IMPLICATIONS OF THE NEW TECHNOLOGY FOR HUMAN RELATIONS WITH EMPHASIS ON WOMEN CLERICAL WORKERS

A Thesis

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by

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CHAPTER I

I. INTRODUCTION

An evolutionary change has taken place in the business world with the advent of automation and a new technology. This new technology is really advanced mechanization, which has been developed in an effort to accomplish objectives in the best way possible.

The human relations aspect of business has frequently lagged behind this technological progress. Douglas McGregor felt that management was severely hampered in its attempts to innovate with respect to the human side of enterprise because conventional organization theory is inadequate. This theory is based, he believed, on invalid and limiting assumptions about human behavior, which blind managers to many possibilities for innovation. Professor McGregor felt that we are in a period when the development of theory within the social sciences will permit innovations which previously were thought to be inconceivable. Among the dramatic changes in the organization will be the realization that the capabilities of the average human being for creativity, growth, collaboration and productivity are far greater than has yet been recognized.[1]

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[1]Douglas McGregor, The Human Side of Enterprise (New York: McGraw-Hill Book Co. Inc., 1960), pp. 245-246.

There are predictions of more advanced forms of technology, and more widespread use of the simpler forms now available as they become less expensive. It seems only proper than an attempt be made to keep apace with better human relations techniques.

Conferences and symposiums concerned with the social and economic effects of the new technology have been sponsored by national and international organizations. But the sociological and psychological effects have received little attention--there is little systematic application of techniques for related human relations. Rogers and Roethlisberger point out that our civilization does not yet have enough faith in the social sciences to utilize findings of social scientists. They point out that the opposite is true of the physical sciences. During the war when a test-tube solution was found to the problem of making synthetic rubber, millions of dollars and an army of talent were turned loose on the problem of using that finding. But in the social science realm, if a way is found to facilitate communication and mutual understanding in small groups, there is no guarantee that the finding will be utilized. It may be a generation or more before the money and the brains will be turned loose to exploit that finding.[2]

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[2]Carl R. Rogers and F. J. Roethlisberger, "Barriers and Gateways to Communication," Harvard Business Review, Vol. XXX, No. 4 (July-August, 1952), p. 49.

II. THE PROBLEM

STATEMENT OF THE PROBLEM

The behavioral science approach to management has shown application to several areas: motivation, participation, the informal organization, leadership, communication and employee development, for example.

The writer has selected from social science publications ideas which appear to be applicable to the new technology for women clerical workers. This thesis is an attempt to show that there is much in social science literature that is applicable to the new technology for workers and specifically for women clerical workers.

The impact of automation is shown by the effect upon the attitudes of workers. This requires a consideration of the importance of attitudes.

ATTITUDES

Communication is one of the most important jobs of management, but communication alone is not enough. It must be appropriate, accurate and understandable in order to answer questions raised by employees. Changed conditions often make communication difficult.

One of the significant contributions of the Hawthorne experiment (see page 18) was the conclusion that workers' attitudes and values are quite different from the assumptions held by the writers associated with the "Scientific Management" school of thought.[3]

[3] F. J. Roethlisberger and W. J. Dickson, Management and the Worker (Science Editions; New York: John Wiley & Sons, Inc., 1964), pp. 500-557.

In the Hawthorne experiments what impressed management most were the stores of latent energy and productive cooperation which clearly could be obtained from its working force under the right conditions. Among the factors producing these conditions employee attitudes stood out as being of predominant importance.[4]

The nature of attitudes and the factors that influence them have been classified by studies in social psychology. Norman Maier feels attitudes should be treated as a frame of reference, and he emphasizes the fact that management, personnel and employees naturally have different frames of reference because of their different backgrounds and interests. He contends that human relations problems stem largely from misunderstandings that have their basis in different frames of reference. The behavior of another person becomes clear only if it is analyzed in terms of his own frame of reference.[5]

Arthur Kornhauser states that an attitude is simply a learned tendency or readiness to react to a specified object in a predictable manner and direction, but not with an automatic or invariable response. Motives which predominate in the origin of the attitude may later become insignificant, while new motives enter to support the attitude and associated conduct. This leads to the practical conclusion that an understanding of labor-management relations requires not only the ascertaining of relevant attitudes, but also the analysis of their

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[4] Ibid., p. 185.

[5] Norman R. F. Maier, Principles of Human Relations (New York: John Wiley & Sons, Inc., 1952), p. 33.

current motivational significance for the person involved. The effect of all the conditions and changes depends on the meanings that they have for the persons concerned; those meanings depend on the varied structures of needs, attitudes, and beliefs of the persons.[6]

Chris Argyris contends that much research has been conducted, and much more is needed, regarding the "proper mix" of individual needs on organizational demands. He says there is a decreasing interest in developing individuals who are "happy" or "satisfied" and have "high morale." There is an increasing interest in developing individuals with commitment and self-worth, who are fully functioning, productive, and self-responsible. This new interest stems from the increasing evidence in personality research that tension, struggle, and "unhappiness" can all be used "in the service of growth." The farther down one goes in the chain of command, the more the job and the work environment control the individual's behavior, and the more important it becomes to change the psycho-socio-technical environment.[7]

Frederick Herzberg and his colleagues in a review of some studies report that the preponderance of data adds up to the following picture: in approximately half of the studies reported, workers with

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[6]Arthur Kornhauser, "Human Motivations Underlying Industrial Conflict," Industrial Conflicts, ed. Arthur Kornhauser, Robert Dubin, and A. M. Ross, (New York: McGraw Hill Book Co., 1954), pp. 62-85.

[7]Chris Argyris, Interpersonal Competence and Organizational Effectiveness (Homewood, Ill.: Richard D. Irwin, Inc., 1962),p. 2.

positive job attitudes outproduced workers with negative job attitudes. This is especially true where social climates favor high production, and where supervision was skillful. Positive job attitudes were even more certainly related to the worker's tendency to stay with the job, both in the day-to-day decisions as to whether to report to work in the face of a minor illness or family crisis, or in the more important decisions to be made about job termination. There is some evidence to show that workers with positive job attitudes have fewer accidents and fewer psychosomatic illnesses.[8]

If attitudes are known it is possible to do something about the prediction and control of behavior; it is possible to foresee and perhaps forestall undesirable results.

OBJECTIVES OF THE STUDY

In order to improve the human quality of organizations it is essential to understand the principles of human relations as they apply to the individual and to groups. The purpose of this study is to examine research on human relations factors involved in technological change. It is an attempt to provide a background for understanding the effect of technological change in job and environment upon the individual.

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[8]Frederick Herzberg, Bernard Mausner, Richard O. Peterson and Dora F. Capwell, Job Attitudes: Review of Research and Opinion (Pittsburgh, Penna.: Psychological Service of Pittsburgh, 1957), pp. 95-111.

SUB-OBJECTIVES OF THE STUDY

The particular areas of interest were:

1. Successful techniques in previous innovative situations, in relation to workers in general, and specifically to women clerical workers.
2. New approaches available in behavioral research to problems created by the new technology.
3. A recognition that participation in behavioral science research and the support of behavioral science research by business organizations can help solve problems of human relations resulting from the new technology.

VALUE OF THE STUDY

It is rare to find a definition of management that does not include people. Dr. Reed Powell, of The Ohio State University, says, "Management is the art of getting things done through and with people in formally organized groups; the art of creating an environment in such an organized group where people can perform as individuals and yet cooperate toward attainment of group goals; the art of removing blocks to such performance, the art of optimizing efficiency in effectively reaching goals."

There is a natural tendency for management to concentrate on technical difficulties of new installations, and overlook the possible human complications which may confront the worker. Technical problems make themselves known, and are more likely to be promptly solved.

Human relations problems are less apparent and a conscious effort is needed to discover them. However, the machine must be used as a tool by the worker, and its accomplishments are related to the worker and the skills and attitudes he brings to the job.

There is an opportunity to utilize research in the behavioral sciences to give new insights into old problems as well as new ones. There is evidence that both individuals and organizations can achieve their goals by applying the results of research in human resources. Industrial psychologists have been interested largely in the individual, and they have made contributions to the rationality and efficiency of the organization. Sociologists are investigating the relationship within and between groups. There is, however, a need for empirical studies. A recent analysis could discover fewer than three dozen research studies in the American, British, French, and German literature dealing empirically with the social aspects of the man-machine relationship.[9]

METHODOLOGY

This study is a review of available knowledge dealing with the new technology as it pertains to the area of human relations. Literature in the areas of business, economics, sociology, and psychology were investigated for specific theories dealing with job change,

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[9]Martin Meissner, "Behavioral Adaptations to Industrial Technology" (unpublished Ph.D. dissertation, Dept. of Sociology, University of Oregon, 1963).

especially but not exclusively with job change caused by technological advances. Further investigation was made to discover any instances of application of these theories, and how such application could be implemented. Books, periodicals, articles and reports were used. An attempt was made to support the premise that social science research can be used creatively to solve problems and make decisions concerning human relations in technologically-caused job change.

CHAPTER II

BACKGROUND CONCERNING THE NEW TECHNOLOGY

MACRO-APPROACH TO TECHNOLOGICAL CHANGE

Introduction. Technological advances have made possible rapid economic growth. Economics may be defined as the relationship between resources and effort. Economic and social developments are shown throughout history to be interrelated.

John K. Galbraith stresses that decision making is inherent in the successful corporation, and a high premium is placed on timely decisions. This does not only pertain to the organization, but also to its relation with its environment.[10]

Impact of Technology. Dr. Lee A. DuBridge, President of the California Institute of Technology, listed the major problems of our society in this order:

1. Avoidance of war.
2. The maintenance of a free society.
3. The spreading of the benefits of, the adjustment to, automation and technological change.[11]

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[10] John K. Galbraith, Economic Development in Perspective (Cambridge: Harvard University Press, 1960), p. 64.

[11] Lee A. DuBridge, "Educational and Social Consequences," Automation and Technological Change, ed. John T. Dunlop (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962), p. 33.

The Ad Hoc Committee on the Triple Revolution, a diverse group of private citizens, viewed cybernation as a means to an end of all employment, or almost all. This committee suggested to President Johnson that "radically new strategies" be employed. Six months of field research and economic and statistical analysis by Fortune with the assistance of Alan Greenspan, industrial economist, of Townsend-Greenspan & Co., claimed that too many of the people writing about automation and cybernation have grossly exaggerated the economic impact of automation. At the same time, some of these researchers may have underestimated or simply ignored the psychological and cultural impact of technology. For technology--any technology--has a logic of its own that affects people more or less independently of the purpose for which the technology may be used.[12]

Arlen Gray served on a small staff that pioneered a Department of Labor program to investigate and act on the manpower utilization and employment problems arising from automation and technological change. Miss Gray feels that the advent of electronic data processing has been far from satisfactory from the employee relations standpoint--and the problems it raises will not solve themselves. Despite glowing forecasts about the automated office, however, it now presents certain personnel relations aspects that management cannot ignore.

