthropology, 1 in mathematics, 3 in psychiatry, 1 in history, 1 in literature, 6 in sociology, 1 in law, 1 in political science, and 2 in economics."⁵⁸ Similarly varied disciplines were found represented in the Harvard Laboratory of Social Relations, the University of Chicago's Committee on Human Development, the University of Pittsburg's Administrative Science Center, the University of California's (Berkeley) Institute of Industrial Relations, the University of Michigan's Institute of Social Research, the Ohio State University's Personnel Research Board, and Yale University's Institute of Human Relations.⁵⁹

The interdisciplinary approach has much to offer, since it draws upon and combines the particular interests and contributions of the various disciplines within the field of the social sciences.

Social Psychology.--Human behavior in a social or group environment is studied in social psychology. Its research methods include empirical studies using controlled variables, multiple factors studies using statistics and computer technology, and experiments using small scale models of real life situations. Special areas of interest include motivation, incentives, leadership, communication, testing and rating scales, job placement and job satisfaction, and the relation of man to his work environment.⁶⁰

Sociology.--Groups of people and their interrelationships and roles is studied in sociology. Its research methods include interviews, case studies, and group observation, without attempting the control of variables. Specific areas of interest include groups and group members interrelationships, roles structure, status, and sociometrics.⁶¹

Psychiatry and Clinical Psychology.--The mental behavior of individuals is studied in psychiatry and clinical psychology, using individual or clinical examinations. Specific studies are concerned with the personality, character, and traits of the individual and his adjustment to the demands of life and his environment. One such application is the recently developed sensitivity training techniques used for management development.⁶²

Physiology.--The human's bodily functioning and physical behavior are studied in physiology. Its research methods are clinical or individual examinations. Specific interest include monotony, fatigue, boredom, and job placement.⁶³

Human Engineering.--The relation between man and machine is studied in human engineering, using applied experimental psychology methods, and treating man as the constant and machine as the variable; i.e., machine is changed to fit man. Specific studies include the optimal environment, information display, and equipment design.⁶⁴

Social Anthropology.--The relation of cultures on classes and their effect on people are studied in social anthropology. Its methods are observation and case study.⁶⁵

Political Science.--Political forces and processes are studied in political science. Research methods include organizational study, historical analysis, and speculative analysis. Specific studies have provided information relating to the political structure of organizations, power struggles between individuals and groups, and the overall administrative process.⁶⁶

Economics.--The income gaining and using aspects of human behavior are studied in economics, using empirical models and statistical and speculative analysis. Of particular importance are the specific studies by labor economists.⁶⁷

Scientists from each of these fields contribute something unique to the study of human resources, but it is in the combining into teams of scientists from several

of these disciplines by which real research gains may be made. The combination of the several disciplines achieves a synergistic effect, for the value gained from the combination exceeds the sum of its parts (i.e., it exceeds the summation of the individual contributions of each discipline comprising the combination). The interdisciplinary approach to research greatly facilitates the pursuit of knowledge and the attainment of understanding in the human resources area.

Contemporary Approach

Even though the areas of interest in human resources research have substantially expanded beyond those which are traditionally associated with the personnel function of organizations, the importance of the latter to the efficient, effective utilization of manpower resources has not in the least diminished. Indeed, the contemporary approach to human relations research includes investigation of both the more traditional areas of personnel functions, processes, and techniques, and the more extended areas relating to the characteristics of and interrelations between people, groups, organizations, and environment.

Thus, although much of the research attention over the more recent years has been directed toward studies in the behavioralistic-oriented areas of motivation and satisfaction, interpersonal relationships, communication and organization theory, and game and decision theory, still important to the manpower management system is the personnel-function type of research concerned with improving employee recruitment, selection and placement, training and development, and utilization and compensation programs.

The personnel research conducted in these traditional areas may not be highly "significant" in the sense that much of the behavioral science research is acclaimed to be. Indeed, the behavioral research might be viewed as pure or basic research investigating general areas of significant importance, while the personnel research is akin to applied research normally focused on some specific problem which may appear to be of small importance. Although the findings from this latter type of research may have limited applicability -- both in breadth and time -- and the individual contributions from each "piece" of research may be "small", the research is, nevertheless, necessary to achieve efficient functioning of the personnel systems; and in the aggregate, when the "pieces" are ultimately added together, their overall contribution is highly important to the effective utilization of the manpower resources of an organization.

John W. Reigel of the University of Michigan has listed a number of personnel research types of studies which might improve the productivity and well-being of the employment relationship:⁶⁸

- 1) Study of men at work in order to set output standards (time, methods studies).
- 2) Study of the content of specific jobs and the working relationships of individual job holders with their associates.
- 3) Studies on the causes of damage or error in making the product.
- 4) Studies of qualifications necessary to perform specific types of work.
- 5) Studies of training programs.
- 6) Studies of experience in selection and development of supervisors and executives.
- 7) Studies of wage and salary administration.
- 8) Job evaluation.
- 9) Performance evaluation.
- 10) analysis of employee benefit plans.
- 11) Studies of labor turnover, absences, and accidents.
- 12) Analysis of industrial medicine and hygiene.

13) Research focused on administrative practices affecting employees. 14) Studies of collective bargaining and management-union relationships. 15) Studies of procedures to foster employee acceptance of technological change.

That some of these more traditional areas of interest in human resources research are still worthy of investigation is confirmed by various surveys. For instance, Robert Fitzpatrick and Clifford Hahn have reported many studies concerned with personnel selection and classification, job evaluation, safety programs, and morale. However, they found few studies relating to evaluation of employee performance and to development evaluation of training programs, and they criticized the quality and orientation of the studies on job evaluation and morale.⁶⁹ One survey found almost all firms covered by the investigation to be making periodic wage and earnings surveys and labor turnover studies;⁷⁰ another study reported most companies conducting surveys of the personnel practices of other firms;⁷¹ and still another report covering 231 companies indicated 172 conducting research activities relevant to keeping current on existing practices and procedures, 164 using wage and salary analyses, and 121 employing labor market surveys, while 176 were performing job evaluating studies.⁷²

In describing research in the functional area of personnel management, Robert G. Murdick provided the following examples of specific research topics in this area:⁷³

1. What is the work background, education, salary, and status in the organization of industrial personnel managers in a specified metropolitan region?

