Organizational climate and creative output in two excellent research and development divisions.

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ORGANIZATIONAL CLIMATE AND CREATIVE OUTPUT IN
TWO EXCELLENT
RESEARCH AND DEVELOPMENT DIVISIONS

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By
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Organizational Climate and Creative Output in Two Excellent Research and Development Divisions

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Organizational climate and creative output were examined in two excellent companies. The study sought to determine the extent to which the following organizational climate measures, i.e. communications, meeting effectiveness, decision making, leadership, role clarity and standards, career development, conflict management, role conflict and overload, performance appraisal and feedback and rewards on performance contributed significantly to explain the variance of high creative output as measured by unpublished technical manuscripts, reports or talks inside or outside the organization and technical papers accepted by professional journals. The instrument used to measure organizational climate was the Profile of Organizational Practices. The data were obtained from 65 research and development employees, 78.5% of whom were Ph.D.'s. Generally it was found that the P.O.P. (except for the Role Conflict and Overload scale) appeared to accurately measure organizational climate. The creativity measure was
generally narrow in scope, had few reference points from which to evaluate it and was subject to misinterpretation by the respondents.

Results indicated that Career Development was the only climate measure to correlate significantly with creativity. Items relating to posting of job opportunities, clear career paths for supervisees, job advancement and training were found to correlate significantly with creative output. Significant numbers of creative employees agreed that some very creative solutions came out of their groups. They did not agree that it was important to them that their organization provide them with opportunities to develop their skills and abilities.
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In a time when knowledge constructive and destructive is advancing by the most incredible leaps and bounds into a fantastic atomic age, genuinely creative adaption seems to represent the only possibility that (man) can keep abreast of the kaleidoscopic changes in his world. With scientific discovery and invention proceeding, we are told, at the rate of geometric progression, a generally passive and culture bound people cannot cope with the multiplying issues and problems. Unless individuals, groups and nations can imagine, construct and creatively revise new ways of relating to these complex changes, the lights will go out. Unless (man) can make new and original adaptions to (his) environment as rapidly as (his) science can change the environment, our culture will perish. Not only individual maladjustment and group tensions but international annihilation will be the price we pay for a lack of creativity (Rogers, 1954)

This quote by Carl Rogers, made as early as 1954, urged society to adapt to a world which is changing at an astonishing pace. Since business organizations are generally regarded as subsets of general societal organization, the challenges of innovation which face society at large, face business as well. In their recent book, In Search of Excellence, Peters and Waterman (1982) conducted research involving sixty-two of the most excellent companies in the United States. The ability of companies to innovate emerged as such an important factor in their study, that it became
synonymous with excellent performance. Peters and Waterman (1982) wrote:

We asserted that innovative companies not only are unusually good at producing viable new widgets; innovative companies are especially adroit at continually responding to change of any sort in their environments . . . That concept of innovation seemed to us to define the task of the truly excellent manager or management team. The companies that seemed to us to have achieved that kind of innovative performance were the ones we labeled excellent companies. (p. 12)

It is clear that innovation is needed to adapt to a changing world. It has also been suggested that excellence in innovation may generalize to overall excellence within a company.

With few companies in the U.S. fitting Peters and Waterman's (1982) description of excellence, the U.S. is in a precarious position to compete in a world market. Failure to innovate could put U.S. economic security in serious jeopardy. Unfortunately there are too few companies which fit the description of excellent companies generated by Peters and Waterman (1982, pp. 13-17).

One way of assessing the amount of innovation which is occurring in American business is through the patent system. The Patent and Trademark Office of the U.S. Department of Commerce stated that in their opinion, each patent represents an "increment of technological activity resulting in an invention. (p. 44) The report described a steady
decline in the use of the patent system by American companies. After various factors were taken into consideration (which will be described in detail in the next section), the Patent and Trademark Office made the following statement in its most recent report:

A look at R & D expenditures, an input to the innovative process leading to patents, suggests that the stagnation in patenting activity (of domestic companies) reflects a stagnation in innovative activity (U.S. Dept. of Commerce; Technology Assessment & Forecast, 1979).

The need for innovation in a fast changing world, the synonymous nature of innovative companies and excellence and the apparent decline in recent years of innovative activity in American companies, indicated the need for more creativity and innovation in American business. The crucial next question was: What are the factors or conditions within the business environment that affect creativity? Specifically, what combination of organizational variables encourage or discourage creative output, especially in Research and Development divisions? It was to these questions that the study was addressed.

Background

In this section, the need for innovation in American business will be explored in light of new trends which are
transforming American society and the decline of creativity in American business during the past ten years (1970-1980).

In the book entitled *The Next 25 Years*, which was produced in conjunction with the World Future Society's Second General Assembly in Washington, D.C., (1975) John Platt made the following statement regarding change:

> The immense technological changes after World War II produced order of magnitude changes in almost every aspect of human physical and biological interactions - in communications, travel, energy, weapons, data processing, agriculture, culture, medicine, birth control, exploration, population pressures, urban problems, international relations and so on . . . These technological changes have now begun to produce corresponding changes in all our human institutions, which never before had to deal with new problems on such a scale (p. 6).

John Naisbitt (1982) in his book, *Megatrends*, described ten new trends which are transforming American society. These trends were based on an analysis of over two million local articles from cities and towns of America over a twelve year period. According to Naisbitt, the first trend was that American society is rapidly changing from a society based on an industrial economy to one based on the creation and distribution of information. Naisbitt argued that innovations in communications and computer technology will accelerate the pace of change by collapsing what we called the "information float." This change in the nature
of our economy will result in corresponding changes in the nature of jobs, development of technology, education, etc.

A second trend was that we are moving in the dual direction of high tech/high touch in which a human response is paired with each new technology. Naisbitt (1982) claimed that one ramification of this trend is that technical innovation will not move in the way of straight-line extrapolation, but will proceed "as part of a lurching dynamic of complicated patterns and processes" (p. 41).

According to business expert Dudley Lynch, (1980) the 1980's are witnessing a countermovement which has developed in reaction to Taylor's principles of individual diminution of the late 1800's. One reason for this countermovement is that specialization has in many cases reached the point of diminishing returns. Lynch pointed out that today's manager is trained in skills but not problem solving methods. As a result, the subfield specialization is inadequate to cope with current huge organizational structures.

A second reason for the countermovement against Taylor's individual diminution was that increasing numbers of top managers are admitting to intuitive management styles and claiming to use hunch making skills. While C.E.O.'s may often be creative holistic thinkers who thrive on chaos, most organizations tend to deprogram chaos. Unfortunately, the equilibrium that results, leaves the organization
without "tools of resynthesis" in a rapidly changing world (Lynch, 1980).

A third reason for the countermovement against Taylor's individual diminution was that entropy is more complicated than previously thought. It was always assumed that the role of managers was to prevent entropy but new ideas about entropy are emerging. Dr. Illya Prigogine, the 1977 Nobel Prize winner in chemistry has stated that: "coherent behavior can rise spontaneously when a system is not in equilibrium" (Lynch, 1980). Another way to describe this is that disorder may not necessarily lead to chaos but to higher orders of organization and diversification. The main components are energy and a setting that allows fluctuations. This is called Prigogine's theory of dissipative structures. Brainstorming techniques in problem solving and planning utilized this kind of unstructured philosophy. Lynch argued that they were not effective because the suspended judgement used in brainstorming was not an atmosphere that organizations were able to sustain. Consequently, the brainstorming became an isolated exercise.

A move from short term considerations to a priority for long term considerations was a third trend cited by Naisbitt (1982). This trend reflected a Japanese influence and one in which values are changing. The past decade has demonstrated that the short term convenience that encouraged us to pollute the air and water was not worth the long range
damage done to the quality of our lives and our environment. Naisbitt wrote:

The preoccupation (of American business managers) with short term results and quantitative measurements of performance was responsible for the neglect of the kinds of investments and innovations necessary to increase the nation's capacity to create wealth (p. 83).

In her book, The Aquarian Conspiracy (1980) Marilyn Ferguson described many changes in economic values which are taking place in American society. In comparing assumptions of old and new economic paradigms, she suggested that innovation and invention in the new paradigm will serve authentic needs as opposed to fitting people to jobs. Ferguson forecasted a shift away from the rational approach in business decision making which Naisbitt mentioned, to one which combines rational and intuitive approaches. The latter will include logic and data augmented by hunches, feelings, insights and a holistic sense of pattern. Concurring with Naisbitt (1982), Ferguson (1980) also indicated that the new economic paradigm was moving from an emphasis on short term solutions to long range efficiency which must accommodate the needs of the work environment, employee health and customer relations.

A fourth trend which is transforming American society was the move by organizations and businesses from centralization to decentralization (Naisbitt, 1982). As a result,
they are acting more innovatively and achieving results from
the bottom up. Ferguson (1980) also suggested there will be
more worker participation and shared goals, in lieu of the
exclusive top-down decision making that has been prevalent
for so long.

Another trend which Naisbitt (1982) predicted was the
move from a national to a global economy. Countries like
Japan and the Third World Countries are in fierce competi¬
tion with the United States for world trade. This kind of
competition increases the need for American companies to be
innovative in adapting to the changing economy.

Other trends which Naisbitt (1982) described included:
a) a move from a representative democracy to a more partici¬
pative democratic structure, b) dependence on large scale
hierarchical structure is shifting to a reliance on informal
networking especially in business, c) a shift in where Amer¬
cans are living; from the North and Midwest to the South and
West, d) a shift from institutional help from social ser¬
vices and health agencies to self help, e) a switch from
"either-or" options, to multiple choice options where many
different facets of life and lifestyles are combined into
unique patterns.

The prevalence of changing trends and its effects on
innovation cannot be overemphasized.