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[12]Charles E. Silberman, "The Real News About Automation," Fortune (January, 1965), pp. 124-126.

Even more complicated problems of adjustment are almost certainly on the horizon. Electronic Data Processing systems are becoming progressively more sophisticated and more economical to purchase and to operate. In addition, the ultimate system has yet to be designed. This implies changes in job and skill requirements that are changing rapidly.[13]

Sociologist George S. Counts points out that we have been so enraptured by technological advance that we have tended to conceive human progress in its terms. We are learning, to our sorrow, that this advance, when not accompanied by equally profound reconstruction in the realm of understanding and value, of customs and institutions, of attitudes and loyalties, can bring trouble and disaster.

The task of bringing our minds and our practices into harmony with physical conditions gives rise to tensions. There is a vast system of relationship between the individual and his environment. New conditions call forth new attitudes, new values, and new conceptions. The individual must establish a new state of equilibrium.[14]

The Organization. Editor Max Ways points out that whatever of truth there once was in the myth of the modern organization as a tyrannical machine has been diminishing for fifty years. The myth

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[13]Arlen Gray, "Problems of Adjustment in the Automated Office," Personnel, Vol. XLI, No. 4 (July-August, 1964), pp. 43-45.

[14]George S. Counts, "The Impact of Technological Change," The Planning of Change, ed. Warren G. Bennis, Kenneth D. Benne and Robert Chin (New York: Holt, Rinehart and Winston, 1961), pp. 20-28.

never took account of the modern organization's essential involvement in change.

The fluid business environment of the future will demand not only a different kind of manager, but a different organizational structure.[15]

H. Igor Ansoff agrees with him contending that the manager of a firm in the future will be different from the typical manager of today. He will have a much broader viewpoint than his present counterpart. On the one hand, he will be representative of today's trend toward selecting managers who have a thorough understanding of the firm's technology. On the other hand, he will need increased skills in human relations. In a climate of change, increasing importance will be placed on the manager's ability to communicate rapidly and intelligently, to gain acceptance for change and innovation, and to motivate and lead people in new and varying directions.[16]

Communication. Arlen Gray contends that no forward-looking company disputes the importance of communication--yet in practice there are many failures to communicate the facts about EDP, with results that may be disastrous in installing an expensive new system. There are at least three pitfalls into which management may slip

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[15]May Ways, "Tomorrow's Management: A More Adventurous Life in a Free-Form Corporation," Fortune, Vol. LXXIV, No. 1 (July 1, 1966), pp. 84-87.

[16]H. Igor Ansoff, "The Firm of the Future," Harvard Business Review, Vol. XLIII, No. 5 (September-October, 1965), p. 176.

because of its organizational and leadership position: 1. Management's wider perspective and control of total operations can make major changes seem so reasonable and even routine that they need not be explained to lower echelons. 2. Away from the confusion and hard realities of operating locations, top management may not see all the facets of a change. On paper some changes look convenient, but in practice thought must be given to the job requirements of the system and the aptitudes and interests of the people involved. 3. Systems designers, EDP technicians, and management itself may become so wrapped up in the science of efficient automated information processing that they may forget that established office patterns and traditions are being shaken up, and that these changes will probably be resisted, particularly if careful preparations are not made for them.

Miss Gray feels that it is possible within the scope of a system's data requirements, to make adjustments that will soften some of the impersonal aspects of EDP offices. The particular problems engendered by automation will require more and more thought and attention as more and more companies turn to computers.

The personnel relations aspect of EDP is not self-adjusting, nor is it becoming any less complex as more and more offices are attracted to the efficiency and speed of EDP.[17]

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[17]Gray, op. cit., pp. 43-48.

Characteristics. Peter Drucker believes that automation's most important impact will not be on employment but on the qualifications and functions of employees. He feels the need is above all qualitative--for better educated people. Even in routine jobs, automation will require ability to think, a trained imagination, and good judgment, plus some skill in using logical methods, some mathematical understanding, and some ability well above the elementary level to read and write. Under automation the job--even the bottom job--will change radically and often. Education for these job changes will have to be done, to a large extent, in and by the business itself. On every level, adult education, mostly given on the job, will be needed.[18]

Richard T. Bueschel reminds us that though the computer can produce information that could not previously be obtained and produce it faster, computers must handle information in a prearranged form. Flexibility, therefore, is reduced to the extent that each action of the computer must be planned.[19]

Edwin B. Flippo emphasizes that the benefits of specialization and work systems are predominately technical. The drawbacks and

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[18]Peter F. Drucker, The Promise of Automation in America's Next Twenty Years (New York: Harper & Brothers, 1955), pp. 17-34.

[19]Richard T. Bueschel, "How EDP Is Improving the Personnel Function," Personnel (Sept.-Oct., 1964), p. 64.

problems are prediminately human (the frustration of basic human needs and unemployment).[20]

Interrelationships. Goals and behavior are linked through technology. Behavior necessary to achieve a particular goal must be appropriate to the situation and a part of the cultural environment. Recognizing the power of the immediate profit objective in our economic system, Flippo reminds us we must still strive to understand the service objective. An excessive pursuit of profit can and does lead into goals not approved by society. Each time this happens, there results another law, another administrative ruling or another regulatory agency. Too avid an interest in the immediate profit objective may lead ultimately to a completely government-regulated economy without the businessman's ever really understanding how this came about.[21]

James K. Langen, operations director of the AFL-CIO Government Employee Council, suggested that "Congress lay down a policy that would require the agencies to have personnel management work closely with the installation engineers to reduce to a minimum the adverse effect upon employees." George Riley, legislative representative of the American Federation of Labor-Congress of Industrial Organizations recommended "the formation of a central transfer unit with authority to overcome resistance of uncooperative agencies."[22]

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[20]Edwin B. Flippo, Principles of Personnel Management (New York McGraw-Hill Book Co. Inc., 1961), pp. 217-221.

[21]Ibid., p. 30.

[22]Richard W. Riche and Will E. Alii, "Office Automation in the Federal Government," Monthly Labor Review, Vol. LXXXIII (July-Dec., 1960), p. 938.

Professors Jucius and Terry believe that there are increasing numbers who recognize the responsibilities of a business to those who invest their labor as well as to those who invest their money. It is not unsafe to conclude that business will increase its over-all concern for customer, investor, worker, and community in its philosophy of management. They conclude that this is a wise course. Unless a businessman voluntarily concerns himself with all things affected by business, he finds he is forced to do so by government or other outside agencies such as labor unions. Thus, sooner or later, all interests must be recognized. For many decades, business took a broader view of all interested parties only when forced to do so. Now the signs indicate that there is a growing acceptance of a voluntary move in this direction.[23]

Andras Hegedus, the former Prime Minister of Hungary during the Stalin era, in a recent study says, "If optimization comes into the foreground, humanistic motives will be pushed into the background, and as a result, bureaucracy will become preponderant and finally the interest of optimization itself will be damaged."[24]

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[23]Michael J. Jucius and George R. Terry, Introduction to Business (Homewood, Ill.: Richard D. Irwin, Inc., 1961), p. 24.

[24]Andras Hegedus, cited in F. F. Herzberg, Work and the Nature of Man (Cleveland: The World Publishing Co., 1966), p. 171.

MICRO-APPROACH TO TECHNOLOGICAL CHANGE

Introduction. Arnold S. Tannenbaum points out that scientific management did not always achieve its goals--for the same reason that the classical approaches to organization did not always succeed. The problem was the human worker--that complex, elusive, emotional, social, and sometimes nonrational being whose behavior comprises the substance of the organization. The classical approaches either ignored the human factor or oversimplified it. A significant point of departure in the growing realization that something more was needed was the famous Hawthorne research, which was designed within the framework of scientific management but which led off in a new direction, into a new movement called human relations.[25]

R. N. McMurry defines human relations as the process of effective motivation of individuals in a given situation, in order to achieve a balance of objectives that will yield greater human satisfaction and help accomplish company goals. Management's role in human relations becomes a task of motivation within the framework of the group. Management must demonstrate that it is open-minded toward values which conflict with its own and that it will do its best to integrate them into the system.[26]

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[25]Arnold S. Tannenbaum, Social Psychology of the Work Organization (Belmont, Cal.: Wadsworth Publishing Co., Inc., 1966), pp. 16-17.

[26]R. N. McMurry, "Conflicts in Human Values," Harvard Business Review (May-June, 1963), pp. 130-135.

Psychological Implications. It has been stated that just as the person strives to maintain biological balance, so does he strive to maintain psychological balance. The elements of this psychological balance are social recognition, self realization and security. In order to maintain integrity of his ego, the individual must fulfill his potentialities in all of these categories.[27]

The cognitions of the individual--his ideas about persons and things--are selectively organized. Only selected objects, among all the objects that are available to him, enter into his conception of the external world. The characteristics of these objects may be distorted to fit his psychological requirements.[28]

Professor Herzberg says that man does not work for profit and to avoid pain; but rather he works in a positive sense, to enjoy the excitement and meaning that achievement provides for his own psychological growth and therefore his happiness.[29]

Communication. Carl Rogers feels that the major barrier to mutual interpersonal communication is our very natural tendency to judge, to evaluate, to approve (or disapprove) the statement of the other person or the other group. F. J. Roethlisberger feels that good personal communication depends on the capacity and willingness

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[27]W. J. Coville, T. W. Costell, and F. L. Rouke, Abnormal Psychology (New York: Barnes and Noble, 1964), pp. 26-50.

[28]David Krech, Richard S. Crutchfield, and Edgerton L. Ballachey, Individual in Society (New York: McGraw-Hill Book Co., 1962), pp. 17-19.