2. What types and mix of training and development programs are most suitable for a certain company?

3. The repetitive job versus job enlargement.

4. The impact of automation and the computer on organization structure.

5. What are effective and what are harmful methods of employee appraisal?

In an extensive survey of research efforts conducted by the government, research organizations, colleges and universities, foundations, companies and associations, Cecil Goode found the problem areas receiving major attention to be:⁷⁴

1. Manpower capabilities and supply; the nature of work, occupations, and careers.

2. Means for improving the identification and development of leadership and supervision.

3. Methods of selection and placement.

4. The nature of human behavior in the work situation.

5. Special problems of engineers, scientists, and other professional groups.

Based upon Goode's categorization of the areas receiving research attention, the following is a more detailed (but not nearly complete) compilation from many different sources describing the types of topics studied in these areas.⁷⁵

Manpower, Work, and Careers.--Research in this area includes studies of manpower potential, including scientific and professional manpower, military manpower, policy for skilled manpower, womanpower; government manpower

problems and practices; inventory of aptitude resources; manpower requirements, including actual requirements and forecasting techniques; job design, including implications, impact and effects of automation; careers, including mobility patterns and follow-up correlations of career with intelligence, attitude, interest inventory, and personality tests.

Leadership and Supervision.--Research in this area includes studies of leadership characteristics, executive development, and supervisory training; general leadership and management, including methods in the study of administrative leadership, patterns of administrative performance, situation factors in leadership, leadership and perceptions of organization, leadership and its effects upon the group, leadership and structures of personal interaction, administrative work patterns, leadership and role expectations, group dimensions, description and measurement of leader behavior, supervisory and management performance related to productivity and satisfaction of those supervised, early identification of management potential, criteria, prediction, and measurement of executive performance, psychological dimensions of the executive job, "in-basket" test techniques, and sensitivity-training techniques; social responsibility of leaders, including management ethics and tactics; dynamics of leadership, including small group experimentation, sociometric measures to select natural leaders and measure psychological distances, decision observation, and communication theory and process; executive and supervisory selection, including development of tests measuring intelligence, creativeness, and leadership situational inventory, and the use of personal history,

performance, and psychological measures for prediction of management potential; assessment of effectiveness of leadership training, including "feedback" method of changing executive and supervisory behavior, impact of sensitivity training.

Selection and Placement.--Research in this area includes studies of machine techniques, including factor analysis by computers to isolate personality factors; aptitude measurement, including multiple factor analysis to isolate reasoning, creative ability, evaluation, planning and problem solving factors, and differential intelligence and mental functioning tests to identify logical verbal, logical non-verbal, inventive verbal, inventive non-verbal, and perceptual functioning; personality measurement through computerized factor analysis; interest measurement; other techniques, including dynamics of employment interview, structured and rated biographic inventories.

Human Behavior in the Work Situation.--Research in this area includes studies of the nature of leadership and supervision related to worker productivity and satisfaction; studies of morale, including use of attitude surveys, components of morale, attitude effect on performance, potency of attitudes, motivating versus dissatisfaction factors, profession versus company oriented motivation; human organization, including synthesis of knowledge and research findings in human organization, studies of communications and theory of influence in discussion groups, potency of peer relationships, and development of meaningful criteria in human organization, including group behavior and social interaction.

Engineers, Scientists, and Other Professional Groups.--Research in this area includes studies of creativity, including identification of characteristics of and situations facilitating creativity and innovation, selection and assignment of professional and technical personnel, including identification of non-cognitive factors associated with creative work, and development of instruments to identify engineering, scientific, and professional talent; management of professional groups, including nature of most effective management, motivations of researchers and their concepts of their superiors, and relationships between productivity and degree of centralization of researchers.

Other Areas of Attention.--Research in this area includes studies of employment of older workers, including measures of biological versus chronological aging, social and psychological aspects of aging and retirement, and problems of older workers; employment of women; and employment of the handicapped.

Agencies of Research

Human resources research is conducted on many levels and by many different agencies. The following is a brief survey of the types of agencies conducting research and their areas of interest and level of effort, accompanied by a limited analysis of the sources of funds for their research endeavors.

Types of Agencies

The extensive survey conducted by Cecil Goode found that almost two-fifths of the more complex research in

human resources was being performed by private research organizations, one-third by colleges and universities, a little more than one-fifth by the government, and only one-twentieth by business. [These proportions reflect only the actual research efforts aimed at improving human resources utilization and exclude the routine compilation of data and statistics by business for use in management control and decision-making.]⁷⁶ A brief summarization of the types and efforts of these research agencies follows.

Private Research Organizations.--Private research organizations range from non-profit research institutes or corporations to management consultant firms. [Although often included in this category are various business and industry associations that conduct some research projects, they are more appropriately listed along with business and industry.] These private organizations, whether they be non-profit or commercial, depend upon clients for their business, and they sell their services to government agencies, educational institutions, and business firms. Their orientation may be toward fundamental scientific research, like that of the Psychological Corporation or of the Center for Advanced Study in the Behavioral Sciences; they may be oriented toward applied or operational research like the Rand Corporation or The American Institute for Research; or their concern may be national and economic policy research, such as that done by the Brookings Institution and the National Planning Association.⁷⁷

Colleges and Universities.--Academic institutions conduct all types of human resources research. Many have

bureaus of business research that conduct applied and operational research projects for individual firms. A portion of their income from such projects is used to finance pure and basic research conducted by individual faculty members or various departments. In more recent years, extensive use has been made of research organizations established separately from the academic institutions, either as mere extensions of the institutions or as quasi-independent bodies or, even, as separate legal entities, receiving funds primarily by selling their services to the government, business enterprises, and foundations.⁷⁸

Much human resources research is conducted by various academic departments, including business administration (for example, the Harvard Graduate School of Business Administration), industrial relations (the Industrial Relations Section of Massachusetts Institute of Technology), psychology (the Laboratory of Personality Assessment and Group Behavior at the University of Illinois), public administration and political science (the Maxwell School of Citizenship and Public Affairs), and interdepartmental (the Department of Social Relations at Harvard). However, the bulk of academic research efforts is performed through special research organizations, including the bureaus of business research (for example, the Bureau of Business Research at Ohio State University), industrial relations research institutions and personnel research organizations (the Industrial Relations Center at the University of Minnesota), and social and behavioral sciences research centers (the Human Relations Training Laboratory at the University of Texas).⁷⁹

Typical of the excellent results that have been achieved at these institutions are the studies of relationships between productivity, morale, and supervision conducted by Rensis Likert and his associates at the University of Michigan's Institute for Social Research, the studies at Yale University⁸⁰ by Walker and Guest of the Institute of Human Relations on human aspects of technology and by Bakke and Argyris of the Labor and Management Center on organization analysis, the work of William Whyte at Cornell analyzing the psychology of groups, and the studies on leadership by Carroll Shartle and his associates of the Personnel Research Board at Ohio State University.⁸⁰

Government.--Within the Federal government, various agencies conduct basic and applied human resources research. The Department of Labor is particularly interested in personnel management research, and the Civil Service Commission conducts a small amount of research. However, the bulk of human resources research within the government is done by the military services, particularly within the Air Force. In addition to the actual research conducted by governmental agencies, the government funds a large amount of the investigations made by private organizations and academic institutions.⁸¹

State and local governments conduct almost no human resources research; however, the states indirectly sponsor much research through their funding of the state universities.