An important aspect of the need for more creativity in
business was that all business organizations are subsets of
the general societal organization. Mars (1972) called the United States an organizational society and argued that major national efforts are represented by various organizations. Consequently, the trends which affect society in general, as described by Naisbitt (1982), Ferguson (1980) and Lynch (1980) and which require innovation and creative adaptations will be the same trends which will challenge business to be creative and adaptive.

Peters and Waterman (1982) of McKinsey & Company conducted in-depth research of sixty-two companies, forty-three of which they described as "excellent." In establishing criteria for the companies, they developed what they called the 7-S Framework. The seven S's stand for: structure, strategy, skills, staff, style, systems, and shared values. Yet, in describing their research they stated that once those S's were constructed, there was still something missing. So, they opted to examine management excellence itself. In the process of this examination they discovered that excellent companies were not only innovative in developing new products, but they were also innovative in responding to changes in their environments. As a result of this, Peters and Waterman defined companies who had achieved this kind of innovative performance as excellent companies. They then developed eight attributes which unfolded to characterize the distinctions of the excellent innovative
companies. One of these attributes was autonomy and entrepreneurship.

The importance of innovation in American business, cannot be underestimated. This is especially crucial because of the decline of creativity over the past decade. While the forty-three companies studied by Peters and Waterman (1982) were outstanding in several aspects including innovation, they were the exception and not the rule. In order to assess the innovativeness of American companies, domestic trends in innovation during the past thirty years were examined (Carney, 1981; National Science Board, 1979; U.S. Dept. of Commerce, 1982).

As reported by the National Science Board, the policy-making body of the National Science Foundation, in a study called "Science Indicators, 1974" the United States produced 82% of the world's major innovations in the late 1950's. In the mid 1960's only 50% of all the research done in the world was done in the United States. This study also differentiated between "major technological advances" and "radical breakthroughs." In the period from 1967 to 1973 the rate of development of radical breakthroughs declined nearly 50% over the period from 1955 to 1959, while the "major technological advances" doubled. In 1981, only 20% of the world's research was done in the United States.

In addition, the Report of the National Science Board (1979) indicated that there was an increase in national
expenditures for R & D between 1960 and 1979. However, when the expenditures were converted to the cost of 1972 dollars, there was really a decline. For example, from 1960 through 1969, the total expenditures increased 55%. From 1970 through 1979 the increase was only 12%. In the last ten years, the investment by the Federal government decreased (Carney, p. 105).

Carney (1981) mentioned several indicators of the declining leadership in the U.S. regarding creativity in industry. One of these indicators of the declining focus on research and development was the decreasing financial investment. According to the report of the National Science Board, (1979), the past ten years has shown a decline in the percentage of our gross national product devoted to research—from 2.9% in 1968 to 2.0% in 1978. During the same time period corporate spending remained at about 1%. The U.S. government only supported two-thirds. While proportions of scientists and engineers in the United States dropped from approximately 25.4 per 10,000 population to 24.8 per 10,000 during the years 1965 to 1975, the proportions doubled in both the Soviet Union and West Germany (Carney p. 104).

Carney (1981) pointed out that financial expenditures do not necessarily describe the creative efforts of a company or government agency. He noted that research and development monies may go for improving existing products and not necessarily for truly creative endeavors.
Another indicator of the decline of creativity was the patent activity of domestic companies. (Carney, 1981) The net decrease of U.S. origin organizational patenting during the period 1969-1974, as reported by the U.S. Department of Commerce (1979) was down to 29,261 from 33,375, a total of 4,114 patents. To get a clearer picture of the range of patents within different U.S. companies, a distribution of organizationally owned U.S. patents (1969-1977) was examined.

As reported by the U.S. Department of Commerce, there were many firms which received only one or a few patents. However, there were a few firms which received many patents. For example, the 343 organizations (247 of them U.S. based) which received 200 or more patents during the period, represented less than seven tenths of one percent of the total number of patenting organizations. Yet, according to the U.S. Dept. of Commerce report, that .7% was responsible for over 52% of the 1969-77 organizational patenting (41% of total patenting). The 247 U.S. organizations in this group were responsible for most of the patents. These U.S. organizations produced 33% of all U.S. patents granted during the period and were responsible for nearly 50% of all domestic patenting.

For each of the 146 most patent active domestic corporations during the period 1969 to 1982, a combined total of patents and patent applications ranged from a low of 563 (Akzona, Inc.) to a high of 12,635 (General Electric
Company). The range of patents granted for the year 1982 ranged from a low of 54 (Akzona, Inc.) to a high of 739 (General Electric Company) (U.S. Dept. of Commerce, 1982).

Of the forty-three excellent companies in Peters and Waterman's (1982) study, twelve or 28% were listed among the 146 most patent active domestic companies. Of the same forty-three companies researched, seven were privately held and had no extensive public data available. Therefore, it was more likely that their patents were owned by individuals and would not be listed with patent active domestic companies. Another six companies in the study were service companies like American Airlines and McDonald's, whose innovativeness was probably not clearly measured by patents. When these 13 companies were subtracted from the data, the percentage of "excellent companies" who were also listed in the 146 most patent active domestic companies increased from 28% to 40% or close to half. This data was further evidence that patents were a good indicator of innovative and thus, excellent companies (Peters and Waterman, In Search of Excellence, Harper & Row, New York, 1982).

Official statistics from the U.S. Dept of Commerce concurred with the trends Carney described regarding the decline of creativity. However, it was not clear exactly what these trends indicated in terms of corporate creativity. The U.S. Dept. of commerce, in its publication Technology Assessment & Forecast argued:
. . . because patents are early evidence of invention and because patent data are readily available across a whole spectrum of technology, failure to consider patents as at least a part of a composite index for innovation trends, is to ignore a potentially important indicator of such trends (1979, p. 45).

Furthermore, in assessing the stagnant nature of domestic patenting during the mid-sixties and seventies, they concluded:

Does (it) reflect stagnation in innovative activity, a decline in the use of the patent system or something else? A look at R & D expenditures, an input to the innovative process leading to patents, suggests that the stagnation in patenting activity reflects a stagnation in innovative activity (U.S. Dept. of Commerce; Technology Assessment & Forecast, 1979 p. 39).

In light of the recent events with regard to creativity, the following conclusions were drawn: 1) The world is changing so rapidly that innovative adaption is necessary for survival by individuals as well as organizations. 2) Various societal trends (Naisbitt, 1982; Ferguson, 1980; Lynch, 1980) which present innovation challenges to society, will present the same challenges to business which is a subset of that society. 3) Excellent companies are also considered innovative ones (Peter and Waterman, 1982). 4) If patents are considered to be a strong indication of innovation in American companies, there has been not only a decline in innovative activity in the past ten years, but there is also only a small minority of companies who are

Considering the importance of creativity and innovation, the next questions asked were: What were the factors or conditions within the business environment that affected creativity and innovation? What combination of organizational variables encouraged or discouraged creative output, specifically in Research and Development Divisions?

The position which this study took was that corporate creativity and innovation were directly influenced by factors which constituted organizational climate or general environmental conditions. Tagiuri and Litwin (1968) defined organizational climate as:

... a relatively enduring quality of the internal environment of an organization that: (a) is experienced by its members, (b) influences their behavior, and (c) can be described in terms of the values of a particular set of characteristics (or attributes) of the organization (1968, p.27).

Taylor and Bowers (1972) further described organizational climate as "a concrete phenomenon reflecting a social-psychological reality, shared by people related to the organization and having its impact on organizational behavior" (p. 62).

Utilizing the theoretical framework of Likert (1967) regarding management systems, Taylor and Bowers (1972) described organizational climate on the basis of interlinking
groups, which formed the building blocks of organizations. They selected various indicators of organizational climate which they used for the standardized questionnaire called Survey of Organizations, (Taylor and Bowers, 1972). These indicators included factors such as the character of motivational forces, communication processes, coordination processes, decision making and goal-setting practices, and control and influence processes (Likert, 1967, pp. 3-10).

These indicators of organizational climate were generally the same indicators used in this study in assessing the effects of organizationa climate on corporate creativity. Corporate creativity was defined as new products, new processes, and new patents. These were measured in the study by counting the number of published and unpublished technical manuscripts and reports or formal presentations either inside or outside the company. It was assumed that this measure best represented creative activity. Unpublished technical manuscripts, reports or formal presentations were used as a measure of new ideas, still on the drawing board, which had not been developed fully, but still constituted creative seeds for new future products.

The key to nurturing creativity is nurturing the environment in which creativity may occur. The following statement, made by Calvin Taylor and Frank Barron, two leaders in the field of creativity, is as relevant today as when it was written:
We are perhaps more in the dark about the environmental conditions which facilitate creativity than we are about any other aspect of the problem. Beyond conditions, such as the need for ample time to work fully on problems of one's own choice, little is known... We are aware of no area in the social sciences where research is simultaneously so vitally needed and so sadly neglected (Taylor and Barron, eds. 1963, p. 373).

**Purpose**

The purpose of this study is to assess the organizational climate and examine how it relates to corporate creativity in two excellent Research and Development Divisions. The study sought to answer the following questions:

1) What is the relationship between various measures of organizational climate; is their intra-correlation high enough to be considered one measure? 2) What is the relationship of each measure to the total organizational climate? 3) What is the relationship between organizational climate and corporate creativity; which factors or combination of factors are most related to creativity?

**Significance**

This study set out to provide important organizational data about how measures of organizational climate contributed to explaining the output of creativity in business. It was based on the assumption that if we knew what conditions
affected creativity in companies, programs could be developed to increase and encourage it. Without those conditions, companies may be focusing valuable time and effort on projects to enhance innovation, which may not yield the results desired. Or worse, American business may be ignoring innovation as a dynamic way of adapting to a changing environment.