[29]Herzberg, op. cit., p. 177.

to see and accept points of view different from one's own, and to practice this orientation in a face-to-face relationship. This practice involves an emotional as well as an intellectual achievement.[30] Michael Jucius quotes a study which ranks job factors by employees and by their foreman. The factors ranked first, second and third by the employees were assigned ranks of eighth, tenth and ninth by the foreman, when he was asked what he thought was the most important to the employees.[31]

Communication within an organization is important in any case, but it is critically important when a change is to take place. It is pointed out that planning a "program" for special consideration of human relations is greatly underestimating the extent of the effects of human relations problems at all times. Such programs are frequently over-institutionalized because they are installed as a matter of course, a matter of fact or a matter of display. Instead human relations must be considered as a matter of policy affecting organizational decisions in the same ways as other administrative policies.[32]

Working Women. The volume of paper work is a rough guide to the demand for white collar labor, and white collar employment has increased rapidly. Within the white collar group, the segment

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[30] Rogers and Roethlisberger, op. cit., pp. 46.

[31] Jucius, op. cit., p. 319.

[32] Herzberg, et al., op. cit., p. 198.

labeled "clerical and kindred workers" is particularly sensitive to the increase in paper work. It almost doubled in size from 1940 to 1956, and at the end of the latter year had approximately 8,772,000 members, representing roughly one-third of total salaried employment. Within the group, women far outnumbered men, comprising 67 per cent of its total membership in 1956.[33]

Millions of the women who worked at some time in 1964 worked to support themselves or others; and even then many were not able to raise their own or their family's income above the poverty level. Nearly all of the 5.9 million women workers who were widowed, divorced or separated from their husbands were working for compelling economic reasons; in addition to supporting themselves, many of them were also raising children. Economic necessity also sent to work the majority of the 8 million single women workers and the four million married women workers whose husbands had an income of less than $3000 a year. If we take into account those women workers whose husband had incomes between $3000 and $5000 (which is still considerably below the level generally regarded as modest but adequate for an urban family of four: $6000 to $7000 in 1964), another 4.7 million women are added.

According to a recent study made by the Bureau of Labor Statistics, nearly one-half of the women 18 to 64 years old who took jobs in 1963 went to work because of economic need. Of married

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[33] Jean A. Flexner and Anna-Stina Ericson, "White Collar Income and Employment," Monthly Labor Review (April, 1956), pp. 402-403.

women who stopped working in 1963, however, only a small percentage did so because they no longer needed to work.[34]

Georgina M. Smith is of the opinion after hearing hundreds of women describe their own and their families' experiences with the labor market, that one cannot help but feel that women's willingness to work has not changed much; the critical change has been in women's opportunity to work--on the demand side of the market. She reports that work is an automatic aftermath to schooling. Sooner or later, those who marry usually interrupt their work lives at least temporarily for personal reasons. But should the family purse be pinched, or illness, death or divorce strike the household, these women return to the labor market, and in the course of a few years, come to regard paid employment as a permanent aspect of their lives. Meanwhile, Mrs. Smith finds that working for money rather than for love also pays psychic dividends. The job itself captures her interest. Technical accomplishments give her a new estimation of her ability, and daily contacts with others expand her world beyond the front door. The paycheck she receives at regular intervals--in itself a universally accepted testimonial of her worth--eases home tensions, takes some of the rough edges off household economics, and makes her a giver rather than a receiver, a difference apparently important to the younger woman whom education has bred to the market.[35]

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[34]U.S. Department of Labor, Women's Bureau, Why Women Work, WB 67-6 (Washington, D.C.: GPO, 1966), pp. 1-3.

[35]Georgina M. Smith, Help Wanted - Female, Institute of Management and Labor Relations (New Brunswick, N.J.: Rutgers, The State University, 1962), pp. 54-71.

Mrs. Smith, in summarizing her study of office automation, feels that computers presage the reversal of a long-run employment trend as well as a large scale and very selective reshuffling of the labor force. The effect of the computers will probably show itself first as a flattening of the demand for unskilled office workers, she contends. What happens then will depend on the rate of growth in the economy as a whole. If the pace of general growth is not maintained, we can expect a gradual decline in clerical employment caused initially by attrition policies, but possibly reinforced later by lay-offs. She points out that as the demand for clerks levels off, the demand for technicians to run the computers is expected to rise rapidly--much more rapidly, some fear, than the supply of these people will rise. Her suggested solution is to train clerks and would-be clerks in the simpler aspects of programming and computer operation.

Mrs. Smith stresses that prerequisite structural changes already in the making affect white collar employment. The long run effect of computers on total white collar employment will depend almost exclusively on the state of the national economy. A given volume of business will need fewer technicians than clerks. Rapid expansion of business activity on the other hand, could continue to swell the total white collar employment while the change in its make-up takes place.[36]

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[36] Ibid.

CHAPTER III

FACTORS INVOLVED IN TECHNOLOGICAL CHANGE

THE NATURE OF WORK

Introduction. Chris Argyris points out that human beings are need-fulfilling, goal-achieving unities. They create various types of strategies to fulfill their needs and to achieve their goals. One of the most important strategies is to organize themselves. Work situations allow individuals to fulfill their economic needs, but the formal organizational structure, the type of leadership, and the controls affect sociological and psychological needs.[37]

The average person spends a major portion of his life in preparation for work, working, and thinking about his work. Work also provides a socialization with others, as few people work alone.

As skills are being built into the machine, industrial psychologists have turned their concern from fitting the worker to the job to preventing boredom, increasing satisfaction, and raising morale. As the problems of the relations between the individual and the job decreases in significance, it is replaced by the

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[37]Chris Argyris, Understanding Organizational Behavior (Homewood, Ill.: The Dorsey Press Inc., 1960), pp. 1-19.

problem of reconciling worker values with management values.[38]

The Hawthorne experiments showed very clearly that conditions of work cannot be treated as things in themselves. Changes of physical circumstance were not significantly responsible in themselves for variability of work behavior. Variations in work behavior could be related far more closely to variations in personal attitude toward the changes introduced. The results showed without question that workers did not respond simply as isolated individuals, but were strongly influenced by the social relations they experienced.

The research offered no evidence that repetitive and semi-repetitive tasks caused the workman to lose his interest in work and to become bored. Monotony or boredom is only one of many responses to work. Moreover, like many other expressions of dissatisfaction with work, they are a response to a total situation which includes not only the job, but also the worker with his own peculiar hopes and expectations.[39]

The experiments identified two possibilities of unbalance in the organization. One was the disparity in the rates of change possible in the technical organization, on the one hand; and the social organization on the other. These conditions were manifested

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[38]Edward Gross, Work and Society (New York: Thomas Y. Crowell Co., 1958), pp. 7-8.

[39]Roethlisberger and Dickson, op. cit., pp. 557-600.

in the workers' behavior by distrust and resistance to change. This resistance was expressed whenever changes were introduced too rapidly or without sufficient consideration of their social implications.

The results of all the experiments pointed to the need to reformulate such problems in terms of the concrete human situations in the plant. They suggested that a general management problem is that of determining the rates at which change may be introduced without disrupting the equilibrium of the social organization.[40]

Studies were conducted in nine different countries using the proposition that man's environment--as expressed in the institutional patterns they adopt or have introduced to them--shapes their experience, and through this their perceptions, attitudes and values in standardized ways. Despite the countervailing randomizing influence of traditional cultural patterns, the results of the studies showed that satisfaction with one's job is differentially experienced by those in the several standard occupational positions. From country to country there was a clear positive correlation between the over-all status of occupations and the experience of satisfaction with one's job.

This research over a wide attitudinal and experimental range led to the conclusion that perceptions, opinions, and values are systematically ordered in modern societies. The proportion of people who give a particular response increases or decreases fairly

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[40] Ibid., pp. 561-564.

regularly as we move up or down the typical status ladders of occupation, income, education and prestige. This similarity in the patterning of responses seems best explained by assuming that to a significant degree, perceptions, attitudes and values are shaped by the network of interpersonal relations in which individuals are enmeshed and particularly by rewards and punishments.[41]

Automation. The replacement of human or animal effort by machine has always been considered a worthy goal. Automation aims at entrusting machines with the execution of work. We have been able to adjust to innovation and technological progress over the years, but now, we need to find new methods of adjusting to the problems brought about by the new technology.

John Diebold, who along with Mr. D. S. Harder, of the Ford Motor Company coined the word "automation," says that we concentrate too much on what automation will do to our present way of doing things and do not give enough thought to the things automation will enable us to do for the first time. Feedback controls have made it possible to reach entirely new levels of achievement. He feels that automation should be thought of from the long range point of view--the production of more wealth with less human effort.

Mr. Diebold points out that critics of automation assume only a set number of jobs exist in our economy and ignore the fundamental fact that our needs increase continually. He feels that

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[41]Alex Inkeles, "Industrial Man: The Relation of Status to Experience, Perception, and Value," Society and Self, ed. B. H. Stoodley (New York: Free Press of Glencoe, 1962), pp. 431-475.

automation is no threat to the economy. On the contrary, by giving us enormously increased productivity it promises to invigorate the economy.[42]

The Lairds, who are psychologists, say that automation is going to loom larger in business in ways one may not have suspected. Workers will be better off in job security and satisfaction, in peace of mind and well-being, if management understands automation and helps the worker understand the following:

1. The competitor is not the automated tool; it is the person who can adapt himself to work with the newer equipment.

2. It is not a battle of machines against people, but a case of what people can accomplish with the improved tools. The machine can do little until man uses it as a tool for the purpose he has chosen.

3. Some of the workers' biological propensities may be thwarted by automation. They will be wise to manage themselves off the job, so that these deprivations do not affect their bodily well-being or zest for life.

4. Workers are going to have to live with more and more automation, they might as well learn to like it.[43]

THE WORKER AS AN INDIVIDUAL

Introduction. Norbert Wiener makes the observation that we should make more human use of human beings. He contends that we have modified our environment so radically that we must now modify ourselves in order to exist in this new environment. He says we can no longer live in the old one. Progress imposes not only new

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[42]John Diebold, "Applications and Uses," in The Challenge of Automation, Papers delivered at the National Conference on Automation. (Washington, D.C.: Public Affairs Press, 1955), pp. 12-20.

[43]Donald A. Laird and Eleanor C. Laird, How to Get Along With Automation (New York: McGraw-Hill Book Co., 1964), p. 8.

possibilities for the future but new restrictions. We must become aware of the new needs that a new environment has imposed on us, as well as the means of meeting these needs that are at our disposal.[44]

Man's culture acts as a protective cocoon, declares social psychologist D. O. Hebb. He cites research studies that have shown evidence that the development of what is called "civilization" is the progressive elimination of acute fear, disgust, and anger and that civilized man may not be less, but more, susceptible to such disturbances because of his success in protecting himself from disturbing situations so much of the time.