Business and Industry.--Most of the research conducted by business firms is of the applied nature, concerned with the compilation of data and statistics to

guide day-to-day managerial decisions and control the mechanizations of the personnel processes. However, a six-year study of worker motivation and dissatisfaction conducted at Texas Instruments is indicative of the more complex human resources relationships capable of study within industry today.⁸² Some of the larger business corporations are beginning to carry out fairly extensive studies of their manpower resources and have even established special departments concerned with nothing but basic, long-range research. "The General Electric Company's recently organized behavioral research service is in the forefront of the trend...."⁸³

Although business firms actually conduct very little of the more complex human resources research, they support a greater share by providing funds for studies by employer associations, private organizations, and academic institutions; and although they may not direct the research, they often collaborate with academic institutions by providing the environment for "field" studies conducted by the latter.⁸⁴

Summary Comment.--Although most of the personnel function type of research of the traditional nature is conducted by the industrial and business organizations directly concerned with the application of their findings, relatively little research of the extended, behavioralistic type is undertaken by business and industry. The latter type of research is usually conducted in research centers, universities, and academically oriented institutions.

Sources of Funds

By far the greatest amount of funds for human resources research has been provided by the Federal government. In 1957, for example, the government underwrote 67 per cent of the research conducted within this country, the remainder of the funding being supplied by foundations (16%), business and industry (13%), and state government (4%). Although the Federal government provided two-thirds of the total human resources research funds, only 1.5 per cent of the government's research dollar went for social science research and only half of that was expended on personnel research.⁸⁵

Cecil Goode estimated the total social science research expenditures for 1957 to be between \$50 million and \$110 million, of which from \$25 million to \$55 million was spent on personnel or human relations research relating to working organizations. Either Goode's estimate for 1957 was low or the situation had improved considerably by 1961, for Hollis W. Peter estimated that of the \$15 billion expended for scientific research and development in the United States (representing 3% of the annual Gross National Product), approximately \$650 million was spent on behavioral science research.⁸⁶ With the explosive expansion of research activities since the early 1960's, the total amount of government expenditures in this area is undoubtedly even greater now.

Whatever the absolute figures may be, the impact of the Federal government's financial support of personnel research programs and of organizations conducting such research is shown by the following listing of percentages of funds reported to be government sponsored.⁸⁷

The Ohio State University leadership studies were supported by the Federal government to the extent of	80%
The Institute for Social Research at the University of Michigan initially received all of its support from the government; now it is	38%
The Electronics Personnel Research Group at the University of Southern California receives support from the Navy	100%
The Laboratory of Personality Assessment at the University of Illinois	75%
The American Institute for Research	78%
The Rand Corporation	100%
The Personnel Research and Development Corporation	79%

The surprisingly small proportion of human resources research conducted (and supported) by business and industry suggests that top management may not be completely cognizant of the advantages to be gained from such research. While their technical and scientific research programs have been expanding manyfold over recent years, the increase in personnel research has been progressing at a much slower rate -- even though one set of comparative studies indicated an 88 per cent increase in expenditures over a three-year span.⁸⁸ Another indication of the rate of increase in personnel research is shown by comparing two studies conducted in 1954 and in 1959. The first survey, of one thousand firms, revealed that 73 per cent conducted some employment relations research, spending an average of \$1.19 per employee,⁸⁹ while the second, similar study conducted four years later indicated a median per capita cost of \$1.88 for the personnel research budget of firms.⁹⁰ Current figures would likely reflect similar rates of increase in personnel research sponsored by business and industry.

Research Evaluation

The modest but increasing amount of funds being spent on human resources research by business and industry emphasizes the need for their evaluating the results obtained from these expenditures. Thus, much industrial research attention is focused on the use of personnel evaluations or audits, which are concerned with measuring the effectiveness of recruiting, selection, placement, training, development, compensation, and similar typical personnel functions, and with conducting attitude and morale surveys of the employees of the organization. Most studies of these types are not so much "research" as they are devices for the measurement and control of the organizational personnel function.

The function of control can be divided into the subfunctions of supervision of activities, comparison of results with standards, and taking corrective action. Although the subfunctions of supervision and corrective action are performed by the immediate supervisor responsible for performance, the subfunction of comparison may be performed elsewhere within the organization. Comparison is the function of determining the degree of agreement between performance results and a performance standard. It is performance evaluation having to do with, first, measuring the effectiveness of a program or activity and, second, as a result of such measurements, determining what should or should not be done to correct any deviation or variance from the established standard.⁹¹

Ralph C. Davis, for instance, has identified four basic phases of comparing or evaluating effectiveness:⁹²

1. The receipt of returns.
2. The accumulation, classification, and recording of information concerning results.
3. The periodic evaluation of completed action to date.
4. The reporting of the status of accomplishment to higher line authority.

Thus, the studies concerned with evaluating various personnel programs and activities by comparing their performance to an established standard are in reality the feedback mechanism within the manpower management system. As such, they are highly important to the effective utilization of the human resources within the system.

Audits/Evaluations

These important personnel studies have been called audits or evaluations, with the principal differentiation between the two being in timing. An audit is normally conducted on an annual basis, whereas an evaluation may be either a continuous process or a special study. Also, evaluation is often looked upon as a comparison of the performance results with the design goals, whereas an audit is viewed as a study to ascertain if all practices that might be of advantage to an organization are, indeed, being pursued. However, the terms are often used interchangeably and their meaning is usually considered as synonymous.

Although some firms hire outside consultants or university research organizations to conduct evaluations and audits, most perform their own studies. In some

cases, the heads of each personnel function accomplish the audit; in other companies, the research function is assigned the task.⁹³

General Electric Company has attempted to evaluate the effectiveness of the performance of personnel management with their Employee Relations Index (ERI) composed of the following eight indicators selected after detailed study of employee behavior:⁹⁴

1. Periods of absence.
2. Separations from payroll.
3. Initial visits to the dispensary for occupational reasons.
4. Formal grievances.
5. Disciplinary suspensions.
6. Work stoppages.
7. Number of suggestions made through suggestion system.
8. Participation in insurance plans.