Methodology

The methodology used for the proposed study was a combination of descriptive and correlational research.

The descriptive research included a systematic analysis and description of the facts and characteristics of organizational climate and corporate creativity. The purpose of this form of research was to provide a detailed and accurate picture of the variables involved.

The correlational research investigated characteristics of organizational climate and corporate creativity and determined the extent to which these characteristics varied together. A more detailed description of the design and methodology is included in Chapter 3.
Over the past twenty years, the rapidly changing environments in which people work (organizational climate) and the creativity needed to respond to these changes (corporate creativity or innovation) has become a concern for many social scientists. During this same time period, the concepts of organizational climate and creativity have largely been studied separately. Most of the literature since the 1960's falls into five categories. The first category focuses exclusively on organizational climate (Campbell, Dunnette, Lawler & Weick, 1970; Forehand & Gilmer, 1964; Tagiuri, 1968, Taylor & Bowers, 1972). The second category deals exclusively with individual processes of creativity in industrial settings with little if any discussion of the influences of organizational climate (environment) on creativity (Taylor & Barron, 1963; Gordon, 1961; Ackoff & Vergara, 1981; Osborn, 1963; Crosby, 1968; Stein, 1975). The third category includes empirical studies which investigated how organizational climate affected creativity (Paolillo & Brown, 1978; and Pelz & Andrews, 1966; Rotundi, 1974). The fourth category describes organizational innovation as a process of change or adaption within the organization (Lawler and Drexler, 1981; Abend, 1979; Weick, 1977;
Innovation was examined as an agent of change, self design and adaptability - not as creative output such as new patents, or products. The fifth category is a kind of "catch all." It consists of articles which described how organizational factors such as team building, problem solving, employee stress, health and turnover, training, risk taking, quality of work life programs, values and corporate culture impacted corporate creativity. The drawback of articles in this category is that the majority of them lack adequately constructed theories, and contained little if any empirical support for their positions. For reasons of efficiency and clarity, the majority of this chapter draws from the third category which concentrates on the interaction between organizational climate and creativity.

The purpose of this chapter is to review the relevant research which describes the relationship between organizational climate and corporate creativity. The chapter consists of three sections. First, a framework for organizational climate is provided by tracing the development of the construct through the past two decades. A discussion of well constructed theories (e.g. those of Likert and Herz-burg, 1966) provides the foundation for this framework. Only major studies which attempted to draw definitive conclusions about organizational climate will be covered since
the chapter is not concerned with organizational climate itself but with its relationship to creativity.

Second, literature pertaining to organizational climate and its effect on creativity is reviewed. This includes some discussion of the "innovation as change" literature but the emphasis is on empirical studies which attempted to measure the effects of organizational climate on corporate creativity.

Third, the research on excellent American companies by Peters and Waterman (1982) is reviewed. This section describes the underlying philosophies and attributes of excellent companies and the organizational practices behind their success. The objective of this section is to suggest a model of excellence for future research on organizational climate and creativity.

The fourth section is a synthesis of the research as it relates to the study. Some tentative conclusions regarding organizational climate and how it affects creativity are suggested. These conclusions provide the foundation for the hypotheses of the study. (See Chapter III).

A Framework for Organizational Climate

The environmental conditions of a large organization are extremely complex (Sells, 1963). As a result of this complexity, defining and measuring of situational
characteristics is very difficult. The amount of empirical work on organizational environment is extremely limited. Existing research has borrowed considerably from the methodology of differential psychology and has made frequent use of the factor analytic approach. Towards the late 1960's the use of the term organizational climate by researchers gradually began to replace "environment" and "situation" in the literature.

Forehand and Gilmer (1964) described organizational climate as a set of characteristics that described an organization, distinguished it from other organizations, were relatively enduring over time and influenced the behavior of the people in it. Georgopoulos (1965) referred to organizational climate as a normative structure of attitudes and behavioral standards which provided a basis for interpreting the situation and acted as a source of pressure for directing activity. Likert (1960, 1967) and Litwin and Stringer (1968) contributed an important element to definitions of organizational climate which has retained a central and sometimes controversial role in its development. This is the idea that organizational climate properties must be perceivable by the people in the organization and that an important aspect of climate is the patterns of expectations and incentive values that impinge on and are created by a group of people that live and work together. H.H. Meyer (1967) suggested that organizational climate arose as the
result of the style of management, the organization's policies and its general operating procedures. Gellerman (1959) added that the goals, tactics, and attitudes of management were a significant determiner of climate.

Based on the various components that different authors believed to constitute organizational climate, Campbell, Dunnette, Lawler and Weick (1970) have defined climate in the following way: "a set of attributes specific to a particular organization that may be induced from the way that organization deals with its members and its environment. For the individual member within the organization, climate takes the form of a set of attitudes and expectancies which describe the organization in terms of both static characteristics (such as degree of autonomy) and behavior-outcome and outcome-outcome contingencies" (Campbell et. al. p. 390).

Campbell et. al. (1970) pointed out that many different variables may contribute to organizational climate. They maintained that the crucial element in measuring organizational climate was the individual's perceptions of the relevant stimuli, constraints, and reinforcement contingencies that govern his/her job behavior. Because of the relevance of individual perception, this is the basic data used by many researchers to organize a classification of "climate" factors.

In order to understand what is meant by organizational climate, it is first necessary to trace the origin and
development of the concept. The importance of the work environment was generally a concern for the earliest researchers in the Human Relations/Organization Development field. Studies beginning with Mayo's (1953) famous Hawthorne experiments indicated the importance of human aspects in productivity and job satisfaction. Mayo and his colleagues at Harvard University determined that the relationships that developed between individuals determined feelings of affiliation, competence and achievement. It was this notion of relationships that began an exciting new trend in organizational psychology. It led to the classic theory X and theory Y assumptions developed by Douglas McGregor (1960) which defined two views of management. The first, theory X, assumed that most people prefer to be directed, are not interested in assuming responsibility and desire safety above other conditions. Theory Y assumed that people can be self-directed and creative if they are appropriately motivated. Other theorists such as Chris Argyris (1962) and George Homans (1950) stressed the importance of groups and relationships in organizations. Two theorists whose work elicited an enormous amount of research on organizational climate were Fredrick Herzberg (1966) and Rensis Likert (1960; 1967).

Herzberg (1966) studied job attitudes in order to formulate some assumptions about human nature, motives and needs. His motivation-hygiene theory resulted from the
analysis of a study with his colleagues at the Psychological Service of Pittsburgh. In this study, extensive interviews were conducted with two hundred engineers and accountants from eleven industries in the Pittsburgh area. Interviewees were questioned about the kinds of things on their jobs that made them happy or satisfied as well as those conditions that made them unhappy and dissatisfied.

Conclusions from these interviews revealed that people have two separate types of needs each affecting behavior in different ways. Herzberg (1966) found that when people felt dissatisfied with their jobs, they were concerned about their work environment. However, when people felt good about their jobs they were concerned with the job itself. Herzberg called the first category of needs hygiene or maintenance factors since they described peoples' environment and greatly affected job satisfaction. He called them maintenance because they are never completely satisfied but must be constantly maintained. The second category of needs were called motivators since they appeared to be effective in motivating peoples' performances.

In Herzberg's (1966) theory, hygiene factors included company policies and administration, supervision, working conditions, interpersonal relations, money, status and security. While not inherent parts of the job, they were related to the conditions under which a job was done. Herzberg
determined that hygiene factors had no effect on increasing workers productivity.

Factors which were found to elicit feelings of achievement, professional growth and recognition were referred to as motivators by Herzberg.

Herzberg's (1966) theory provided a framework from which management began to evaluate productivity and worker performance. One of its significant contributions to organizational psychology was that it identified those factors which eliminated dissatisfaction and work restriction (hygiene) and those factors that motivated an individual to superior performance or increased capacity (motivators). Herzberg's motivation-hygiene theory stressed the importance of the environment in determining worker productivity and management effectiveness.

Rensis Likert's work (1961, 1967) on management systems has contributed an enormous amount of theory and empirical research to our knowledge of organizational climate. Likert and his colleagues at the Institute for Social Research at the University of Michigan conducted studies with several organizations and developed organizational change programs in many of them. They found consistently that the most productive organizations functioned very differently from the least productive organizations. To illustrate the continuum from least to most productive functioning, Likert conceptualized four systems of management. These systems
represented four management styles and are described as follows:

In System 1, management was perceived as having no confidence or trust in subordinates, since they were infrequently involved in decision making. The large majority of decisions and goal setting was done at the highest levels of management and issued down the management hierarchy. Subordinates worked under conditions of fear, threats, and punishment. There were infrequent rewards and need satisfaction at the physiological and safety levels. The scant amount of superior-subordinate interaction occurred with fear and mistrust. In System 1, informal organizations which opposed the goals of the formal organization developed quite frequently, interfering with overall productivity and management effectiveness.

In System 2, management was perceived as having condescending confidence and trust in subordinates. In this system, the majority of decisions and goal setting of the organization were made at the top but many decisions were made within a prescribed framework at lower levels. Some rewards and punishments were used to motivate workers. Superior-subordinate interaction occurred with some condescension by superiors and fear and caution by subordinates. Some power was delegated to middle and lower levels of management, yet control was still concentrated in top
management. Although an informal organization frequently developed, it did not actively oppose the formal one.

In System 3, management was perceived as having substantial but not total confidence and trust in subordinates. While most policy and general decisions were kept at the top, subordinates were allowed to make more specific decisions at lower levels. Communication traveled up as well as down the hierarchy of the organization. Rewards, occasional punishment and some involvement were used to motivate workers. Superior-subordinate interaction occurred moderately and with a good degree of confidence and trust. The control process was not exclusively concentrated at the top but was frequently delegated downward with a feeling of responsibility at both higher and lower levels. An informal organization may develop but it may either support or partially resist goals of the organization.