He feels there is evidence to show that the well-adjusted adult, therefore, is not intrinsically less subject to emotional disturbances; but rather he is well-adjusted, relatively unemotional as long as he is in his cocoon. We think of some persons as being emotionally dependent, others not; but it looks as though we are all completely dependent on the environment in a way and to a degree unsuspected.[45]

Needs of Man. A system of organization under competitive pressures of technological progress is reflected in the increased constraints on the individual. Workers perform activities usually specified by others to achieve objectives that are also defined by others.

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[44]Norbert Wiener, The Human Use of Human Beings (Garden City N.Y.: Anchor Books, 1954), p. 162.

[45]D. O. Hebb, "The Mammal and His Environment," Current Studies in Social Psychology, ed. I. D. Steiner and Morris Fishbein (New York: Holt, Rinehart, and Winston, 1965), pp. 43-50.

Psychologists recognize that needs have a certain priority. A. H. Maslow classified these needs in five categories: physiological, safety, love, esteem and self actualization. As the more basic needs are satisfied, a person seeks the higher needs. The degree to which people can fulfill the fifth need after the first four are satisfied determines how well people will like their work.[46]

Professor Herzberg feels man has two categories of needs. One set, stemming from his animal disposition, is centered on the avoidance of loss of life, hunger, pain, sexual deprivation, and on other primary drives, in addition to the infinite varieties of learned fears that are attached to these basic drives. The other segment is man's compelling urge to realize his own potentiality by continuous psychological growth.[47] These sets of needs were classified as: 1. the events that cause him pain; 2. the events that make him happy. Those who seek only to gratify the needs of their animal natures are doomed to live in dreadful anticipation of pain and suffering. It has been demonstrated that man can be happy only by seeking to satisfy both his animal need to avoid pain and his human need to grow psychologically.

Herzberg calls a person, who is primarily influenced by the nature of the environment of his job rather than by his tasks, a "hygiene seeker." He suffers from a chronic and heightened dissatisfaction with his job hygiene. Why? Because he lives by it. The

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[46]A. H. Maslow, "A Theory of Human Motivation," Psychological Review, Vol. L (1943), pp. 370-396.

[47]Herzberg, op. cit., pp. 44-91.

hygiene seeker realizes little satisfaction from accomplishment and consequently shows little interest in the kind and quality of the work he does. Hygiene factors are: company policy and administration, supervision-technical, salary, interpersonal relations, working conditions.

The "satisfier" factors were named the motivators, since other findings of the study suggest that they are effective in motivating the individual to superior performance. The motivators are: 1. achievement and recognition for achievement; 2. responsibility; 3. possibility of growth; 4. advancement.

It has been found that the lack of motivators in jobs will increase the sensitivity of employees to real or imagined bad job hygiene, and then the amount and quality of the hygiene must be improved.[48]

Conscious or unconscious needs cause certain individual tensions which stimulate behavior that will relieve those tensions. The objective of behavioral acts is to gratify these needs. It is doubtful if any or all needs are ever completely and permanently satisfied, inasmuch as man seems constantly to raise his level of aspiration as his accomplishments develop. If the person is able to satisfy his needs in a manner that is acceptable to both himself and the society of which he is a part, he is designated "adjusted." Thus behavior is a process of adjusting to certain human needs. The goal of this adjustment process is satisfaction.

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[48] Ibid., pp. 70-170.

Some needs cannot be satisfied in any manner by the individual; his tensions are not relieved; and the result is termed "frustration." Frustration is often recognized by certain types of behavior such as agression, regression, fixation, and resignation.[49]

Others define the reactions to frustration as: 1. repression--some repress it for a long time and then suddenly blow up without notice or repress to less mature behavior; 2. resignation; 3. scapegoating; 4. sublimation.[50]

There are ways in which an organization can enhance the psychological strength of the people within it. Arthur Shostak and William Gomberg report that when a psychological contract was being fulfilled, the five kinds of behavior indicative of good mental health tended to appear. A number of psychiatrists and psychoanalysts on the staff of the Menninger Foundation were asked to describe the behavior of people they had known whom they considered to be mentally healthy. Interestingly enough their answers were similar to those given by undergraduate students at Wayne State University when asked the same question. These are the behavior characteristics described:

1. They had a wide variety of sources of gratification, satisfaction, or psychological reward.
2. They were flexible under stress.
3. They treated others as individuals.

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[49]Flippo, op. cit., pp. 409-410.

[50]George Strauss and Leonard R. Sayles, Personnel - The Human Problems of Management (New York: Prentice-Hall, 1960), p. 60.

4. They recognized, understood, and accepted their own capacities and limitations.

5. They were active and productive.

Reciprocation was defined by Shostak and Gomberg as filling the psychological contract for both parties. When reciprocation was not operating well, other kinds of behavior occurred more frequently: 1. outright hostility; 2. sabotage of the organization; 3. accidents; 4. rejection of relationships with other people in the organization; 5. running away from the job as quickly as possible; 6. destruction of social groups on the job; 7. physical symptoms.

Mental health research reported by Shostak and Gomberg indicates that the wider the range of gratifications, the more adequate are the resources available to the individual in maintaining his mental health. Studies cited point dramatically to the value of more attention to the psychological dimension of all work.[51]

People's reports of their satisfaction with their jobs are, in fact, directly related to the extent to which their jobs provide them with such rewarding outcomes as pay, variety in stimulation, consideration from their superior, a high probability of promotion, close interaction with co-workers, an opportunity to influence decisions which have future effects on them, and control over their pace of work. Individual differences in motives also have effects. Maslow called the motivation of people to utilize their abilities a self-actualization need.[52]

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[51]Arthur Shostak and William Gomberg, Blue Collar World (Englewood Cliffs, N.J.: Prentice-Hall, 1964) pp. 398-400.

[52]Victor H. Vroom, Work and Motivation (New York: John Wiley & Sons, Inc., 1964), pp. 99-175.

Adjustment operationally indicates the general ability of the individual to live in a tolerable association with his society. It should be regarded as a state often leading to a productive or creative social-self relationship.[53]

Supervision. Herzberg and others feel that to do an effective job, the supervisor must take as one of his goals the needs, attitudes, and desires of his employees. Production may be the ultimate goal of both supervisory practices and management policies, but there is considerable evidence that the action which leads to this goal may be better achieved by stressing production only in ways which are both meaningful and acceptable to the employee, and by indicating that the employee's own goals are of real importance to the company.

In reported studies one of the most frequently mentioned suggestions of employees is the need for improved communication. Also it is pointed out that the greater the supervisor's sensitivity to employee attitudes, the higher the productivity of his work group, and the more favorable the employee attitude toward him. It is particularly interesting to note that if a supervisor is sensitive to employee attitudes about one area of the job, he is likely to be sensitive to employee attitudes toward other areas.

The evidence is strong that both the attitudes and the effectiveness of employees are a direct factor of the quality of supervision.[54]

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[53]Stoodley, "Social Aspects of Self Structure," op. cit., p. 403.

[54]Herzberg et al., op. cit., pp. 167-199.

Researchers at the University of Michigan's Institute for Social Research found a pattern of results in their studies of effective supervisors. Likert calls it the principle of supportive relationships: "The leadership and other processes of the organization must be such as to ensure a maximum probability that in all interactions and all relationships within the organization each member will, in the light of his background, values, and expectations, view the experience as supportive and one which builds and maintains his sense of personal worth and importance." That is, supervisors must help their subordinates achieve satisfaction for their ego and recognize other motives in addition to the economic ones.[55]

A group of social scientists at The Ohio State University analyzed questionnaires collected from a large number of persons, supervisors and subordinates, in a variety of organizations and discovered two distinct factors of leadership. The first dimension is called initiating structure. A leader high in this dimension "organizes and defines the relationship between himself and the members of his crew. He tends to define the role which he expects each member of the crew to assume, and endeavors to establish well-defined patterns of organization, channels of communication, and ways of getting jobs done."

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[55]Rensis Likert, New Patterns in Management (New York: McGraw-Hill Book Co., Inc., 1961), p. 103.

The second dimension is called consideration. It is "associated with behavior indicative of friendship, mutual trust, respect, and warmth in the relations between the supervisor and his crew." This does not imply that the supervisor is lax.[56]

CHANGE

Characteristics. The Menninger Foundation through its Industrial Mental Health program conducted a study in a utility company for a year to determine the problem of relationships between work and mental health. The purpose was to understand some of the effects of work experience on mental health.

From their findings the Menninger research team concluded that only those changes which are interpreted as violations of the psychological contract result in anger, withdrawal, hostility and similar reflections of distress.

The fact that some changes in the psychological contract do arise out of the changing expectancies of both parties does not of itself constitute a violation of the psychological contract. Violation occurs when the changing expectancies of one party are imposed on and threaten the state of interdependence and balance in psychological distance achieved by the other.

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[56]A. Halpin and B. Winer, "A Factorial Study of the Leader Behavior Descriptions," Leader Behavior: Its Description and Measurement, ed. Ralph Stogdill and Alvin Coons (Columbus, Ohio: Bureau of Business Research, The Ohio State University, 1957), pp. 42-43.

Whether any given change was important to a person and how he reacted to this change was significantly related to the perspectives of the work situation, work life involving other people and other groups and the task. The reciprocal process involves all of the various aspects of work life. In addition to reciprocation, an important characteristic of the three central concerns was the expectations which people held about them.

The study led to the conclusion, upon examining change experiences, that only those changes which are interpreted as violations of the psychological contract result in anger, withdrawal, hostility, and similar reflections of distress.

If change is not imposed, if it involves no loss of interdependence or psychological distance, or if it is not accompanied by increasing demand, then it appears not to be interpreted as a contractual violation. The partnership remains equally acceptable to both parties. If interdependence and balanced distance can be maintained in the face of change, then the person has greater flexibility for coping with the stress of the increasing demands. Flexibility under stress means essentially the capacity to find adequate substitutes for that which has been lost or to make extraordinary efforts to meet demands.[57]

Regardless of who may institute the change, the employee affected is compelled to react in some manner to specific changes

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[57]Harry Levinson, Charlton R. Price, Kenneth J. Munden, Harold J. Mandl, and Charles M. Solley, Men, Management and Mental Health (Cambridge: Harvard University Press, 1963), pp. 81-105.

proposed. Roethlisberger indicated that the employee's response is a function of both his background, including his needs and experiences, and the particular situation in which the change is introduced. He felt that the employer may view the change logically and feel that any resistance is irrational, but he will never understand or be able to predict change responses unless something is known about the employee and his past experiences.[58]

Equilibrium. Flippo suggests that all organizations that have existed for any length of time have attained a position of equilibrium and balance. Interests have been integrated to a degree and relationships have been established, labeled, and routinized. There is a certain amount of security in the status quo. It is familiar, and we have made our adjustments to our physical and social environments. Change disturbs this temporary state of organization equilibrium. Management must recognize the fact that change per se is disruptive and that people in general tend to resist all changes, good or bad.[59]

Resistance to Change. Of all the types of resistance to change perhaps the one most commonly recognized is the resistance of many employees to technological change.