Crucible Steel Corporation of America has developed its Industrial Relations Index to evaluate wages and hours, accessions and separations (turnover), labor grievances, arbitration, and work stoppages, safety, supervisory training, and suggestions.⁹⁵

The areas and methods of evaluation generally used by organizations have been outlined by Michael J. Jucius of Ohio State University, as follows:⁹⁶

1. Personnel functions to be evaluated:
 - a) Programming.
 - b) Job analysis.
 - c) Recruitment.
 - d) Selection.
 - e) Training.
 - f) Rating.
 - g) Transfers and promotions.
 - h) Morale development.
 - i) Health and safety.
 - j) Employment stabilization.
 - k) Wage and salary administration.
 - l) Collective bargaining.

2. Records and statistics to be used:

- | | |
|-----------------------|--------------------------------|
| a) Time standards | g) Numbers of medical reports. |
| b) Cost records. | h) Accident reports. |
| c) Test scores. | i) Grievance reports. |
| d) Training scores. | j) Turnover rates. |
| e) Interview records. | k) Unit labor costs. |
| f) Work stoppages. | l) Payroll data. |

3. Methods of analysis:

- a) Comparisons between various time periods.
- b) Comparisons between departments and with other companies.
- c) Trend lines, frequency distributions, and statistical correlations.
- d) Ratio analysis, e.g., labor costs per unit of output.
- e) Classification of data by kinds of employees, products, departments, etc.
- f) Graphical or pictorial displays.

The Industrial Relations Center of the University of Minnesota has developed a comprehensive "Triple Audit System" by which objective data can be obtained from use of three "standardized, research-tested measurement instruments and checklists," including:⁹⁷ (1) an Attitude Scale covering morale in general and specific attitudes toward type of work, supervision, communications, hours and pay, working conditions, and co-workers -- scaled for five degrees of grading; (2) a Check-List of Economic Characteristics of the Firm, seeking quantitative data on such items as labor turnover, grievances, labor costs, wage rates, and fringe benefits; and (3) a Check-List of Industrial Relations Policies and Practices, covering the entire industrial relations program, and including such items as job analysis, selection, training, management development, wage and salary administration, labor relations, employee services, and research.

Generally, there are three essential steps in these attempts to measure and evaluate policies, programs, and results to a degree determined by preliminary decisions on their depth. The audit must: (1) identify indicators or criteria of success or quality; (2) discover sources of reliable information with respect to these criteria; and (3) apply yardsticks or measures with which to compare these indicators with norms or other standards. Some of the most commonly used qualitative and quantitative indicators of effectiveness have been classified by major functions of the personnel organization, as follows: (1) Policy determination, organization, and administration; (2) Labor relations: negotiation and contract administration; (3) Staffing: job analysis, recruiting, selection, orientation, induction, promotions, transfers; (4) Training and development; (5) Incentivating: wage and salary administration, employee benefits, morale, communications; (6) Audit and review; and (7) Research.⁹⁸

Qualitative indicators and scales or measures relating to each of the major functions have been provided in the audit checklists. For instance, qualitative indicators for the incentivating function include the job evaluation program, wage and salary surveys, house organ, employee handbook, and accident and health programs; and scales or measures for that function include wage and salary differentials, benefit range and costs, unemployment insurance costs, measured morale, measured communications, absenteeism rates, suggestion ratios, and communications readability. Similar indicators and scales or measures have been identified and provided for each of the other major functions.⁹⁹

Both the criteria and the yardsticks used in measurement are usually somewhat crude, and the information collected in respect to the criteria is often little better refined. To provide more reliable evaluations, the essential elements to the process must be improved. In this respect, research plays an important role in discovering additional criteria of effective manpower management and in developing useful instruments for measuring the quality of managerial activity. Research can provide tests of the syndromes of effects and results thought to be associated with effective utilization of human resources, and it can combine experiment and experience to identify better yardsticks or techniques for the measurement of results and effectiveness of programs.¹⁰⁰

Equal in importance to the discovery of valid criteria and the development of improved measurements is the acquisition of accurate and reliable information. Audits are highly dependent upon records and reports as the source of information upon which their evaluation is based. The importance of having a system that provides accurate and timely personnel data cannot be overemphasized. Not only does it enable the organization to build factual information of employee performance, develop controls and standards by use of statistical data, and analyze causes of difficulties with some degree of accuracy, it helps management to administer policies uniformly and equitably, protect employees by concentrating on objective data, follow employee progress and assist employees in their personal development, and forecast needs and make long-range plans for effective manpower management.¹⁰¹

Employee Surveys

As another means of determining the effectiveness of personnel programs and activities, surveys of employee attitudes and morale have also become increasingly prevalent in recent years. Management has turned to their use in order to improve upward communication within the organization and better to ascertain employee needs, desires, and problems. In a publication of the American Management Association, Robert K. Burns has described the attitude survey as, ". . . a procedure for mirroring and measuring employees' thinking, attitudes, feelings, and sentiments about the important aspects of their work."¹⁰²

Attitudes may be surveyed by interviews or questionnaires. Although the interview is time-consuming and the results obtained are normally not best suited for quantitative analysis, questionnaires, on the other hand, may not provide the subjective answers necessary for insightful analysis. Therefore, both techniques are frequently used to supplement each other and to provide complementary data.

A survey by the Bureau of National Affairs queried 160 company executives on the worthwhileness of formal attitude and morale surveys. Over 70 per cent of the respondents agreed that they were of value, but one-fifth of these expressed some reservation. "An attitude survey should not be used if other more personal methods of sounding out employees are available."¹⁰³ Nevertheless, conducted properly, employee surveys permit management to feel the pulse of their employees and can provide invaluable feedback on company policies and programs.

Commentary

Despite the increasing industrial investment in personnel research and the use of methods developed for evaluating its effectiveness, many authorities believe that these efforts by business firms have not been nearly sufficient to meet the research needs imposed by the many problems facing modern industry and society. Herbert Heneman of the Industrial Relations Center of the University of Minnesota, in a special report on manpower management, clearly cited the need for more research funding:¹⁰⁴

. . . we must put some of our resources aside, and with blood, sweat, tears, and cash dig into the basic problems of understanding, as well pursuing the task of attempting to put out fires armed with an arsenal of ignorance.

Thus, although the need for better utilization of the manpower resources of organizations is generally recognized, the research directed to this purpose has been fraught with difficulty.