In System 4, management was perceived as having complete confidence and trust in subordinates. Decision making was broadly practiced throughout the company. Communication traveled up and down the organization as well as among colleagues. Employees were motivated by participation and involvement in developing economic rewards, setting goals, improving methods and appraising progress toward goals. The superior-subordinate relationship was a positive and active one with a high degree of confidence and trust. Control was distributed broadly throughout the organization,
including the lowest levels. There was no separation between informal and formal organizations, therefore all energies contributed to effective functioning of the organization.

To summarize, System 1 is a task oriented, highly structured authoritarian management style; System 4 is a relationships-oriented management style based on teamwork, mutual trust, and confidence. Systems 2 and 3 are intermediate stages between two extremes, which approximate closely theory X and theory Y assumptions (McGregor, 1960).

Likert (1961) developed two principles which are central to his theory of effective management systems. One was called the principle of supportive relationships. It stated:

The leadership and other processes of the organization must be such as to ensure a maximum probability that in all interactions and all relationships with 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 (Likert, 1961, p. 103).

The other principle was called the integrating principle of management. This principle was based on the assumption that an individual's reaction to any situation was always a function of his perception of it. These perceptions were based on the person's background, culture, experience and expectations.
Likert (1955) conducted a series of studies to test his theory of management. He asked whether relationships, expected if the "newer" theory was valid, actually existed. Data collected in 1955 found that supportive behavior by the superior was associated with higher productivity. Data also supported the assumption that units and departments displaying effective group functioning, were more productive than units and departments which did not. In general, Likert's research supported his new theory of management. Later studies (Likert, 1967) showed similar findings.

What is important about Likert's work is that he identified and organized elements that make up productive organizational climates. Likert devised a table which he called "profile of organizational characteristics." Each item corresponded to four possible descriptions each representing one of the four systems Likert had devised. Subjects were asked to place an "n" at the point which described their perception of their organization at that time. Items included leadership processes, character of motivational forces, character of communication process, character of interaction-influence processes, character of decision making processes, and performance goals and training. This table provided a framework for considering organizational variables and was the basis upon which much future research was based.
One body of research based on Likert's work, utilized the "Survey of Organizations", a questionnaire which measures organizational climate. The Survey of Organizations was developed at the University of Michigan by Likert's colleagues, James Taylor and David Bowers (1972) and is consistent with Likert's theoretical framework regarding management systems. Research with this instrument was understood and measured on the basis of three essential premises. The first was that groups form the basic components of organizations. Second, those groups were interlinked by their functional and hierarchical ties. Third, the patterns occurring outside a given group, especially those above it, affected corresponding functional patterns within that group. These patterns were formed through perceptions and information sharing. The cumulative effect of how these groups developed constituted organizational climate.

The Survey of Organizations was based on the organizational processes which Likert described (1961 and 1967) which included the character of motivational forces, communication processes, coordination process, decision making and goal setting practices and control and influence processes (Likert, 1967, p. 3-10).

The questions on the Survey of Organizations measured perceptual rather than attitudinal or other types of responses. In other words, the subject gave his/her opinion of the facts as s/he saw them, regardless of whether s/he
liked them. In addition, the instrument limited the respondent's reactions to a set of five conventional response categories. Finally, the items on the Survey of Organizations were found to represent clear-cut validity in measuring organizational climate (Taylor and Bowers, 1972).

In building upon the work of Herzberg (1966) and Likert (1960; 1967), Campbell, Dunnette, Lawler and Weick (1970) conducted considerable research on managerial effectiveness. According to the model of management behavior developed by these authors, environmental determinants were found to profoundly impact managerial effectiveness. These authors defined the following four classes of variables which determined managerial effectiveness: 1) predictors, or individual differences developed before the manager was selected for his/her position; 2) experimental treatments in the form of training and development programs; 3) organizational rewards or motivators; 4) situational determinants or environmental determinants. Campbell et. al. found that the environment determinants appeared to account for more than half of the variability in measures of managerial effectiveness. This assumption was based on evidence that the other three classes of variables have never been able to account for much more than half the variability in measures of managerial effectiveness. In a preponderance of research, there was even evidence that the percentage was considerably less (Campbell et. al. 1970).
According to Campbell et. al. (1970), the variables which made up the organizational "situation" included:
1) structural properties, 2) environmental characteristics, 3) organizational climate and 4) formal role characteristics. They added that the majority of research has been with organizational climate. They stated: "Even though there have been relatively few studies with organizational climate and they varied widely in their approach, four factors appeared common to them. These have been labeled: 1) autonomy, 2) structure, 3) general reward level and 4) warmth and support (Campbell et. al., 1970, p. 413).

Situational or environmental determinants included structural properties of organizations (e.g. organization size or number of levels of supervision), the psychological climate (e.g. pressure for production, perceived reward system, individual autonomy), industry characteristics (e.g. growth industry, competitive, tight labor market) and the specified role characteristics of the management job (e.g. formal power, procedural rules, constraints). These were characteristics of the environment, not of individuals even though individuals may perceive these characteristics in various ways. The salient quality of environmental determinants was that they must constitute a cumulative main effect. For example, in an analysis of variance, the total variability in behavior must not be explained totally by: 1) differences between individuals, 2) error. Instead,
variability in management performance must be attributable to differences in the environmental variable, to the interaction between the environmental characteristic and individual differences or to both.

In 1974, James and Jones reviewed the literature on organizational climate from approximately 1960 through 1973. One of the important issues addressed in their review was whether or not organizational climate constituted a cumulative main effect. These authors alleged that there was a lot of confusion surrounding theoretical and conceptual issues of organizational climate. They claimed that if organizational climate was an organizational attribute, there should be no differences in the way climate was experienced across departments within the same organization.

James and Jones suggested that organizational climate should be differentiated from psychological climate since the former measured organizational attributes and the latter measured individual attributes. James and Jones defined psychological climate as: "the intervening psychological process in which an individual interprets the interaction between perceived organizational attributes and individual characteristics into a set of expectancies, attitudes and behaviors" (p. 1110).

James and Jones (1974) made the following recommendations for research in organizational climate:

1) Theoretical and conceptual issues rather than specific
measurement techniques should govern measurement of organizational climate. 2) Organizational climate is distinct from psychological climate and the two constructs should be studied separately. 3) Accuracy of perceptual organizational climate measurements should be determined with respect to objective organizational climate variables. 4) The role of consensus versus diversity of perception should be defined as a situational influence. 5) Appropriate levels of explanation for each level of analysis should be identified. For example, can perceptual measures be collected to reflect group, subsystem or organizational levels of explanation?

Much controversy has surrounded the issues of perception in measuring organizational climate. James and Jones (1974) in their review of the literature, indicated that there is some confusion with current operationalizations and conceptualizations of this construct (i.e. multiple measurement - organizational attribute approach, perceptual measurement - organizational attribute approach and perceptual measurement - individual attribute approach). They concluded that if measures of organizational climate were exclusively perceptual ones, then the construct might be renamed "psychological climate."

Another concern raised by James and Jones (1974) was the appropriate level of explanation for the term organization. For example, James and Jones questioned the parameters under which "climate" should be included. Is it
defined at the level of an entire industrial plant or is it limited to some subsystems such as a department or division? The theoretical work of Likert (1961, 1967) and empirical work by Franklin (1975a, 1975b) indicated that policies and behaviors of highest level managers established the conditions and procedures in an organization. In turn, these procedures and conditions had a restraining influence on the behavior of managers at the next lower level. Likewise, managers at this lower level influenced managers at the next lower level and so on down the hierarchy. If this concept was correct, there should be some variation in perceived organizational climate across departments in an organization. However, if climate is an organizational attribute, subunit differences should be much less significant than interorganizational differences.

Drexler (1977) addressed several issues raised by James and Jones (1974). His study examined whether organizational climate was a construct that distinguished among organizations and whether it had organization-specific variance. Drexler sought to determine whether descriptive, but perceptually generated measures of organizational practices characterized organizations or whether they characterized variance at individual, group, or other levels. If they characterized measures of organizational conditions, then analysis of variance that used as dependent variables, the same climate measures in several organizations should yield
main effects of organization. Drexler hypothesized that the main effect should exist whether the sample included heterogeneous groups from diverse industries or whether the sample included groups serving similar functions across different organizations.

Drexler's (1977) study specifically examined: a) differences in climate among different organizations, b) differences in climate across different organizations using groups that served the same functions, c) differences in climate among departments within the same organization and d) differences in the relative strengths of organization effects and department effects.

The climate measure used in Drexler's (1977) study was the Survey of Organizations (Taylor & Bowers, 1972). His sample consisted of 21 industrial or business organizations ranging from insurance companies to oil, glass, automotive etc. The climate data were average scores for work groups that ranged in size from 3 to 10. A total of 6,996 individuals comprised the 1,256 groups in the analysis. Drexler's (1977) results showed that there was a strong main effect of organization on organizational climate. The correlation ratio showed that 42.2% of the variance in climate could be accounted for by organization. These differences were organization specific and not due to differences in organization type. Thus, the study found that while organizational climate characterized organizations among groups serving
different functions in diverse industries, it also characterized organizations among groups serving the same function in different organizations.

The results supported the position that descriptive measures of organizational climate characterized organizations. According to Drexler (1977) these measures had organization-specific variance and in James and Jones (1974) terms, represented organizational attributes. Accepting James and Jones' suggestion that perceptually generated measures of climate be called "psychological climate" would be misleading if it indicated a construct that is largely intra-individual. Drexler demonstrated that a significant portion of the variance in climate was organization specific, therefore the term "organizational climate" remains more appropriate.