Strauss and Sayles state that change may show itself in unexpected ways--for instance in aggression, regression, and in other

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[58]R. J. Roethlisberger, Management and Morale (Cambridge: Harvard University Press, 1946), p. 21.

[59]Flippo, op. cit., p. 495.

negative reactions. One clear sign of resistance is a series of apparently emotional or irrational objections to minor changes; these often indicate that more deep-seated problems are involved.

People resist change even when it is in their own interest. They have vested interest in the old ways; they fear the uncertainties of the new. They give strange meanings to change, and dislike having traditional customs, status, and symbols violated. People seldom resist change just to be stubborn; they resist it because it hurts them--economically, psychologically, or socially.

The most obvious reason for resistance to change is economic, Strauss and Sayles feel. Workers fear they will lose their jobs. A craftsman may fear that new developments will reduce the economic value of his skills. In addition, learning new ways requires the expenditure of energy, and human beings are generally lazy. Even for the simplest job there are tricks of the trade that take time to learn. When a person is thrown into a new situation his tricks no longer apply and he loses the security of the familiar. The new way is always strange, threatening, and laden with uncertainties--even if it is an improvement over the old.

Over a period of time, assuming an employee is not anxious to quit his present job, he has probably developed a good fit between his personality needs and the requirements of the job. Changing work procedures and systems and introducing new equipment upsets these convenient, pleasant job patterns. The sequence of work may be so drastically changed that the man who was formerly isolated must now work with a high-pressure colleague, and the

leader is left with no one to lead.

A symbol cannot be eliminated without threatening in people's minds the things of which it stands. Small changes may symbolize big ones, particularly when employees are uncertain about how extensive the program of change will be. A symbol represents a whole framework of treasured relationships and values; subordinates unite to protect it against attack just as if what it represented were actually in danger. Every supervisor develops patterns of informal relations with his subordinates. Every new supervisor requires a long period of initiation before he is accepted by his subordinates.[60]

Effect on the Group. Anything that disrupts the customary social relationships and standards of groups is disrupting. Changes may threaten a worker's opportunity to provide leadership. It may mean that the worker who could use his own initiative to schedule his work is now dependent upon others in the group.[61]

Ralph Stogdill cites research results to support his opinion that job satisfaction is a multi-dimensional variable, which includes group integration.

In summarizing results of a number of studies concerning change, Stogdill concludes that evidence indicates that various kinds of groups adapt different methods for reducing their tensions and maintaining their integrity. Groups that are highly structured and

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[60] Strauss and Sayles, op. cit., pp. 264-285.

[61] Ibid., p. 270.

integrated tend to exert pressures on the deviate in an effort to bring him into the group. If this effort does not succeed, the deviate is isolated or rejected, thus preserving the integrity of the system.

He concludes that the identity of individual and group goals, member conformity to group norms, a feeling of mutual acceptance, mutual liking among the members, satisfaction of member expectations, member support of the group leadership, and sub-group support of group goals are all measures of various aspects of group integration. He says group integration is found to involve formal and operative structures, communication structures, role structures, group purpose and norms, subgroup purpose and norms, and individual goals and expectations. Group integration is high when structure, functional operativeness, and communications are maintained, and when all members and subgroups are working in coordination to support the group and its purpose.[62]

Herzberg and his colleagues presented evidence that groups can act as a vehicle for resistance to change, or as a means of helping the individual to accept change. Workers often resist change when communication is a one-way street with orders coming to workers and there is no possibility for participation in decision making on their part.

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[62]Ralph M. Stogdill, Individual Behavior and Group Achievement (New York: Oxford University Press, 1959), pp. 254-255.

Workers who are liked by their fellow group members are reported to be highly productive, show relatively little psychosomatic illness, and a low accident rate, reports Herzberg. It is possible for an individual worker to think of himself as belonging to more than one group, and to feel allegiance to more than one group at a time. There is some evidence that the group which involves him most in the process of decision making will be the one which claims his highest loyalty.[63]

Participation. Keith Davis defines participation as mental and emotional involvement of a person in a group situation which encourages him to contribute to group goals and share responsibility in them. He points out that employee participation is an important part of human relations because of the enormous potential which it offers for higher productivity, improved satisfaction, and creative thinking.

The benefits of participation have been recognized for years by managers. The research studies which first experimentally suggested the relationship of physical changes in environment and the workers were the classic studies in industry by Roethlisberger, Bavelas, and Coch and French. These are mentioned in more detail on page 58 of this paper. These experiments and others suggest that especially at the introduction of changes, participation tends to improve adjustment, output, and general job satisfaction.[64] Delbert

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[63] Herzberg, et al., op. cit., pp. 123-151.

[64] Keith Davis, Human Relations At Work (New York: McGraw-Hill Book Co., 1962), p. 426.

C. Miller says that it has been demonstrated by industrial sociology research that changes in social organizations are more rapidly accepted when the persons involved have an opportunity to participate in decisions that affect them.[65] Chris Argyris points out that where there is employee participation, there is a greater tendency for the employees to identify with the firm. This identification tends to develop commitment to the organization. This not only reduces overt acts against the firm, but also apathy and alienation.[66]

Rensis Likert has developed a continuum of possibilities for acquainting employees with change depending upon the workers themselves, the work, the environment, and the nature of the change itself. He suggests as a possibility for greater acceptance of change that the employees be notified of a proposed change in advance and an opportunity offered for them to express reactions and suggestions on the proposed change if they desire to do so.[67]

Herzberg and others present evidence that if groups of workers discuss the necessity for change, and develop the changes through group decision, change is often very easily accepted. They feel that workers often resist change if there is no possibility for participation in decision making on their part.[68]

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[65]Delbert C. Miller, "How Behavioral Scientists Can Help Business," Readings in Organization and Management (New York: Holt, Rinehart and Winston, 1963), p. 438.

[66]Chris Argyris, "Organizational Leadership and Participation," Journal of Business, Vol. XXVII, No. 1, January 1955, p. 1.

[67]Likert, op. cit., p. 244.

[68]Herzberg et al., op. cit., pp. 150-151.

Meaning of Change. Kornhauser suggests that the effect of all the conditions and changes depends on the meanings that they have for the persons concerned, and those meanings depend on the varied structures of needs, attitudes, and beliefs of the persons.

He feels that a person thinks and acts positively toward those things which fit in with, or enhance, his self-esteem and feeling of personal security; he reacts negatively toward those that conflict with, or lower his self-feelings. Repression reduces the anxiety and tension resulting from conflicting desires, but these unconscious motives continue to press for gratification and in doing so produce further effects upon behavior. An understanding of the devious processes people employ in resolving inner conflicts is important for an understanding of industrial conflict, since the behavior of people in industry is always partially determined by their personal patterns of self-defense.[69]

Newman and Summer point out that we often have difficulty with new ideas simply because of the way we perceive things. Transferring habits is one cause of perceptual blocks. The transfer of past habits to new situations may block out the fresh perception of possible alternative courses of action. An additional source of difficulty is that we too readily approach a problem as an "either-or" dilemma and examine only two courses of action.[70]

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[69]Kornhauser, op. cit., pp. 63-74.

[70]William H. Newman and Charles E. Summer, Jr., The Process of Management: Concepts, Behavior, and Practice (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962), pp. 288-289.

In analyzing a company situation discussed in Charles R. Walker's book, Toward the Automatic Factory: A Case Study of Men and Machines, William Foote Whyte observes that there is a tendency for workers to become accustomed to the favorable aspects of working conditions and come to take them for granted. The unfavorable aspects do not seem to be so readily taken for granted and may in fact increase in their impact over time. Such unfavorable aspects may come to symbolize worker-management relations. They apply this to technological change. Management might well argue that technological change, in the long run, raises the standard of living of workers and provides new and better jobs as fast as it eliminates the old one; the workers judge primarily from their immediate environment, and perceive a change as a permanent threat.[71]

Robert Dubin suggests that most people can and will adjust even to those tightly regimented work situations which Argyris contends would demand immature personalities. Dubin sees the individual as "caught up in necessary behaviors that are organizationally relevant, and imperative, but normatively neutral in their consequences for the individual. Voluntary behavior implies some choice among alternatives on either rational or affective grounds. Necessary behavior, on the other hand, implies no such choices." Thus, necessary behavior is regarded by subordinates neither with repugnance nor enthusiasm, but rather indifference. Dubin accepts indifference as a normal characteristic of many employees. It would

[71] William Foote Whyte, Men at Work (Homewood, Ill.: The Dorsey Press, Inc., 1961), pp. 230-231.

be very difficult, if not impossible, for everyone to sustain high interest in every activity, everyday. The individual has many opportunities to achieve self-actualization off the job, particularly with the shorter and shorter work days and weeks. He concludes that no serious damage will be done to human personalities by scientific managers for man is basically a flexible and adaptable creature.[72]

David Jenkins raises the question that perhaps the first step in making a change might be to determine what forces, if any, must be dealt with. He feels a neglected aspect of a change situation is the tendency to rest on our oars and feel the job has been completed. Later upon examination, we may be surprised to find that the old situation has gradually returned, and the changes need to be made all over again. He contends that whenever change is planned we must make sure that the new condition will be stable. We need to develop in our analysis as clear a picture as possible of the forces which will exist when the new condition is achieved.[73]

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[72]Robert Dubin, Human Relations in Administration (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1961), pp. 60-61.

[73]David H. Jenkins, "Force Field Analysis Applied to a School Situation," The Planning of Change, ed. Warren G. Bennis, Kenneth D. Benne, and Robert Chin (New York: Holt, Rinehart & Winston, 1961), pp. 242-243.