Criticism Levied

Substantial criticism has been directed toward not only the methods practiced in personnel management but toward the human resources research efforts as well, as is revealed by the following statements:

. . . most of our current practice in manpower management is based on folklore and tradition (if not superstition) rather than on thorough-going understanding of employment relationships. Most of our current "principles" are rule-of-thumb conclusions, many of them probably based on misinformation, erroneous inference, and thoughtless imitation. The state of the art at this time is such that many of our practices might be regarded as malpractice if facts were known and relationships understood. --Dale Yoder¹⁰⁵

. . . in this age of science, personnel management has hardly divested itself of principles which are akin to proverbs, maxims which are merely myths, and formulas which border on fantasy. --Julius Eittington¹⁰⁶

In many management set-ups, research in management and personnel administration has involved merely conducting correspondence, interviews, and inspection trips to find out what other companies are doing. The arm-chair method of rationalizing human behavior and developing management policies and procedure in personnel administration . . . --Cecil Goode¹⁰⁷

The lack of agreement on basic terminology, the want of firmly rooted research, and the repeated appearance of "fads" are indicative of the fact that, at present, the field has no real integration of practice, purpose, theory or orientation for the future. This is particularly true of personnel research. --Craig Lundberg¹⁰⁸

Upon being questioned as to what they considered the new frontiers in personnel research to be, two eminent personnel researchers gave these replies:

There are still too many of the old frontiers to be mastered. . . . By and large, we have made no substantial progress in any of the old frontiers in personnel research. We know precious little more now than we did before the war about personnel selection, particularly selection for managerial and executive positions. We have little, if any, established principals concerning employee motivation and we can measure job performance effectiveness in only the crudest and frequently the most biased manner. . . . no sound basis exists for deciding who to train, what to train, or how to train. --Edwin K. Taylor, Personnel Research and Development Corporation.¹⁰⁹

Many people in the area of personnel administration . . . have not "caught-up" with what is already known, especially through research studies, regarding human growth, development,

and behavior, including interaction and group dynamics. [Before considering new frontiers] there will have to be a speedup in translation of what is known. --W. R. C. Bener, Manager, Personnel Research Section, E. I. Dupont de Nemours and Company¹¹⁰

Many of these criticisms were noted in an appraisal of employee relations research made by a group of scientists from the University of Minnesota:¹¹¹

In terms of sheer volume, a first glance at the growing literature of the field would suggest that tremendous strides have been made in advancing knowledge and understanding of industrial relations. A more penetrating look, however, raises some questions. First, the bulk of the literature consists of documents with a plethora of hypotheses and speculations, and a notable shortage of facts and measurements. Secondly, some areas of employment problems have received much attention and others but little. Third, within each area of study, variations in research design may be noted with respect to both concept and competence. Fourth, as might be expected in an area of studies, findings and conclusions in similar situations frequently appear to be in conflict. Fifth, the sheer scope of this research field makes it difficult to assay the present "state of the arts."

Cecil Goode arrived at quite similar conclusions in his extensive survey of personnel research efforts. The following were some of his observations:¹¹²

1. Although there is some important and very intriguing research being done on the human problems of organization, there is still too much fragmented empiricism.
2. Not enough attention has been given to the time factor in personnel research.
3. Not enough imagination is used in the search for criteria.

4. There is not enough correlation of research efforts and findings, and hence not enough integration of social science knowledge.

5. Practitioners do not have much understanding or knowledge of important new human research and insights.

These varied criticisms clearly reflect the problems faced by the organization manager who wishes to obtain the most efficient and effective utilization of his manpower resources. His plight was aptly described by Harold Wilensky of the University of Michigan:¹¹³

All this suggests that . . . the practitioner who wants to apply the human relations research has no clear directive as to what to do -- and this is true not only of the findings on size of immediate work group, the character of informal work group solidarity, degree of identification with company goals, and the type of leadership style as related to productivity; it applies also to the findings on the relation of "morale" (i.e., satisfaction with job and with company) to all of these variables. The evidence is typically inconclusive, the interpretations sometimes contradictory.

Obstacles Encountered

These many criticisms, though perhaps overly harsh, do have some degree of validity. There are many problems which must be overcome if human resources research is to be conducted within business and industry and if the results obtained therefrom are to be applicable. Research encounters numerous obstacles when undertaken in an enterprise, especially in an industrial organization that cannot halt production to allow the researcher

the control he would like.¹¹⁴ Line management resists activities that might interfere with operations; if an experiment does not look "practical", the supervisors may sabotage it even while appearing to be cooperating; unions are suspicious that the research may adversely affect the worker; and even middle and top management present difficulties in their haste to obtain quick results from the research efforts.¹¹⁵

Another type of difficulty is often presented by the variance of roles of the researcher and the manager. The researcher must abstract from the confusing reality of the industrial setting, considering only a few things at a time and imagining other factors as constants because of their assumed lesser importance. He must be ploddingly patient in developing the research program and gathering the slowly accumulating data. His efforts are time-consuming, costly, and often yield no tangible results in the short-run. Any possible pay-off may be well off in the future.¹¹⁶

The manager, on the other hand, is a practitioner, concerned with immediate actions and timely results. While the researcher leisurely isolates variables and imagines that some are constant, the manager must consider all of them hurriedly and at one time. He cannot wait for the accumulation of data and the massing of evidence but must act now, making on-the-spot decisions based on whatever information he has available at the time.¹¹⁷

Solution Offered

These criticisms and obstacles relating to human resources research in the industrial setting can be,

perhaps, overcome or at least lessened by viewing the organization's personnel function and associated human resources research in a systems context, as is described in the next section of this paper.

IV. RESEARCH AND INFORMATION SUBSYSTEM

From a systems context, the personnel function of an organization may be viewed as a manpower management system, whose principal objective is the effective and efficient use of human resources in attaining organizational goals. As described by Edgar G. Williams of Indiana University, the manpower management system, through the activities of its basic subsystems -- the employment, development, utilization, compensation, maintenance, and research and information subsystems -- converts the required inputs of human faculties, job related information, and environmental factors into the desired outputs of organizational effectiveness, personal satisfactions, productivity, and other associated values.¹¹⁸

The employment subsystem is primarily concerned with the selection and placement of the manpower resources of the organization. The utilization subsystem is concerned with their productive use on the job through appropriate job design and assignment of tasks and duties in order to achieve the organizational objectives. The development system is concerned with the training and professional expansion of the manpower resources within the organization; and the compensation system is concerned with their salary, wages, incentives, and benefits. The maintenance subsystem is concerned with all the supporting programs, such as environmental engineering, health and safety management, which are so necessary to the maintenance of an organizational environment conducive to the productive utilization of the invaluable human resources of the organization.