To summarize, organizational climate is a construct which accounted for more than half of the variability in measures of managerial effectiveness. (Campbell et. al, 1970) Much of the research on organizational climate is based on theories of Herzberg (1966), Likert (1960, 1967), Forehand and Gilmer (1964), Litwin and Stringer (1968), Meyer (1967), Campbell, Dunnette, Lawler and Weick (1970) and others. In recent years, the major issues with regard to organizational climate were addressed by James and Jones in their review of the literature, (1974). Issues included the following: 1) whether organizational climate is a main
effect for organizations, 2) whether it is distinct from notions of psychological climate, 3) whether perceptual or objective measures should be used to measure organizational climate and 4) the identification of appropriate levels of explanation for each level of analysis. Drexler's (1977) study addressed these issues and found that: 1) organizational climate is a main effect of organizations, 2) that organizational climate is a more appropriate term than "psychological climate" because the construct of organizational climate is organization specific, not specific to individuals, 3) that perceptual measures should continue to measure organizational climate since they measure how the individual perceives his/her environment regardless of how s/he feels about it, and 4) organizational climate characterizes organizations among groups serving different functions in different organizations.

Based on the research cited, organizational climate was considered a homogeneous concept within organizations. In the next section, the effects of organizational climate on creativity will be examined.

**Organizational Climate and How it Affects Creativity**

To date, the focus of most published research on creativity has dealt with psychogenic factors such as testing for creativity, the creative personality, methods of
teaching creativity, left brain/right brain research, descriptions of the creative process, and types of creativity. Some research has been devoted to stimulating creativity in small groups. Unfortunately very little empirical research has been done to investigate how organizational climate affects creative performance, especially in an industrial setting.

Numerous authors have suggested that environmental conditions and general organizational climate may affect creativity (Lehr, 1979; Reich, 1960; Crosby, 1968; Sarett, 1979; Kottcamp and Rushton, 1979; Raudsepp, 1958; Argyrus, 1965; Taylor and Barron, 1963; Pelz and Andrews, 1976; Gershinowitz, 1960; Hinrichs, 1961; Kaplan, 1964; Abend, 1979; Weick, 1977; Kimberly and Evanisko, 1981).

On the basis of interviews and questionnaires conducted with managers, Lawler and Drexler (1981) concluded that entrepreneurial drive is often stifled by the way organizations are designed and controlled. Joshua Abend (1979) argued that an important component in innovation planning was the organization itself. Abend cited the following attributes of an organization as important contributors to overall organizational climate: a) its objectives, b) its policies, c) venture structure, d) structure it gives to research and development, e) criteria it values, f) license it gives to innovation. Abend also cited organizational and group structure, communication in planning processes and
rewards of innovation as important factors in encouraging innovation. Factors such as isolation of the innovation group, little or no feedback and a great deal of judgement were cited as inhibitors of creativity.

Weick (1977) characterized organizations which are incapable of self design and adaptability as having the following qualities: 1) valued forecasts more than improvisation 2) dwelled in constraints rather than opportunities, 3) borrowed solutions rather than inventing new ones, 4) cultivated permanence rather than impermanence, 5) valued serenity more highly than argument, 6) relied on accounting systems to assess performance rather than use of more diverse measures, 7) removed doubt rather than encouraging it, 8) searched for final solutions rather than continuously experimenting, 9) discouraged contradictions rather than seeking them.

Kimberly and Evanisko (1981) studied the effects of individual, organizational and contextual variables on medical and managerial innovations. Their findings demonstrated that while all three variables had an influence on innovations, organizational variables had the largest influence.

Moch (1976) studied how organizational factors specifically structural attributes affected the adoption of innovation. His data showed that increases in size, specialization, functional differentiation and decentralization all increase the adoption of innovations in organizations.
The studies by Lawler and Drexler (1981); Abend, (1979); Weick, (1977); Kimberly and Evanisko, (1981); Moch, (1976); examined organizational innovation as an agent of change, self design or adaptability. These studies identified important variables which facilitated change and adaptation in organizations. The "innovation as organizational adaptation" studies as referred to in this study, reported findings similar to those that Peters and Waterman (1982) found in their study of excellent companies. For example, Abend (1977) cited organizational attributes such as policies, objectives, valued criteria, venture structure and license given to innovation as important factors which encouraged creativity. In a similar manner, Peters and Waterman described the crucial importance of corporate culture, which included values, and philosophy. These authors discussed the rich mythology and legends present in the excellent companies which represented their objectives and the criteria which they valued. In addition, the ability of innovative companies to adapt to change, was described by Peters and Waterman as the "emergence of the successful company through purposeful but specifically unpredictable evolution" (p. 103). These authors also called the excellent companies "learning organizations" which do not wait for the marketplace but instead, created their own internal marketplace and seeded their own evolutions.
Weick's (1977) description of organizations which are incapable of self-design and adaptability specify nearly opposite attributes of the excellent companies. For example, instead of relying on forecasts, the excellent companies more often utilized a non-rational approach which incorporated diverse experimentation. Peters and Waterman (1982) wrote: "Our guess is that some of the most creative directions taken by the adaptive organizations are not planned with much precision" (p. 114). Likewise, the excellent companies dwelled in opportunities more than constraints and more frequently invented new solutions rather than borrowing them. This is demonstrated in their bias for action, one of eight attributes of the excellent companies. Rather than cultivating permanence, they consistently utilized ad hoc groups, "skunk works" and other temporary work groups to solve problems and develop new ideas. They drastically reduced if not eliminated long reports and paperwork and replaced them with one page memos and constant verbal communication. Instead of assessing performance through accounting systems, they emphasized diverse measures such as peer reviews, internal competition, product champions, management by walking around, and intense informal communications. Rather than removing doubt, they encouraged it by assigning individuals to "shake up the system" with new ideas and methods from other companies and from customers. Multitudinous experiments were done in the excellent companies and
the most promising ideas and products were developed. The search for final solutions was replaced by a search for many solutions. Contradictions were constantly sought; the ability to manage paradox and ambiguity is a distinguishing quality of the excellent companies.

How organizations adapt and evolve has a continuing effect on the conditions under which people of the organization work. The ways in which scientists identify with their organizations, may provide clues concerning their productivity and motivation. Rotundi (1974) studied R & D settings in which scientists and engineers worked to see if they identified primarily with their organization or with their professions. Rotundi held that in research and development settings, creativity is facilitated by diversities in organizational climate, not typically found in more bureaucratic structures. He described creative organizations as having "flat" or adaptive hierarchies with a focus on intrinsic motivations and rewards, receptiveness of new ideas and tolerance of non-conformity. According to Rotundi, an important aspect of creative organizations was that they differentiated or specialized their activities to meet changing conditions and this may have resulted in ambiguity and conflict situations.

In a study of research and development personnel in a large Midwestern laboratory, Rotundi tested the following hypotheses: 1) creativity is inversely related to
organizational identification; 2) creativity is directly related to occupational identification and 3) organizational identification is inversely related to occupational identification. The study included non-managerial personnel in the following occupational groups: engineers, programmers, scientists and technical writers.

Support for the three hypotheses existed in all four groups with the highest creativity and occupational identification being demonstrated among scientists and engineers, and the highest organizational identification among programmers and technical writers.

Findings from two diverse samples (one of scientists engaged in experimental technology and one of product development engineers) resulted in a significant empirical support of the first two expectations dealing with creativity. According to Rotundi, (1974) this indicated that creative individuals were found to identify professionally with their occupations, rather than locally with their employing organizations regardless of their orientation toward basic or applied research. A significant inverse relationship between organizational identification and occupational identification was indicated with regard to the third hypothesis, only in the sample of scientists. However, both samples were consistent in reporting an absence of any significant direct relationship between the two identification variables. Based on these research findings, Rotundi suggested
two basic personnel types. One was the innovator who was primarily concerned with introducing new ideas and methods through originality and imagination, and the other was the ritualist who was primarily concerned with maintaining the status quo through observance of existent policies and procedures. Implications of this research indicated the incompatibility of the creativity and organizational identification concepts. It appeared that rewards for organizational identification behavior are extrinsic in nature, resulting in conformity rather than creativity. Rotundi (1974) suggested the process be reversed through deemphasizing organizational identification as an underlying value in organizations, most emphatically in areas where it influenced personnel criteria, such as placement and compensation, and where it affected organizational policies and training programs.

Rotundi (1974) suggested that personnel management can stimulate creativity among employees by stressing policies like professional development, interpersonal competence and decentralized decision making. Creative potential has been shown in other studies, to develop into practical innovation in situations where individuals have the ability to influence decision making and to communicate new ideas to colleagues (Pelz and Andrews, 1966; Paolillo and Brown, 1978). As indicated by these studies, it is necessary for management to provide a flexible work environment which is fertile
for innovation and change whereby creative individuals will be self motivated both to achieve organizational goals and to remain with the organization. Paolillo and Brown, (1978) considered financial rewards to be equivalent to extrinsic rewards. They wrote:

The lack of an appreciable correlation between the size of an R & D unit's budget and its innovativeness appears to indicate that the non-financial resources available such as talented research personnel, a collegial atmosphere and a supportive organizational climate may have a greater impact on R & D innovation than does the need for R & D management to consider the allocation of non-financial resources as well as financial resources in their attempts to enhance innovativeness (p. 14).

The studies described this far have examined organizational and professional identification of scientists, as important variables which facilitate change and adaptation in organizations. However, they do not specifically examine how organizational climate affects the production of new products or processes in research and development divisions. Perhaps the most in depth study of research scientists and organizational climate which examined this issue was done by Pelz and Andrews (1966). The original study was published in 1966 and a revised edition was published in 1976. The 1976 edition included an overview and summary not included in the first edition. References will be made accordingly.