CHAPTER IV

APPROACHES TO THE NEW TECHNOLOGY

INTRODUCTION

An Over-View. Keith Davis points out that no matter how much machinery and equipment a firm has, these things cannot be put to use until they are released and guided by people who have been motivated. It is assumed that all human behavior is caused. The causes influence the individual to act in a way to try to satisfy his needs as he sees them. He behaves according to the way that he sees his needs can be best satisfied. His behavior is goal-directed. Needs generally have a priority among people in the following order: physiological needs, safety and security, affection and social activity, esteem and self-realization. Management, therefore, has but two ways to motivate a person. It can get him to see that a desired action will increase his need satisfaction, or it can convince him that he must follow a couse of action to avoid a decreased need satisfaction.[74]

Dr. Thomas Stelson, the head of the Civil Engineering Department at Carnegie Tech, is quoted as stating that with modern technology advancing so rapidly, the indications are that the experienced

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[74]Davis, op. cit., pp. 16-33.

man may have to devote about a third of his time to self-education.[75]

Stephen Cotgrove confirmed in a study that the work situation is a significant variable for the sociological analysis of occupations. Furthermore, the study suggests that the worker's involvement in the work situation depends not only on internal factors such as the nature of the work task and of supervision, but also on the needs and expectations which he brings with him; that is, derived experiences external to the work situation, such as education.[76]

The success with which an Electronic Data Processing change is implemented, contends Charles Myers, will certainly depend on how it is introduced and whether it is seen by the members of the group affected as a source of help or as a threat. The organization must adapt to and cope with this element of change. It must provide ways to help employees adapt.[77]

RETRAINING

Introduction. Strauss and Sayles feel that the satisfaction an employee derives from his work experience depends on his knowing what to do and how to do it. The success of any training program is a direct function of the success of other aspects of the personnel

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[75]Donald W. Devine, "Retraining: Background, Actions, and Prospects," The Personnel Job in a Changing World, ed. Jerome W. Blood, (New York: American Management Association, 1964), pp. 69-79.

[76]Stephen Cotgrove, "The Relations Between Work and Non-Work Among Technicians," Sociological Review, Vol. XIII, No. 2, (July, 1965), pp. 121-130.

[77]Charles A. Myers, "Behavioral Sciences for Personnel Managers," Harvard Business Review, Vol. XLIV, No. 4, (July-August, 1966), p. 160.

program. Where employees are already highly motivated and closely identified with the goals of the organization, well conceived training programs will lead to better performance.

An individual's method of doing a job, the skills he employs, the energy and thought he applies, the checking and coordinating he does with other people--all are a reflection of his personality and the needs he has brought to the work situation. The supervisor must assume that the employee's old pattern of behavior brought certain satisfactions, else he would have abandoned it. Since a change in work methods will be a threat to these satisfactions, the employee will resist new learning.[78]

Characteristics. Once a decision has been made to retrain manpower, effectively designed programs must be developed, Frank Leamer stresses. Past experience reveals that those associated with this phase of retraining have not given proper attention to the fundamental considerations required to meet the needs of adult learners. He feels there is much yet that needs to be known about retraining successes and failures. As we continue to become more enlightned about these matters, our efforts will become less compromised. Research in the area of retraining offers us a propitious opportunity to examine some fundamental assumptions on which we operate in relationship with our fellowmen. If we use the opportunity wisely and treat new facts with a sense of objectivity, we will have

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[78]Strauss and Sayles, op. cit., pp. 490-505.

accomplished an important mission.[79]

Strauss and Sayles point out the importance of the employees' understanding and being able to do the job. The employee who lacks confidence in his ability to perform successfully can never do his job well, no matter how vigorously management pursues the other aspects of its personnel program.[80]

The Job. Psychologists have investigated the redesign of jobs to take account of the social and psychological implications of technology. Job rotation is one approach. Workers learn several jobs, thus adding variety to their work. Job enlargement is a second approach. This broadens the scope of the job. This implies greater variety, allows more flexibility, requires increased skill--and it is likely to be more meaningful to most workers. Psychologists at the Tavistock Institute in London have placed special emphasis on the sociotechnical implications of job design. These researchers propose that the most productive and satisfying work systems are those that combine social and technological considerations. The reconstituted jobs are assigned to groups, not to individuals. The work group should have reasonable autonomy and responsibility as groups for the total task. This matching of social and technological aspects of the work situation yields optimum results for the organization and its members.[81]

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[79]Frank D. Leamer, "Key Factors in Motivating Professionals," The Personnel Job In A Changing World, ed. Jerome W. Blood, (New York: American Management Association, 1964), p. 149.

[80]Strauss and Sayles, op. cit., p. 506.

[81]Arnold S. Tannenbaum, Social Psychology of the Work Organization (Belmont, Calif.: Wadsworth Publishing Co. Inc., 1966) pp. 106-107.

EDUCATION

Introduction. Paul Armer writes that computers are accelerating the pace of technological change. People who find it difficult to adapt to change will find life less easy. As the tempo of change increases, men must adopt the view that education is a continuous process throughout life. Computers are likely to make the educational system much more efficient and tailored to the individual. If this does occur, it may well be the greatest achievement of the twentieth century.[82]

Automation. E. B. Speer of U. S. Steel says that the only predictable fact in all economics is the fact of change. In the face of this permanence of change no man can remain stationary. No man can expect that his environment will never be transformed or that conditions around him will remain as they are forever. Thus, man must adapt himself to a changing world. He must progress, and grow with growth, and do it intelligently and gracefully.

He says that if we can be sure of one thing, it is this: today's skills will not hold tomorrow's jobs. The world does not owe us a living; in fact, the world cannot afford to owe us a living even if it wanted to do so. Only we ourselves can provide that living.

He feels we must, therefore, recognize that each of us has an obligation, as a matter of personal security and national security, not merely to acquire a competence, but to develop more than one

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[82]Paul Armer, The New York Times (April 24, 1966).

competence and to strive for excellence in each of them so that we may thus enjoy the satisfying human need to be useful and productive.

He feels that education will play a leading role in preparing us for the years ahead. That is why the U.S. Steel Company has offered several training and study programs for their employees. They feel it will provide the best (and perhaps the only) enduring solution to the problem of developing the new skills necessary to meet the job opportunities opening up on all sides.[83]

Chester C. Behrens, Vice President of the Ohio Bell Telephone Company, says that technological knowledge is doubling every eight to ten years. This requires retraining technical people two or three times in their careers. His company has recognized this and has established updating courses for employees, particularly in the engineering and technical fields. Several hundred Ohio Bell engineers have already completed courses in advanced communications technology in several universities. There is evidence that society as a whole will continue to feel the need for more training and more education as technological changes progress. Mr. Behrens quotes Dr. Michelon, an economist with Republic Steel Corporation, as saying that today's labor force is obsolete. He says that new job openings are hard to fill because today's workers do not have the necessary skill or education.

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[83]E. B. Speer, "Automation: Its Significance and Effect at the Plant Level," Paper prepared for the Conference on Automation, 1963-1964, Interdepartmental Seminar, College of Commerce and Administration, Columbus, Ohio: The Ohio State University, February 21, 1964, p. 30.

Mr. Behrens points out that education underlies research. Research and innovation produce progress through change. Training in the schools and on the job must provide the required skills for the worker, the technician and the manager. It must provide the greater part of the solution to unemployment and to adaptation to change. It must find or help find constructive uses for the greater leisure ahead. Education and training will continue to be a real growth situation. Here society is investing in its most important capital asset: an educated, competent, mobile citizenry.[84]

THE BEHAVIORAL SCIENCES

Introduction. William Foote Whyte's prime concern has been applying research to the organization. He feels problems have been encountered in the past because of the failure to determine the proper process for applying behavioral data to business environment. He feels it is erroneous to believe that data is applicable once the basic research is completed. He stresses that continual research and development are necessary in the application process.[85]

Douglas McGregor suggests that we are in a period when the development of theory within the social sciences will permit innovations which were thought inconceivable. Among the dramatic changes in the organization will be the realization that the capabilities of

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[84]Chester C. Behrens, "Automation: Its Significance and Effect at the Managerial Level," Paper prepared for the Conference on Automation, 1963-1964, Interdepartmental Seminar, College of Commerce and Administration, Columbus, Ohio: The Ohio State University, February 21, 1964, pp. 40-44.

[85]Whyte, op. cit., p. 527.

the average human being for creativity, for growth, for collaboration, for productivity are far greater than has yet been recognized.[86]

Robert Dubin refers to many available behavioral studies of workers and industrial organizations to support his view that systematically observed behavior can be used to augment management decisions.[87]

Application. Whyte feels that a systems approach to organizations involves a state of mutual dependence among the elements of the social system. There is now a mutual dependence between the environment and the social system. The social, economical, and technological environment is interrelated. Conflict or harmony on any one level can affect the whole organization. He stresses that the effective manager does not see human relations in a vacuum. He recognizes that the technology, work flow, and organization structure tend to channel relations in certain ways. Whyte feels the organization should utilize research whenever possible to organize environmental forces, symbols, and the interacting activities of the organization, then the sentiments will take care of themselves.[88]

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[86] Douglas McGregor, The Human Side of Enterprise (New York: McGraw-Hill, 1960), p. 47.

[87] Robert Dubin, "Supervision and Productivity," Leadership and Productivity, ed. Robert Dubin et al. (San Francisco: Chandler Publishing Co., 1965), pp. 1-46.

[88] Whyte, op. cit., pp. 570-578.

Douglas McGregor contends that we must learn how to utilize the social sciences to make our human organizations truly effective. It is impossible to tell management how to apply this knowledge in simple, economic ways, because it will take years of continuous exploration, much costly developmental research and a substantial amount of creative imagination on the part of management to discover how to apply this growing knowledge to the organization of human effort in industry.[89]

McGregor feels we can, if we choose, greatly accelerate the increasing rate of our ability to influence, control and change human behavior. We have been bound within narrow limits of action by a grossly oversimplified view of the causes of human behavior. He brings out the fact that although the behavioral sciences are still in an early stage of development, the body of existing knowledge is considerably larger than most realize--and it is having only a limited influence on practice. The reasons for this limited influence are varied. One is that man's image of himself, his anxieties over being manipulated, his very identity, are threatened whenever the values of his centrality, his superiority, his uniqueness in nature are held in question.

McGregor contends that another problem faced when man attempts to use the knowledge gained from behavioral science is the frequently expressed criticism that much of this knowledge is unrealistic and

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[89]McGregor, op. cit., pp. 1-5.

impractical. This is a way of saying that it is not consistent with every-day experience and observation. The manager who has developed a workable strategy of control is somewhat disbelieving when it is suggested that a very different strategy, based on assumptions that are inconsistent with his experience would work better. Valid and reliable data of results of behavioral science studies have been flatly rejected, the experiments terminated and behavioral science branded as useless and outright dangerous when considered to be threatening to management.