The means of keeping the total system dynamic and adjustive, rather than static and inflexible, are provided by the research and information subsystem of the manpower management system. Primarily concerned with the relation between human resources research and the utilization of manpower resources within the organization, the research subsystem may also be viewed as an information system whose inputs are raw data or rough information and whose outputs are refined information or intelligence. It receives inputs from the other manpower management subsystems and from the external environment. It classifies, collates, processes, analyses, and evaluates the inputs in order to produce outputs that may be used for feedback control and redirection of the other subsystems and that may be transmitted to the external environment.

Thus, the research and information subsystem operates across the entire manpower system to process both feedback information from within the system itself and current research information from the environment which interfaces with the system. By analyzing and evaluating the outputs from the other manpower subsystems to measure the effectiveness of their performance, the research and information subsystem functions as a mechanism through which the other subsystems may control and adjust their operations to achieve their desired outputs and subsystems objectives. And, through its communication channels with the external environment, the subsystem feeds into the other subsystems the most current human resources research information, which may be used to redefine their objectives or desired outputs and redirect their activities to achieve improved operational effectiveness.

Subsystem Activities

The general activities of the research and information subsystem are the gathering of information, the processing of data, and the producing of intelligence. A better perspective of these subsystem activities may be gained by discussing them in relation to the personnel and human resources research efforts described earlier in this report.

Internal

The subsystem collects the information outputs from the other subsystems of the manpower management system and then processes, analyzes, and evaluates the data to measure how well the others have achieved their system objectives. The refined information resulting from these activities of the research and information subsystem is fed back to the other subsystems so they may control and adjust their own activities and improve the effectiveness of their performance.

Specific research activities conducted within the manpower management system include research relating to the job itself, special audits and surveys, and personnel data studies. Also, in recent years, research concerned with the human behavior of employees has been conducted within the organization itself.

Job Research Activities.--Research relating to the job is highly important to the manpower management system. Much of the research conducted within the organization is concerned with job analysis, job descriptions and specifications, job classification and evaluation, job grading,

performance standards, work rules, and the establishment of acceptable compensation schedules. Unless these vital activities relating to job duties and requirements are satisfactorily performed, there can be little effective utilization of the human resources within the organization.

Audits and Surveys.--Research activities described as personal evaluations or audits are concerned with measuring the effectiveness of typical personnel functions such as employment, training, and compensation, and with conducting surveys of attitude and morale. They evaluate performance or measure its effectiveness by comparing the degree of agreement between the performance results and previously established performance standards. Such measurements, indicating either deviation or conformance to standards, provide a guide as to what should or should not be done to achieve desired results. Surveys are used to determine employee needs, desires, attitudes, feelings, sentiments, and problems concerning their work. They are also used to provide invaluable feedback on organizational policies, programs and practices.

Thus, these audit and survey research activities are highly important to the effective utilization of the human resources within the manpower management system, since they function as feedback mechanisms for control or correction within the system.

Personnel Data.--Because personnel data, such as test scores, turnover, and absenteeism rates, and cost records, are so necessary to the measurement of system effectiveness, the importance of accurate and timely information cannot be overemphasized. The research and

information subsystem, therefore, establishes the requirements for and develops the design of records, reports, manuals, and forms needed to facilitate the collection of accurate and reliable personnel data and statistics.

The accumulation, classification, and recording of information concerning results and the periodic review and evaluation of such data against established indicators or criteria of success or quality enables the manpower management system to build factual information of personnel function performance, to develop controls and standards via statistical data, and to identify sources and causes of deviation from the norm. The subsystem thereby guides corrective action, helps management to develop or reformulate improved policies, and assists in forecasting requirements and building long-range plans needed for effective use of manpower resources.

Human Behavior Research.--Many larger organizations are now conducting research activities within the organization itself that are concerned with investigating the behavior of the human resources employed. Such applied research is aimed at identifying and improving the interrelationships between the individuals and the groups forming the organization. The end purpose of these efforts is increased employee satisfaction that, hopefully, will lead to greater productivity.

External

Most of the activities described in the preceding sections related to research and communication within the manpower management system of the organization.

However, the research subsystem, in its dual role as an information system, is also concerned with communications external to the manpower management system and the organization itself. The principal channels of communication for exogenous information may be through liaison with trade, business, professional, labor, scientific, and educational associations; through review of current manpower resources literature, including business and trade magazines, professional journals and books, and government documents and reports; and through direct contact with governmental agencies, universities, research groups, and other business and industrial organizations.

Comparative Studies.--Of particular interest to the organization are the extraorganizational studies such as inter-company and intra-industry surveys which provide information revealing the degree of conformance or variance of the organization's own activities with those of others. Such studies as labor market surveys, wage and salary surveys, cost of living indices, wage and salary surveys, cost of living surveys, wage and salary surveys, and comparative practices surveys, provide relative measures of deviation from the general norms and assist the organization -- in particular, the manpower management system in formulating policy and redirecting activities.

Thus, these information channels which serve as important linkages with the external environment help insure that the organization is synchronously attuned to the environmental factors affecting human resources and their utilization within the organization.

Human Resources Research.--Also of importance to the manpower management system are the communication channels maintained by the research and information subsystem for the flow of information relating to human resources research activities conducted by the government, universities, and industry. Either through a review of the literature pertinent to the field or by direct contact with external organizations, research by behavioral scientists, organizational theorists, information technologists, and personnel researchers are evaluated to ascertain what may be applicable to the improved use of human resources within the organization. Applicable findings from these sources may be converted into intelligence which is funneled into the other manpower management subsystems to redirect their activities or to redefine their objectives or outputs, as may be appropriate, in order to achieve more effective performance.

Input/Output Relationships

As a prelude to discussing the interrelationships between the research and information subsystem and the other manpower management subsystems, the input/output relationships described thus far are restated.

The input to the research and information subsystem is raw information which consists essentially of two types. One type of input is the data received into the subsystem as the outputs from the other subsystems. The second type of input is the current information received from extraorganizational comparative studies and from human resources research activities.

The general output of the subsystem is refined information. The objective of the subsystem is to provide appropriate information which will help the other subsystems within the manpower management system achieve their desired outputs and which will facilitate the effective and efficient utilization of manpower resources. The subsystem output consists essentially of two types of information. One output is feedback information by which the other subsystems may control and adjust their operations in accordance with their objectives. The other is intelligence by which the other subsystems may redefine their objectives and redirect their operations.

Systems Interrelationships

Although all the subsystems within the manpower management system are, to some degree, interrelated with and dependent upon one another, the research and information subsystem is highly related to each of the others. The employment, development, utilization, compensation, and maintenance subsystems heavily rely on research and information in order to perform their activities and attain their output objectives. In fact, the research subsystem may be viewed as an integral part of each of the other subsystems, so interwoven, integrated, and infused with the functioning of each that the segregation of the research and information activities into a separate subsystem is all but an impossibility.