Pelz and Andrews (1966) studied 1300 scientists and engineers in 11 research and development laboratories. This
study included five industrial laboratories, five government laboratories and seven departments in a major university, whose objectives ranged from basic research to product development.

Productive climates for scientists were assessed by measuring each man's* scientific or technical contribution to his field of knowledge in the past 5 years, as judged by panels of his colleagues; his overall usefulness to the organization, through research or administration, also as judged by his colleagues; the number of professional papers he had published in the past five years or the number of his patents or patent applications, and the number of his unpublished reports in the same period.

Characteristics of organizational climate were assessed using a carefully tested questionnaire. These two sets of data (performance and climate) were analyzed to find those conditions under which scientists actually performed at a higher or lower level. Subjects were divided into the following five categories: Ph.D.'s in research oriented laboratories; Ph.D.'s in development oriented laboratories; non Ph.D.'s in research oriented and in development oriented laboratories (referred to as engineers) and non Ph.D.'s in laboratories where 40 percent or more of the staff members held a doctoral degree (referred to as assistant scientists).

*There were no women in the study.
The central finding of this study revealed that an optimum climate for research scientists involved the presence of antithetical conditions; that of security and challenge, not unlike Peters and Waterman's (1982) simultaneous loose-tight properties of the excellent companies. In Pelz and Andrews study (1966), the challenge condition referred to an organizational climate wherein associates held divergent viewpoints or which required disruption of established patterns. The security condition referred to some protection from environmental demands. This included factors like freedom to pursue one's ideas, to influence others or to specialize. These factors offered the scientist stability and continuity in his work (Pelz and Andrews, 1976).

In a comparison between the creative tension, i.e. security and challenge (Pelz and Andrews, 1966) and the loose-tight properties (Peters and Waterman, 1982) there appears to be strong similarities. Challenge-security appears to correspond with loose-tight properties. The following discussion examines the relationship between these concepts more closely.

One difference between the Pelz and Andrews (1966) study and Peters and Waterman's research was that the former studied scientists as individuals; the latter studied organizations as a whole. This may explain the different language used to describe the principles. It appeared that the principles of creative tension and loose-tight properties
were similar in that they both described contradictory conditions which co-existed and resulted in productive climates for research and development. Both principles involved tension and paradoxical conditions that appear necessary for creativity and innovation. However, Pelz and Andrews referred to challenge as the existence of divergent viewpoints and disruption of established patterns. Peters and Waterman referred to "loose" properties as campus-like environments, flexible organizational structures, volunteers, zealous champions, maximized autonomy for individuals, teams and divisions, regular and extensive experimentation, feedback focusing on positive and strong social networks. It may be argued that the loose properties referred to by Peters and Waterman provide the kind of stimulation, and conflict which encouraged divergent viewpoints. These viewpoints may then disrupt established patterns, and correspond to the challenge condition discussed in Pelz and Andrews (1966). The tight properties referred to by Peters and Waterman included rigidly shared values, an action focus, emphasis on extremely regular communication and almost immediate feedback, concise paperwork, attention to the customer and a focus on realism. It may be argued that these tight conditions, because of their shared nature and predictability, provided the kind of stability and continuity that Pelz and Andrews called the "security condition."
A major discrepancy between the views of these authors is where they fit freedom and autonomy. Pelz and Andrews included it with the security condition which corresponds to tight properties in Peters and Waterman's principle. Peters and Waterman included freedom with the loose condition, which corresponds to challenge in Pelz and Andrews principle. In the Pelz and Andrews study freedom is defined as self direction; the ability to assign oneself a large portion of the weight in deciding technical goals. These researchers expected that the higher the level of autonomy was for a scientist, the higher would be his performance. Preliminary results did not concur with their expectations. They showed instead, that scientists performed better when influence on their important decisions was shared with several persons at various levels. In fact, results indicated that the more sources involved in deciding the scientists' technical goals, the better was his performance. The discrepancy between Pelz and Andrews (1966) and Peters and Waterman's (1982) view of freedom demonstrates the paradoxical nature of freedom. While scientists wanted to exert some weight in choosing their technical goals, (security or tight property) they also needed input and stimulation from numerous other sources (challenge or loose properties) in order to perform well. To summarize, the principle of "challenge vs. security" as a creative tension necessary for high innovative performance (Pelz and Andrews, 1966) is
equivalent to the loose-tight properties described by Peters and Waterman (1982). The concept of freedom which was incorporated into both principles, has a loose-tight, challenge vs. security quality and should not be considered exclusively in either domain.

The notion of creative tension has been discussed in depth because it was central to Pelz and Andrews (1976) findings. Their results are described as eight creative tensions which were consistently found to exist for high performing scientists. Please see Table 1.

The first creative tension concerned science oriented and product oriented activity. It stated:

Effective scientists and engineers in both research and development laboratories did not limit their activities either to pure science or to application but spent some time on several kinds of R & D activities, ranging from basic research to technical research to technical services.

Subjects were asked to rate the amount of time spent in the following R & D functions:

**Research:** discovery of new knowledge, either basic or applied):

a. general knowledge relevant to a broad class of problems.

b. specific knowledge for solving particular problems.

**Development and Invention:** (translating knowledge into useful form):
TABLE 1
Eight Creative Tensions

<table>
<thead>
<tr>
<th>Security</th>
<th>Challenge</th>
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<tbody>
<tr>
<td><strong>Tension 1</strong></td>
<td>Effective scientists and engineers in both research and development laboratories did not limit their activities either to pure science or to application but spent some time on several kinds of R &amp; D activities ranging from basic research to technical services</td>
</tr>
</tbody>
</table>

Active scientists were intellectually independent or self-reliant; they pursued their own ideas and valued freedom... 

But they did not avoid other people; they and their colleagues interacted vigorously... 

**Tension 2** | But young non-Ph.D.'s also achieved if they had several skills, and young Ph.D.'s did better when they avoided narrow specialization |

In the first decade of work, young scientists and engineers did well if they spent a few years on one main project... 

But young non-Ph.D.'s also achieved if they had several skills, and young Ph.D.'s did better when they avoided narrow specialization... 

**Tension 3** | But young non-Ph.D.'s also achieved if they had several skills, and young Ph.D.'s did better when they avoided narrow specialization |

Among mature scientists high performers had greater self-confidence and an interest in probing deeply... 

...At the same time, effective older scientists wanted to pioneer in broad new areas... 

**Tension 4** | More effective were those persons who experienced stimulation from a variety of external or internal sources |

In loosest departments with minimum coordination, the most autonomous individuals, with maximum security and minimum challenge, were ineffective... 

...to important problems faced by the organization... 

**Tension 5** | ...but also when persons in several other positions had a voice in selecting their goals |

In departments with moderate coordination, it seems likely that individual autonomy permitted a search for the best solution... 

Both Ph.D.'s and engineers contributed most when they strongly influenced key decision-makers... 

...but also when persons in several other positions had a voice in selecting their goals... 

**Tension 6** | ...but they differed from colleagues in technical style and strategy (dither or intellectual conflict) |

High performers named colleagues with whom they shared similar sources of stimulation (personal support)... 

...but they differed from colleagues in technical style and strategy (dither or intellectual conflict)... 

**Tension 7** | ...but interest in broad pioneering had not yet disappeared |

R & D teams were of greatest use to their organization at that "group age" when interest in narrow specializations had increased to a medium level... 

...but interest in broad pioneering had not yet disappeared... 

**Tension 8** | ...yet their technical strategies differed and they remained intellectually combative |

In older groups which retained vitality the members preferred each other as motivators... 

...yet their technical strategies differed and they remained intellectually combative...
a. improving existing products or processes
b. inventing new products or processes

Technical Services: (either analysis by standardized techniques or consultation and trouble shooting.

Pelz and Andrews concluded:

Findings indicated that, even in laboratories devoted to pure research, the best performers carried on four functions; they did not concentrate on research alone, but spent time on development or service functions. Performance dropped if Ph.D.'s or assistant scientists tried to perform all five functions. Effective scientists, in short, did not limit their efforts either to the world of pure science or to the world of application but were active in both (1976, p. xix).

Somewhat similar to Tension 1, Tension 3 describes the relationship between scientists' ages, specialization and broad interests. Tension 3 stated, "In the first decade of work, young scientists and engineers did well if they spent a few years on one main project. But young non Ph.D.'s also achieved if they had several skills and young Ph.D.'s did better when they avoided narrow specialization (Pelz and Andrews, 1976, p. xvi).

Pelz and Andrews found that for younger as well as older scientists, security and challenge were required for achievement. Diversity was an important factor in subjects through age 34. The best performers were involved in various areas of specialization, as well as having devoted 2-3 years to one area of study. After age 40, achievement was
highest when subjects were motivated from their own ideas and willing to take risks. After age 50, achievement was also linked with an interest in probing deeply. At the same time, achievement after 50 was also linked strongly with an interest in mapping broad features of new areas. Hence, among older scientists, positive correlations were indicated between performance and both penetrating study and wide ranging study.

Tension 3 was similar in some respects to the "stick to the knitting" attribute of the excellent companies (Peters and Waterman, 1982). This attribute demonstrated that companies performed best when they were skilled and knowledgeable in their specializations, and when they diversified in small manageable steps, maintaining a devotion to their central skill.

Tension 2 dealt with self reliance of scientists as well as their need to communicate with others. It stated: "Effective scientists were intellectually independent or self reliant; they did not avoid other people; they and their colleagues interacted vigorously" (Pelz and Andrews, 1976, p. xvi).