The manager, McGregor believes, must abandon certain firmly held habits and beliefs--for example, that his power consists solely in the direct application of force to human objects. He stresses that if the slow rate of change of behavioral science is to be accelerated, ways must be found: 1. to gain acceptance of the idea that at least large areas of human behavior are fundamentally subject to discoverable law; 2. to help managers shift from Aristotelian concepts of cause and effect to the systems concept characteristic of science; 3. to obtain acceptance of the fact that reality in human behavior is not always as it appears to direct observation and experience; 4. to persuade managers to face the complexity of the phenomena of human behavior in organized settings and, as a result, to modify the grossly oversimplified order that they have imposed on the world. Additionally, managers must realize that attempting to choose among "firm," "soft" and "firm-but-fair" modes of management is futile. They are not separate strategies, but

tactics within a single strategy--the manipulation of extrinsic rewards and punishment in order to control behavior.[90]

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[90]Douglas McGregor, "Why Not Exploit Behavioral Science?", Leadership and Motivation: Essays of Douglas McGregor, ed. Warren G. Bennis, Edgar H. Schein with collaboration of Caroline McGregor (Cambridge, Mass.: The Massachusetts Institute of Technology Press, 1966), pp. 239-277.

CHAPTER V

BEHAVIORAL RESEARCH RELEVANT TO THE NEW TECHNOLOGY

PARTICIPATION

Bavelas. Bavelas worked with a group of women on a sewing operation which was performed on a group incentive basis. He chose a superior group and allowed them to set their own production goal. They agreed upon a goal, but exceeded it within five days. Another meeting was held and a new goal was set. This new goal could not be met, so in a few days the girls reduced the goal. During the next several months this group's production averaged about seventeen per cent over the amount produced before the participation discussion began.[91]

Coch and French. One of the most effective techniques of reducing resistance to change is to permit the affected individuals to share in the making of decisions. A classic study in this area involved a pajama factory that was subject to constant changes in style and production methods. The workers met the changes with great opposition. This was shown by transference from one job to another and active resistance; the type of opposition depended on the degree

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[91]Norman R. F. Maier, Psychology in Industry (Boston: Houghton Mifflin Co., 1946), pp. 264-266.

of internal cohesion in the group whose work was changed. Cohesive groups restricted output and engaged in aggressive acts against management. Members of noncohesive groups quit the job. The causes of the resistance were frustration over loss of status, difficulty in learning new methods, and fear of never regaining the former rate of speed.

An experiment was set up involving four groups: a control group following standard routines, a partial participation group, and two total participation groups. Production dropped substantially in the control, and there were marked expressions of aggression against management. There were 17 per cent quits in the first forty days. The experimental groups cooperated very well, and achieved a very rapid re-learning curve. Soon production was 40 per cent higher than the control group. There was no turnover at all in the experimental groups.

Several other experiments have pointed to the same conclusion, i.e., group decision making is an effective method of reducing resistance to change in some circumstances.[92]

GROUP COHESION

The Longwall Method of Coal Mining. E. L. Trist and K. W. Banforth, a research team from the Tavistock Institute of Human Relations conducted an investigation in the British coal industry. The

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[92]Lester Coch and John R. P. French, "Overcoming Resistance to Change," Human Relations, Vol. IV, No. 1 (January, 1948), pp. 512-532.

British coal industry was troubled by technical obsolence of some of its mining methods. In many mines, coal was extracted by pairs of miners who shared between them all the necessary tasks. The men had usually chosen each other as work partners and were closely tied by their sharing of a dangerous and difficult job. With this system, each worker could carry out all the tasks. The system was costly and inefficient. It was dangerous, and could not be easily mechanized.

With the introduction of mining machinery and mechanical conveyors, it became possible to work large areas of a mine (long rather than short) simultaneously by means of separation of tasks and specialization. The two-man groups were replaced by large gangs of men working in rotation with each group carrying out only one task. This change should have produced an appreciable increase in output. However, it did not. Coal production rose hardly at all; absenteeism increased markedly; the amount of psychosomatic illness among the workers was much greater than before, the level of tension in the mining group was disturbingly high.

Some of the reasons for this failure were investigated by Trist and Banforth. Their survey consisted of comprehensive interviews as well as systematic observation of the operations of the mine. They found that the failure of the longwall system could be traced to the social tensions produced by the shift from two-man autonomous groups to large 40 or 50 man groups. The separation of the various functions previously carried out by the two-man team had

two results. First, the men lost their sense of identification with the job. They were no longer close enough to the whole task of coal mining to care how much coal was extracted. Second, rivalries which sprang up between the large teams interfered with the coordination of the various stages of the job, a coordination which had been easily achieved by the members of the old two-man team. It was unfortunate that one task which was crucial to the smooth operation of the mine was exceptionally dirty and regarded as "bad work." The group which was assigned to this task had low social status as a result, and responded to this by slowing down the whole mine's operations.

Miners who had previously had high morale in the face of the hazardous conditions of the mine now found themselves without the support of the closely knit social group within which they had worked. Trist and Banforth's reports of observations and interviews are convincing evidence that a real drop in job satisfaction had taken place. A consequence beyond the increase in absenteeism and turnover suggests the importance of membership in a cohesive group.[93]

JOB SATISFACTION

Nancy C. Morse. Approximately 742 employees doing clerical work in a large factory were used in a research project by Nancy C. Morse. Three aspects of employee satisfaction were investigated:

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[93] E. L. Trist and K. W. Banforth, "Some Social Psychological Consequences of the Long-wall Method of Coal-Getting," Human Relations, Vol. IV, (March, 1951), pp. 3-38.

intrinsic job satisfaction, financial and job status satisfaction, and company involvement. The results indicated that: 1. When employees are satisfied with the content of their work, their pay and job status and with the company organization as a place to work, they also have a more favorable opinion of their supervisors, they are better disposed toward many of the specific policies of the company and less likely to express a desire to leave the organization. 2. The degree of satisfaction which an individual derives from the content of the job depends primarily upon the skill level of the job. Needs vary and some will be satisfied with less skilled work. 3. The degree of satisfaction which the individual obtains from his pay and job status depends upon the extent to which his pay and job status level at a particular stage of his life cycle meets his aspirations. The desire for pay and job status appears to depend on a variety of factors. 4. Satisfaction with the organization as a place to work appeared, to a large extent, to be a function of both satisfaction with job content and satisfaction with pay and job status. 5. The differences in satisfaction between employees and supervisors appear to be partly due to the differences in their needs and partly to differences in their specific environments.[94]

RETRAINING

The Armour Experience. The Armour Meat-Packing Company, shortly after announcing the impending shut-down of six plants, set

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[94]Nancy C. Morse, Satisfactions in the White-Collar Job (Ann Arbor, Mich.: University of Michigan, 1953), pp. 4-5.

up a tri-partite committee to study the problems resulting from the company's modernization program and to make recommendations for their solution. A number of studies were made. After all of these studies were underway, Armour announced the unforseen closing of its Oklahoma City Plant, much to the shock of both the 400 employees and the local plant management. The Committee then hastily improvised attempts to assist workers in Oklahoma City whose jobs had disappeared. Dean Edwin Young, of the University of Wisconsin, reached a number of conclusions as a result of the experience. These were: 1. Careful advance planning and contact with other employers will benefit displaced employees more than a sudden "crash" program. 2. No amount of contact or promotion is likely to produce any significant number of jobs in a period when unemployment is steadily rising. 3. Public employment services are, in their present status, relatively ineffective in helping employees find jobs. 4. Retraining on a "crash" basis is likely to benefit only a minority of employees in a situation involving middle-aged individuals who have limited formal education to start with. 5. A carefully planned, continuing education program promoted and supported by both the company and the union would help employees develop abilities and skills which would improve their positions in the labor market in a time of crisis.

He felt a basic skill, with a chance to keep up to date either by work experience or occasional classes, may provide "job insurance." A carefully conceived plan of pretermination counselling carried on by a trained and experienced person familiar with

severance pay would have done much for morale and general welfare of the displaced workers.[95]

AUTOMATION

Einar Hardin. The installation of an IBM 650 electronic data-processing machine in a medium sized insurance company caused substantial changes in work methods and assignment in the statistical and automobile underwriting departments, but caused very few changes in the rest of the home office. Affected and unaffected departments were compared after installation had been completed with respect to responses given by non-supervisory employees to survey questions concerning perceived computer impact on their jobs, perceived net change in a series of job aspects, feelings about computer import, and about net change, and over all and specific job satisfaction. Affected departments reported more computer impact on the job as a whole and on specific job aspects. Employees in affected and unaffected departments also did not differ in feelings about perceived computer impact or about net change in job aspects. Affected departments tended to show more dissatisfaction with their jobs after the installation, but the differences were small.

The findings support the notion that the major technological change which computer automation is taken to represent causes changes in some job aspects regarded as relevant to employee satisfaction, but by and large, they do not support the hypothesis that these individual changes constitute either an acceleration or a reversal of general trends. The interpretation suggested by the data is that

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[95]Edwin Young, "The Armour Experience: A Case Study in Plant Shutdown," Adjusting to Technological Changes, ed. G. Somers, E. Cushman, and Nat Weinberg (New York: Harper & Row, 1963), pp. 144-158.

the form of automation studied here, revolutionary though it may be technologically, causes change in work environment and job satisfaction very similar to those which occur normally and without computer automation.[96]

Otis Lipstreu. The author of this study lived under change conditions with some six hundred employees for two years, one year prior to automated change and one year after. He was convinced that automation anxiety did not receive as much top management interest and concern as it warrants. The subject company, a producer of baked goods, physically transported almost seven hundred plant employees about five miles from a crowded, obsolete plant in a congested downtown area to a landscaped, air conditioned, highly automated plant in a suburban setting. In general how did these fortunate personnel feel about the change? Negative and anxious are the words which describe their attitude. Every index examined prior to the change indicated an extremely favorable reservoir of goodwill that had been built up over fifty years under the same top management, but it was almost completely exhausted in a matter of weeks.

The subject company followed a "textbook" approach to the organization and management of change. Officials prepared and displayed mock-ups of the new facilities, supervisors were briefed frequently--orally, and in groups--by higher management. In turn they passed on pertinent information to their employees. Movies of the

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[96]Einar Hardin, "Computer Automation, Work Environment, and Employee Satisfaction: A Case Study," Industrial and Labor Relations Review, Vol. XIII, No. 4, (July, I960), pp. 559-567.

new processes were shown. Conducted employee trips were made to the new plant while it was under construction. Floor plans and still pictures of layout and equipment were circulated widely. The president of the company personally wrote an intermittent newsletter containing change information to all employees. The house organ carried monthly items on construction progress. Key supervisors were dispatched to similar plants, already automated, for observation and study. Each developed an extensive manual that was widely disseminated.