All of the subsystems rely on specific research to collect and review the applicable personnel data, records, reports, and information, in order to measure and analyze their output and to audit and evaluate their performance.

Additionally, each of the subsystems relies on the findings from general research which have applicability to its own particular systems operations. For instance, the utilization subsystem, the majority of whose activities are of a leader-follower nature, leans heavily on the research findings of the behavioral sciences to achieve productive work relationships. Similarly, the effective operation of the maintenance subsystem depends, to a large extent, upon the application of social (particularly physiological and psychological) sciences knowledge relating to the satisfaction of human needs. The development subsystem must apply behavioral research findings concerning perception, motivation, learning, and attitude change, in order to effectively train and develop the human resources within the organization. The compensation subsystem must be designed with psychic income factors also kept in mind; and even the employment subsystem relies on psychological research for effective testing, evaluation, and placement of the human resources employed by the organization.

A more detailed description of the manner in which the research and information subsystem is so closely related to the other manpower management subsystems is given in the following analysis of the interaction with the compensation subsystem.

The objective of the compensation subsystem is a schedule or arrangement of jobs and pay such that an equitable or acceptable remuneration is made to compensate the human resources for their efforts in accomplishing their specialized tasks designed to satisfy organizational goals. The compensation subsystem must rely

on human resources research and information to attain its output objective. Research performs job analysis or systematic investigation of the job in order to reduce its essential characteristics to a job description, which in turn provides reference documentation for the development of job specifications and classifications and for the performance of job evaluation. Research is extensively used in the latter to determine the relative worth of various jobs within the organization so that those with differing worth may be differentially compensated. At the same time, the research subsystem, through its exogenous information channels, provides data by means of wage and salary surveys to insure that the wage rate structures within the organization are consistent and/or equitably related with those of the external environment, i.e., with other business firms and industrial enterprises within the community or the given labor market. And, through its external communication linkage with the behavioral science sources, the research subsystem provides appropriate information to the compensation subsystem concerning the effects of monetary remuneration and its relationship with the physiological and psychological need requirements and fulfillments of human beings.

Without the intelligence outputs from the activities of the research subsystem, the activities of the compensation subsystem would likely be ineffective and an acceptable, satisficing, or equitable wage and salary structure (depending on organizational values and goals as to which type is desired) would not be attained as its output. Similar, detailed illustrations could be given to show the integrated relationship

between the research and information subsystem and the other subsystems of the manpower management system.

In short, the research and information subsystem is the means by which the manpower management system achieves dynamic equilibrium. The various subsystems constituting the overall system are not simply a conglomeration of independent and separate elements but are a definite system of interrelated parts which must work in conjunction with one another to satisfy total system requirements and achieve overall system objectives.

For smooth and efficient, rather than erratic and chaotic, operation, the subsystems must maintain a state of equilibrium with each other and with the total manpower management system of which they are a part; and the total system must, in turn, maintain a state of equilibrium with its environment. Such equilibrium, however, is not static, but dynamic. The activities of each part of the system generate forces which impinge upon one another, and the activities of the total system are influenced by forces emanating from the environment. These forces necessitate adaptation and change on the part of the system if viable and effective performance is to be realized. However, such adaptation to change must not be effected unilaterally by a single element of the system, but must be coordinated and integrated with the activities and outputs of all the other parts, since they are all dynamically interrelated with each other and their environment. Otherwise, internal imbalances and external disequilibrium would be created both within and without the total system.

The research subsystem, through its information and communication activities, provides the coordinating mechanism for integrating the various subsystems of the manpower management system into a synchronized pattern and for balancing the parts of the system in relation to each other and the total system in relation to its environment.

The information flow activities of the research subsystem are, basically, of two types: closed-flow and open-flow. The closed-flow system receives the information outputs from the activities of the other manpower management subsystems, measures them against previously established performance standards, analyzes any deviation to determine whether or not it is within allowable parameters or is beyond specification limits, and feeds back a flow of corrective or directive information to the subsystems, depending on whether the deviation from standard is minor or major. Should the deviation be minor, that is, as expected under the allowable parameters of standard performance, the feedback information is merely used by the subsystem for control and adjustment of its activities; however, if the deviation is found to be major, i.e., significantly greater than allowable specification limits, the objectives of the subsystem may well exceed its capabilities, and the feedback information would then be used for redefining subsystem objectives or redesigning the subsystem itself.

The other type of information flow activities of the research subsystem is that of the open-flow system, which receives from the environment information that relates to the use of manpower resources. The findings

from comparative inter-company and intra-industry surveys and from human resources research efforts are analyzed and evaluated by the research subsystem to ascertain their applicability to the activities of the manpower management system. The resulting intelligence is disseminated to the various subsystems for their use in redefining their objectives and redirecting their activities, as may be appropriate. Should either of these be done, then the closed-flow information system would measure their future outputs in terms of the redefined performance standards and would provide feedback information to the subsystems for the regulation and control of their redirected activities.

In final summary, the research and information subsystem serves to keep the manpower management system dynamic and adaptive. It operates across the entire system and is closely related with the activities of each subsystem. It functions as an information system, receiving raw data and information as its inputs and producing refined data and intelligence as its outputs. Its communications channels provide internal linkages connecting the subsystems within the total system and exogenous linkages connecting the total system and its parts with the environment external to the system. Its activities include the following: (1) those related with the external environment; (a) conducting various comparative surveys, and (b) "intelligencing" the applicable findings of human resources research activities; (2) those related to the internal dynamics of the manpower system itself; (a) performing personnel-oriented studies, such as job analyses and evaluations, (b) conducting special internal surveys, such as opinion, morale,

and attitude surveys, (c) performing operational evaluations, such as performance measurement and audits, and (d) conducting behavioral research studies primarily designed to add to the knowledge of the field; and (3) those concerned with the information system and communications function; (a) receiving personnel records, reports, and data from internal sources, output information from other subsystems, research and survey information and findings from exogenous sources, (b) disseminating employee-oriented information through the various communication media and devices, and feedback information to adjust or redirect the activities of the other subsystems, and (c) reporting systems data for external comparative surveys, and appropriate findings from any internally conducted research activities.

In conclusion, the research and information subsystem is an important element of the manpower management system and significantly contributes to the effective and efficient utilization of the human resources employed in attaining organizational objectives.