Pelz and Andrews study indicated that the scientists' need for autonomy, and independence of action was very strong. Correlations between intellectual independence (which was measured by stimulus by one's previous work, one's own curiosity and desire for freedom to follow one's
own ideas) and the four performance measures within each category of scientific personnel resulted in a series of 36 correlation coefficients, 25 of which were positive (r = .10 or larger).

In addition to the need for autonomy, effective scientists also interacted several times a week or daily with their most important colleagues and regularly communicated with colleagues in their own section and frequently with ten or more elsewhere in the organization.

According to Pelz and Andrews, independence or self-reliance was a source of security. Interaction with colleagues was a source of challenge, since they may criticize and question. The study found the high contributor experienced a creative tension between independence and interaction.

A study by Paolillo and Brown (1978) indicated similar findings regarding interaction of scientists. This study examined the relationship between product/process innovation and ten selected characteristics of R & D organizations. Eighty-four research scientists and engineers above the technician level were asked to rate the innovativeness of their R & D laboratory on a 5 point scale ranging from non-innovative to highly innovative. The questionnaire was made up of four sections: 1) characteristics of the total R & D subsystem, 2) innovativeness and acquisition of new information, 3) individual characteristics and 4) organizational climate.
The organizational climate data consisted of subjects perceptions of 5 dimensions of organizational climate within the R & D subsystem. The dimensions were: autonomy, creativity, information flow, rewards and training. Findings indicated that characteristics of size (number of R & D employees) and structure (number of formal supervisory levels) were significantly and negatively related to R & D subsystem innovation. Instead of larger R & D units being associated with perceived innovativeness, the smaller ones were perceived by R & D personnel as being more closely associated with innovation. According to Paolillo and Brown (1978), large numbers of research scientists, engineers, and technicians were perceived as a hindrance to innovation. The number of technological forecasting techniques utilized and the R & D budget were unrelated to R & D subsystem innovation. However, the average size of research project teams and the dimensions of organizational climate were significantly and positively related to innovativeness. R & D subsystems which employed large (five man) research teams were perceived to be more innovative than subsystems which utilized smaller (two man) teams. Paolillo and Brown suggested two reasons for the correlation between the size of research project teams and innovativeness. These are: 1) the greater the pool, the greater the probability that one will find a creative individual and 2) the collegial interaction and exchange of ideas offered by larger project teams were
perceived as being conducive to R & D innovativeness. The study does not answer the question of how large the research team could be before size becomes dysfunctional.

Paolillo and Brown's (1978) data indicated that an organizational climate perceived to support the exchange and dissemination of information between R & D personnel was conducive to the adoption of new ideas, techniques or designs. Peters and Waterman (1982) discussed the importance of constant informal and intense communication among people in the excellent companies. In general, research indicated that feedback was an important factor in creativity, especially in creative problem solving in small groups (5-7 members). As Lehr (1979) CEO of the 3M Company pointed out in a recent article, criticism as opposed to constructive feedback was commonly cited as an obstacle to innovators. Studies showed that feedback which motivated without inhibiting the free flow of ideas facilitated creative problem solving (Hoffman, 1978). In a similar study, Oaks, Droge and August (1960) found that general and continuous approval of members' ideas as well as feedback without value judgments, facilitated creative problem solving. Nadler, Mirvis and Cammann (1976) found that employees in bank branches who were involved in a high use of feedback showed more positive changes in some satisfaction and performance indicators than employees involved with less feedback.
Tension 6 of Pelz and Andrews study (1976) reiterates the need for stimulating inter-action among scientists. It stated: "High performers named colleagues with whom they shared similar sources of stimulation (personal support)... but they differed from colleagues in technical style and strategy (dither or intellectual conflict)" (Pelz and Andrews, 1976, p. xvi).

One way to provide challenge in an organization is through the questioning of ideas. A scientist's colleagues may shake up his ideas if he and they approach a problem differently. Pelz and Andrews (1976) referred to this as "dither" or mental challenge and stimulation. To test their hypothesis, they measured similarity or dissimilarity between the scientist and his colleagues. One subjective method was the respondent's perception of how his own technical strategy resembled that of his co-workers. Other measures were objective, and included examining approaches reported by the respondent and by each of his colleagues and numerically scoring the similarity among them.

In attempting to answer what kind of dither or disagreement was healthy, data revealed that it depended on the kind of dither. One objective measure concerned the source of motivation - whether one's superior, the technical literature or another source. Scientists who responded to the same sources were somewhat more effective.
On three other measures, the antithesis was true. Scientists and engineers did somewhat better when they saw themselves as different from colleagues in technical strategy, and when as scored objectively, they differed from colleagues in style of approach (when for example, the individual stressed the abstract, his colleagues the concrete) or differed in career orientation. In striving to make sense of this paradox, Pelz and Andrews referred to data attained by Evan (1965) who studied industrial R & D groups. Evan found that the most effective teams reported personal harmony or liking among members, but there was a strong presence of intellectual conflict. Pelz and Andrews (1976) concluded that colleagues who reported the same sources of motivation as the scientist's own probably provided personal harmony and support—a form of security. When they argued about technical strategy or approach, they provided dither or challenge.

Studies on creative problem solving, as well as the landmark studies by Pelz and Andrews (1966) show considerable evidence that communications, and conflict management are closely linked in terms of the kind of organizational climate they created. In small group work, it was found that free flowing ideas and diverse viewpoints were important elements of creative problem solving (Hoffman, 1959; Hoffman and Maier, 1961; Osborn, 1953; Hoffman and Maier, 1964; Parnes and Meadow, 1959). In a related study, Lewin
(1951) found that interdependence of groups (of which communication is assumed to be functioning as an important element) led to more equal participation under stress. In a discussion of five essentially different roles which are crucial to innovative outcomes, Roberts (1979) stressed that communication between them is the essential link to successful innovation.

Conflict management (indicated by "dither" in Pelz and Andrews study, 1966) also involved a substantial amount of communication. Studies by Hoffman, 1961; Hoffman, Harburg and Maier, 1962; and Guetzkow and Gyr, 1954; demonstrated that the exchange of differing opinions and ideas facilitated creative problem solving. Maier and Hoffman, (1964) demonstrated that positive feelings may be generated through successful resolution of conflicts.

Tension 4 concerned the relationship between individual scientists and the coordination of their departments. Tension 4 stated: "In loosest departments with minimum coordination, the most autonomous individuals, with maximum security and minimum challenge were ineffective . . . More effective were those persons who experienced stimulation from a variety of external or internal sources" (Pelz and Andrews, 1976, p. xvi).

Autonomy of individual scientists were measured by the freedom to choose their own research or development tasks. Each scientist was asked who decided what his technical
goals or assignments were to be. The more weight exerted by the technical man himself, relative to that exerted by his chief, his colleagues or higher executives or clients, the greater his perceived autonomy. The measure identified Ph.D.'s as being highest in autonomy for research and assistant scientists as being lowest (Pelz and Andrews, 1966).

Pelz and Andrews (1976) reasoned that, the more autonomy an individual had, the greater should be the stability and continuity of his work, which also implied greater security. They found this to be true only to the point at which scientists had about half of the weight in choosing their assignments. When Ph.D.'s had more than half the weight in choosing their goals, their performance dropped, whereas for non Ph.D.'s, this same amount of autonomy resulted in increased performance.

According to Pelz and Andrews, (1976) the reason for this inconsistency had to do with the tightness or looseness of coordination within the department, measured by nonsupervisory scientists' ratings of the coordination within their section and supervisor's rating of coordination between sections. A loose organization did not make demands on its members; it provided high security with little challenges.

Pelz and Andrews (1976) found that in the most loosely coordinated departments, highly autonomous individuals actually experience less stimulation, from either external or internal sources. They withdrew from contact with
colleagues; they specialized in narrow areas, and became less interested in their work. In loose settings, maximum autonomy coexisted in an environment of minimum challenge. These findings demonstrated that challenge was an essential ingredient for achievement. Loosely coordinated settings provided great opportunity for diversity in the work, communication with colleagues, competition between groups and involvement in the job. If, however, the individual in this setting isolated himself from the challenges (as many of the highly autonomous scientists did) his productivity decreased.

In the more tightly coordinated settings, Pelz and Andrews found that autonomous persons here had more diversity in their work, not less. They hypothesized that in these departments, the scientist had to face problems important to the organization; personal freedom enabled him to find the best solutions. The emphasis was not on the coordination of the setting or the autonomy alone but on the creative tension between the two.

Tension 4 is nearly identical to the loose-tight properties of the excellent companies (Peters and Waterman, 1982). The loose-tight properties attribute was described as the coexistence of firm central direction and maximum individual autonomy. However, the loose-tight properties that Peters and Waterman referred to included cultural aspects of the companies such as flexible organizational structure, maximized autonomy for individuals; teams and divisions,
extensive experimentation, feedback etc. (loose properties) and shared values, an action focus, emphasis on extremely regular communication etc. (tight properties). The loose-tight coordination of departments in the Pelz and Andrews study is described exclusively by the level of autonomy of work groups. The total response in each subgroup on individual autonomy, or own weight in setting goals, was used to assign a group to one of five levels: very tight, moderately tight, mixed, loose and very loose.

The significance of the tight-loose principle was that it indicated the importance of equal participation among co-workers and top management. It pointed to the need for both individuals and organizations to participate in selecting goals and direction.

Krech, Crutchfield and Ballachy (1962) found that even for groups in which freedom is valuable, an element of leadership is vital to maximize the quality of performance. Maier and Solem (1952) also found that the leader's direction in helping the group to be problem minded rather than solution minded, helped to facilitate creative problem solving. This finding was concurred by Kirton's (1980) theory that individuals have characteristically different styles of creativity, problem solving and decision making. In his theory, adaptors operated cognitively within the confines of the appropriately accepted paradigm within which a problem is perceived. On the other hand, innovators were
more likely to formally or intuitively treat the enveloping paradigm as part of the problem.