Interviews were conducted individually with each employee whose job would be eliminated. He was given an opportunity to enter in-plant training programs if he were qualified on the basis of an aptitude test battery. If not eligible, he was given a choice of other jobs for which he was qualified without reduction in pay.

Although the subject company did an exemplary job as far as the foregoing prevention activities were concerned, after the change it did almost nothing to continue the orientation. In fact, management itself became afflicted with its own type of anxiety syndrome which is best described as an "incredible preoccupation with machinery." It was striking to see a management which had been empathetic, suddenly become impersonal, cold, and efficiency-oriented.

Professor Lipstreu feels that management must manifest its continuing concern for employees by being sensitive to employee inconvenience and hardship during and after the change. He feels a planned program of each group with its supervisor discussing all

the changes both before and during the change period appears to represent the most promising treatment yet devised to cushion automation impact.[97]

Dean J. Champion and Edward Z. Dager. The advent of electronic data processing in a bank brought on fundamental changes in operational employee job statuses, and roles. It increased impersonalization and alienation; it decreased human contact and cooperation. This tended to increase anxiety and job dissatisfaction, which were minimized when work loads were heavy, status was raised, or when the employee had a predominance of certain personality traits, such as being aloof, cold, thick-skinned, or enthusiastic. Under these conditions the transition to EDP was made most efficiently and with least disturbance.

They concluded that with the increased use of automation, personality will probably become an increasingly definitive criterion for hiring and firing.[98]

Floyd C. Mann and L. Richard Hoffman. Floyd C. Mann and Richard Hoffman in a study of two automated electric plants found that certain other features of automation in addition to improved working conditions common to most new facilities can contribute to a worker's satisfaction with his work situation. One of these stems

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[97]Otis Lipstreu, "The Automation Anxiety Syndrome: Symptoms and Treatment," Management of Personnel Quarterly, Vol. V, No. 1 (Spring, 1966), pp. 31-35.

[98]Dean J. Champion and Edward Z. Dager, "Automation Man in the Counting House," Transaction, Vol. III, No. 3, (March-April), 1965, pp. 34-37.

from the fact that automation has made work physically easier, even if it has made it mentally more demanding. The ability to learn how new equipment operates and to appreciate how each piece of equipment fits into the total system along with the ability to be continuously alert to the variations in operation which may produce inefficiencies and even dangerous situations, appear to be essential requirements for workers in automated factories. The very size of the work force may be anything but reassuring. The combination of job enlargement and job rotation produced a high level of job satisfaction among the operators in the new plant. It would appear that company management through design engineers are now in a position to restore to our working population some of the pride and satisfaction that comes from performing interesting and challenging jobs.

Mann and Hoffman contend that the successful functioning of a newly automated system will depend in a large part on the adequacy of the training given. The pace of the change is another factor the designers of a training program should be aware of. In the two electric companies studied, the workers were no longer physically isolated. The operators worked more closely together. A strong feeling of group identity and common purpose was present. The researchers feel there is a need for all those concerned with planning functions to become aware of the "delicate interactive balance between technical and social systems." In this study it became apparent that the men looked up to their supervisors for their interpersonal qualities rather than for their technical skill.[99]

[99]Floyd C. Mann and L. Richard Hoffman, Automation and the Worker, (New York: Henry Holt Co.), pp. 202-213.

CHAPTER VI

CONCLUSIONS

GENERAL IMPLICATIONS OF THE NEW TECHNOLOGY IN OFFICES

Technological progress has been going on for generations. The revolutionary improvements brought about by these advances have been routinely accompanied by transitional problems. These problems, transitional as they may be, are nevertheless critical to the individuals and to the industries directly involved in them.

Today's increased technology forces us to look at the broader effects of mechanization and technological improvements of machines, material, and methods--particularly at their effects on human beings. And this same technology which disrupts and disturbs people must be used to solve the human problems it creates.

The demand for jobs and the skills needed for them have always been changing; re-evaluation has always been necessary. Automation and technology may eliminate the demand for some jobs, but it will create a demand for other jobs and it will also increase productive ability.

The transitional problems caused by a decrease in the demand for jobs is linked with other less obvious problems caused by the attitudes of the worker toward his changing role. Man gains satisfaction from the challenge of problems and from solving them. He performs creative, rational, and organizational acts through communication

with others. He cannot contribute to society without relationships with others. The important factor is to make these relationships as meaningful and helpful as possible.

How can business use automation to solve these two transitional problems, i.e., a decrease in the amount of routine work, and the workers' negative attitudes toward automation?

First, by using the workers to gather the information needed to process the automated machines. For automation to provide answers to questions at any level of business--in fact, to get answers by any method--information must either exist or be produced. The need for information has grown proportionately as business has become more complex and as recording devices have become more precise, today the retrieval of information about business compares to any other scientific activity. Even information on the technique of gathering information is needed. Collecting information, processing it, and storing it can be designated the primary jobs of the office workers.

When management and worker understand thoroughly what the new technology can do for business, the office worker will receive a new image as well as a new job. And, since the gathering of information necessitates a freely flowing communication system, other workers who provide information will perceive themselves in a new role as a valuable member of the organization.

Besides using the new technology for gathering and processing information automation can be used to create new jobs and new

perceptions. Management can take advantage of the technology to gather and synthesize data from all the social sciences. Research efforts are expanding knowledge about human relationships at an increasing rate. There are more problems, more variables, and more possible solutions. The number of pertinent publications is increasing. The multidiscipline approach to problems reveals the increased scope of these problems and requires an increasing amount of information for their solution. This information must be synthesized and made available to management, who then must incorporate it into the day-by-day activities. Only by applying this up-to-date information can managers make appropriate decisions for future development of their organizations.

Automation, in short, will eliminate most routine activities which are now being performed by human workers. The resulting problems--the loss of routine work and the workers' negative attitudes toward the necessary new tasks--can be solved in part by the same automation which created them, provided managers are alert to use the new processes effectively.

THE NEW TECHNOLOGY IN REGARD TO WORKERS IN GENERAL

Successful installation of the new technology can be insured by considering and using techniques to overcome resistance and to create positive attitudes. There are no set rules and no absolute answers, but there is a considerable body of helpful information that

has been gathered by social scientists. Cultural factors which influence acceptance or rejection may be either a help or a hinderance. An awareness of the needs of people can be used in introducing change. Workers are aware of some of their needs and unaware of other, more subtle ones. The new technology will remove some tedious, time-consuming jobs. This is one of the results that can be stressed in developing positive attitudes.

In any change situation, the dissemination of information is of foremost importance. The more complicated the network of communication, the greater the need that it be two-way. Misunderstandings can mushroom into problems if the worker has no easy way to state his reactions.

It must be recognized that simple changes are more readily accepted than complex innovations. Complex changes require more time and have a greater chance for unfavorable results.

The work situation and the informal organization prescribe certain norms of behavior. Any change situation should take this into consideration. If the norms must be disrupted, then suitable alternatives must be made available. Training and re-education may be viewed as raising the level of the worker, yet if this is improperly understood, it may seem demeaning to him.

The worker must perceive the rewards or satisfactions resulting from change as outweighing the disadvantages. His perception of the situation is very important. Recognition that acceptance of change comes from within and can be motivated makes it easier for the manager to plan for change. The worker is motivated

by what? By goals, by the situation itself, by the relative weighing of efforts to results. The situation includes not only the technology and the organization, but also the social system in which it exists--the group, status, interaction. It is impossible to ignore social relations in the work situation. We must find ways to have them work with and for us. Opinions are reinforced by interaction with others. For change to be effective there must be a correlation between the situation and the expectations of the workers.

In any social system there is a certain amount of unpredictability of action. Consequently, in an innovative situation, the manager needs to develop a frame of mind that will consider the human relations aspect as well as the physical aspect when unforeseen circumstances arise that disrupt the smooth operation of the organization. It has been demonstrated that even the most extensive attempts to prepare workers for a change fail to provide for their continuing adjustment once the new technology has been installed.

WOMEN AND THE NEW TECHNOLOGY

This thesis has considered the implication of the new technology for women clerical workers. The emphasis has been on workers, and on clerical workers. At no place in the literature did the writer find a different hierarchy of needs for men and for women. A perusal of the literature and observation leads one to believe that because of the environment in which they work there has been an educational discrepancy between women clerical workers and the

executives with whom they come in contact. This has led to performance comparisons between women with high school educations and men with college degrees.

A cursory survey of empirical studies shows there is little difference in intelligence, ability or performance due to sex. There is evidence that there is a cultural lag in recognizing the role that women are assuming in our complex world, and the contributions that they are capable of making in business.

Women are not only responding to the current conditions in the economy by entering the labor market, but are acting from personal motivation in which economic, social and psychological factors are interrelated. Some women work for economic reasons, while others wish to use their ability to widen their mental horizon; others are naturally gregarious. There are a variety of types of women, just as there are a variety of types of men, but their response to job change is not dependent on their sex.

Careful selection of personnel will avoid problems. It is easier to select personnel who meet the demands of the task environment than it is to change the worker once chosen.

THE BEHAVIORAL SCIENCES AND THE NEW TECHNOLOGY

The systems approach to organization assumes a mutual dependence. It considers the organization as a system of mutually dependent parts and variables, a social system that is part of society. This involves the interaction and sentiments of the members of the organization in relation to the social, economic, and technological

environment.

This interrelation requires that an integration and coordination take place. There must be an equilibrium. Too often we have concentrated upon the technological factors, because they are readily discernible when they are not functioning properly. For the greatest effectiveness we must consider not only the organization objectives, but also the individual needs. We have developed skills in organizing environmental forces for economic goals. This has put individuals into relationship with the work with the environment, and with each other. We need to develop skills to motivate, educate, train, give understanding of objectives, and to allow achievement of individual goals. We need to find ways to allow the worker to continue his development.

We need to call upon the behavioral scientists to help us more effectively in the use of human resources. He can provide new insights. Group dynamics and small group research can be used to improve communication and understanding. Research in diffusion may lead to new and effective ways of communication. The manager needs to keep abreast of these developments, and find applications for them after they have been tested. There is considerably more research available than is being used at present. The behavioral scientist can help work out effective programs to incorporate this research into the organization. He can help match human resources with organizational goals and objectives.

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