V. CONCLUSION

In conclusion, the research and information relating to the use of human resources is of great importance to any organization. This paper has presented an historical perspective of the evolution of human resources research and has described the research efforts in this important area. It has addressed the meaning and need of human resources research, the methodology employed, the various approaches used, and the agencies conducting and sponsoring the research. It has also provided a commentary on the criticisms levied against, and the obstacles encountered by, human resources research, and it has offered an integrative model in a systems context that might be used to help lessen the criticism and overcome the obstacles. It was concluded that the research and information subsystem is an important element of the manpower management system, which significantly contributes to the effective and efficient utilization of the human resources employed in attaining organizational objectives.

Several other points should be made in conclusion. First, this paper has addressed the traditional aspects of personnel research and communication as well as the contemporary aspects of human resources research and information technology processes. It is important to remember, however, that although the latter seem to be receiving the greater attention in our present environment, it is only because they constitute newer and less

mature areas of study and it is not because the importance of the traditional aspects has become lessened, for these still remain vitally essential to the effective use of personnel resources.

Second, specifically excluded from consideration in this paper is the increasingly important impact of technology, especially of automation, upon the functioning of the organization. Automation significantly affects the manpower management system, requiring shifts in the skills required, necessitating changes in both philosophy and methodology, and presenting innumerable socio-psychological problems concerning the workers involved. Since analysis of the effects of technological change on the personnel function would be a study in itself, the subject was excluded in order to limit the scope of this paper.

Third, in discussing research and information from a systems context, the area of coverage was limited to the manpower management system itself, rather than including the other systems which make up the organizational whole. For instance, discussion of the information system could well have been broadened to cover the entire organization, for adequate data flow is necessary to every system making up the organization. Communication networks and information channels form a linkage system between all organizational units, and the information system is an integral part of the whole. However, this paper addressed only the manpower system without considering the overall organization data processing and information flow system.

Finally, the conceptual framework presented for the research and information subsystem is an amalgamation of the author's own thinking on the subject and the data and findings from many various sources. The important point to recognize is that all the human resources research and information are of no value to the improving of the utilization of human resources unless they can be related to the organizational setting in which these resources are employed. The research and information subsystem described in this paper has an important role in this task, but it takes joint effort on the part of both the researcher and the manpower manager to make the findings applicable. This effort has several aspects.

The first is that the mass of current knowledge and existing theory in the human or social sciences must be assimilated and understood. The second is the recognition that the existing general information may have applicability within the organization, perhaps in the short-run but more likely, in the long-run. The third is determining the means of making effective use of this knowledge. The fourth is evaluating the results of such application, in the hope that not only may immediate improvements in the use of manpower resources be achieved but that additions to the basic knowledge of the social and behavioral sciences may be made.

This requires active collaboration between the researcher and the practitioner, between the scientist and the manager. It requires professional competence on the part of each and a mutual understanding of each other's roles. It requires cooperative effort between the social scientist, the behavioral engineer, and the professional manager.

The social scientist, through his training and knowledge of his professional field, identifies findings from the literature and research that may be applicable in the industrial or organizational setting. The behavioral engineer, through his knowledge of both the worker and his environment, develops programs incorporating the research findings that are relevant to the problems within the particular setting. And, the professional manager, through his intimate knowledge of the work situation itself, actively directs the programs to achieve the most effective use of the human resources under his direction.

The key to an effective human resources research program, then, is a combination of knowledge, recognition, understanding, cooperation, and professional competence. There must be knowledge of the general findings of social science research and of the specific factors of the work situation. There must be recognition of not only the value to be gained by applying these findings to the industrial or organizational setting but of the limitations of their use. There must be understanding by each of the participants in the research effort of not only what is their own role but what is the role of the others. There must be cooperation between them in executing their functions and operating the research and information program. And, of course, each of the participants must be completely competent in his profession if success is to be attained. Only then may the information and findings from personnel studies and human resources research be used to achieve efficient and effective utilization of the invaluable human resources within the organization.¹¹⁹

Reference and Content Footnotes

1. Many of the ideas presented in this paper may be traced back to my studies in a graduate seminar conducted by Edgar G. Williams at Indiana University's Graduate School of Business. The seminar group, consisting of Professor Williams and 5 doctoral candidates, focused its attention on describing the personnel function of organizations in a systems context, with each of the students preparing a conceptualization paper on one of the subsystems comprising the manpower management system. My own area of investigation was to conceptualize a research subsystem which served to relate the other subsystems with each other and to the total system. This paper is an extension of my own research in the area of human resources research.
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L T C O L O N E L J A M E S L. Q U I N N

Lieutenant Colonel James L. Quinn, a member of the faculty of the Air Force Institute of Technology's School of Systems and Logistics, is Head of the Department of Research and Communicative Studies of the Graduate Education Division.

His military experience ranges across a broad spectrum-- from the command of combat intelligence units, through the planning and development of space systems, to his present role as a professor and researcher in the academic environment. He has served as commander of classified operational units of the USAF Security Service, as a special projects officer within the Directorate of Operations, Headquarters USAFSS, as a project engineer on the nation's top-priority space satellite system with the Office of the Secretary of the Air Force, and as the systems management officer for a major space vehicle program with Headquarters Space Systems Division. He commanded the unit which received the first Air Force Outstanding Unit Award for combat operations, he has been a member of the United States Intelligence Board, he represented his command at the first International Space Symposiums, he was an original member of the Weapon System Phasing Group that planned many of our present USAF space programs, and he was the PERT (Program Evaluation and Review Technique) officer for the first Air Force space program employing this sophisticated management and control device.

Lt Colonel Quinn's academic qualifications include a Bachelor of Science in Engineering and graduate study in Law (both with honors) from the University of Texas, a Master of Business Administration (With Distinction) in Engineering Management from the Air University Institute of Technology, and a Doctor of Business Administration (with Special Recognition from the President) in Management and Behavioral Science from Indiana University. Among his many publications are articles on personnel administration, a series of casebooks on logistics management, a history of management thought and philosophy, and technical reports on performance appraisal and evaluation, human resources research, functional areas of management, research and development management and evaluation, economic concentration in industry, logistics personnel career progression, and logistics management education.

Lt Colonel Quinn holds the academic rank of Associate Professor of Logistics Management and has received the Advanced Professional Designation for Logistics Management from the Society of Logistics Engineers. He has developed and taught courses in Advanced Management and in Logistics Planning in the Graduate Logistics Management Program. His honoraries and memberships have included the Academy of Management, American Institute of Mining and Metallurgical Engineers, Arnold Air Society, Beta Gamma Sigma, Presidents' Association of the American Management Association, Ramshorn Engineering Society, Scabbard and Blade Society, Sigma Iota Epsilon, Society of American Military Engineers, and Society of Logistics Engineers. *Strength Through Knowledge*