Tension 5 addressed the issue of participation in decision making on the part of scientists. Tension 5 stated: "Both Ph.D.'s and engineers contributed most when they strongly influenced key decision makers . . . but also when persons in several other positions had a voice in selecting their goals" (Pelz and Andrews, 1976, p. xvi).

Pelz and Andrews made the assumption that the more sources there were involved in decision making, the more conflict and criticism will provide challenge. At the same time, the more the scientist is able to influence the decision shapers, the more security is provided. Results confirmed this. Both Ph.D.'s and engineers performed well when all four sources had some voice in shaping their goals but when, at the same time, the individual could influence the main decision makers. Creative tension 5 illustrates influence received from others (challenge) combined with influence exerted on others (security).

Solem (1958) found that leaders who encouraged members to discuss their own ideas and make their own decisions were more effective in facilitating creative problem solving than leaders who did not.

Tensions 7 and 8 in Pelz and Andrews' study (1966) described older groups and the conditions which motivated high performance. Tension 7 stated: "R & D teams were of
greatest use to their organization at the group age when interest in narrow specialization had increased to a medium level . . . but interest in broad pioneering had not yet disappeared" (Pelz and Andrews, 1976, p. xvi).

Tension 8 stated: "In older groups which retained vitality, the members preferred each other as collaborators . . . yet their technical strategies differed and they remained intellectually combative" (Pelz and Andrews, 1976, p. xvi).

With regard to age as a variable, Pelz and Andrews hypothesized that as a work group gets older, security was likely to rise and challenge was likely to diminish. They found this to be only partly true. Based on research designed by Wells, a collaborator in the Pelz and Andrews study, group performance generally declined as group age increased, although usefulness was highest for groups with an average tenure of 4 to 5 years. After this time, the average preference for "deep probing of narrow areas" (a source of security) rose steadily as group age increased, while the interest in broad mapping of new areas (a source of challenge) dropped.

Some older groups continued to be useful and technically creative. A quality of cohesiveness was present in those groups which listed other members of the team as their main colleagues. If an older team continued to be cohesive, it stayed effective. Also, those older groups whose members
communicated freely with one another performed better than younger ones did. In addition, Wells found that on the measure of felt similarity of colleagues in technical strategies, performance was higher for older groups when these approaches were most dissimilar.

Other research also found small groups to be an important aspect of innovation. The study by Paolillo and Brown (1978) examined the relationship between product/process innovation and ten selected characteristics of R & D. The data appeared to indicate that R & D innovation is more dependent upon organizational climate dimensions than other organizational (structure-design) characteristics of the R & D unit. Although the findings are based on a limited sample (n=84), their data corroborated some of the conclusions made by Peters and Waterman (1982) regarding small groups and project teams. For example, in Paolillo and Brown's study (1978), small research project teams were considered to be more innovative than large numbers of scientists, engineers and technicians which were seen as hindrances to innovation. Peters and Waterman's (1982) research stressed the importance of chunking; breaking large organizations into many small units to facilitate organizational fluidity and to encourage action. Unfortunately, Paolillo and Brown's study did not describe the quality of these small groups or how they functioned. In contrast, Peters and Waterman referred to the small project teams in the excellent companies as
being outside of the formal organization; they did not appear in the formal organization chart and rarely in the corporate phone directory. According to these authors, one of the distinguishing features of the small group was its flexibility, the voluntary nature of its membership, its limited duration and ability to set its own goals.

Pelz and Andrews (1966) findings regarding R & D teams and small work groups indicated the importance of diversity and a blending of specialization and interest in broad areas. Creative tensions 7 and 8 also indicated the importance of conflict and challenge among colleagues. Paolillo and Brown (1978) illustrated the effectiveness of small research teams and their potential for more innovative activities than large numbers of scientists. Peters and Waterman (1982) characterized small work groups in the excellent companies as temporary, no part of the formal organizational matrix, and composed of volunteers who largely set their own goals.

A limitation of Pelz and Andrews' (1966) study is that women were not included. The number of female scientists and engineers had increased since 1966. Whether there are differences in motivational factors and organizational climate preferences for women scientists is an issue for further study.
In this section, the research on excellent companies by Peters and Waterman (1982) was integrated into a discussion of organizational climate and how it affects creativity. Peters and Waterman's research is extremely important to this study because it investigated how excellent, innovative companies functioned and what factors set them apart from other not so excellent companies. Peters and Waterman have made an important contribution to social science. Because the present study draws heavily from their research, a more detailed analysis of the excellent companies is covered in the next section.

Excellent Companies and Innovation

The rational model of organizational management has dominated business and academic institutions since Fredrick Taylor published his book on scientific management in 1911. The rational model taught detached, analytical justification for all decisions. It was extremely conservative and valued cost reduction over revenue enhancement. The rational model made sense up to now because business conditions were simpler, especially after World War II, when there was an accumulated demand for products. In addition, the post depression work force valued the stability of a job above its quality and took great pride in producing American products. Finally, there was not the stringent international
competition that exists today. According to Peters and Waterman (1982), the rational model of organizational management has become increasingly narrow and dysfunctional. For example, it does not teach: 1) love of the customer, 2) making the average worker a prized employee and a consistent winner, 3) how strongly workers can identify with their work if they participate in some decision making, 4) why self-generated quality control is more effective than inspector-generated quality control, 5) how to nourish product champions, 5) how to encourage in house product line competition and duplication, 6) to overspend on quality, 7) to overkill on customer service and 8) to make products that last and work (Peters and Waterman, 1982, p. 29).

Since negativity is often the product of narrowly defined rationality, a pure analytic approach results in an abstract, heartless philosophy. (Peters and Waterman, 1982) In the opinion of these authors: "today's version of rationality does not value experimentation, abhors mistakes and does not celebrate informality" (p.47). The terminology of the rational process used such words as analyze, plan, tell, specify and check-up. Words of the informal managing process include: interact, test, try, fail, stay in touch, learn, shift direction, adapt, modify and see.

A major difference between the rational and non-rational model is how each viewed the concept of values. In the rational model, the importance of values was denigrated;
in the non-rational model, it was emphasized. Peters and Waterman (1982) claimed that the major decisions of excellent companies depended more on their values than on superb analytic skills. They had strong functional cultures which focused on the product and the people who made and sold it.

A new non-rational theory of management argued that "man is quite strikingly irrational" and reasons more often by intuition than by rationality (Peters and Waterman, 1982, p. 86). Qualities of a new theory of management included: 1) accepting the limits of rationality, 2) accepting basic human needs in organizations such as: peoples' need for meaning, peoples' need for a modicum of control, peoples' need for positive reinforcement, to think of themselves as winners in some sense, and the degrees to which actions and behaviors shape attitudes and beliefs rather than vice versa (Peters and Waterman, 1982).

Also needed in a new theory according to Peters and Waterman (1982) was the realization that companies, particularly the excellent ones, are distinctive cultures and emerged through purposeful but specifically unpredictable evolution.

An examination of forty-three excellent companies by Peters and Waterman (1982) supported the initiation of a new theory of management. These researchers began with a sample of sixty-two companies considered to be innovative and excellent by an informed group of observers of the business

In order to qualify as excellent, a company must have been in the top half of its industry in at least four out of six of these measures over the full twenty year period. As a result, 19 companies were dropped from the sample.

The final criteria of excellence was a measure of innovativeness. To obtain this measure, selected industry experts were asked, "to rate the company's twenty year record of innovation, defined as a continuous flow of industry
bellwether products and services and general rapidness of response to changing markets and other external dynamics" (Peters and Waterman, 1982, p. 23).

All companies which passed these hurdles for excellence were found to have eight basic attributes: 1) a bias for action, 2) close to the customer, 3) autonomy and entrepreneurship, 4) productivity through people, 5) hands-on value driven, 6) stick to the knitting, 7) simple form, lean staff and 8) simultaneous loose-tight properties.

An important quality of the excellent companies was their ability to manage ambiguity and paradox. Traditional management theories were straightforward, largely without ambiguity or paradox. For example, the emphasis of the Weber-Taylor school (from 1900 to 1930) was to suggest that if a specific body of rules and techniques could be learned and mastered, then all the major concerns of managing large organizations would be solved. This era was known as the "closed system-rational actor" era. From 1930 to 1960, this era was replaced by the "closed system-social actor" era, led by Elton Mayo, (1933), Douglas Mcgregor (1960), Chester Barnard (1968), and Philip Selznick (1957). Whereas the rational model was a pure top-down method, the social model, especially influenced by McGregor's dichotomous X and Y theories, became a pure bottom-up method. Barnard and Selznick's contributions were important in that they identified the importance of culture in organizations and of managing
the organization "as a whole." Two of Peters and Waterman's findings (the correlatives of autonomy and entrepreneurship and of productivity through people) were consistent with McGregor; three others (hands on, value driven; stick to the knitting; and simultaneous loose-tight properties) reflected writings of Barnard and Selznick.

The third era, from 1960 to 1970 was named by Scott (1978) as the "open system, rational actor" era. This era contributed an understanding of a company as part of a competitive marketplace, influenced by forces outside itself.

The fourth era began in 1970 and continues to the present. Scott (1978) called its theoretical position, "open system-social actor." This era emphasized informality, individual entrepreneurship and evolution. Major shifts in thought of this era are reflected by the use of new metaphors to describe managing. For example, Weick (1977) and March and Olsen, (1976) have contrasted the old military metaphors with new ones such as sailing, playfulness, seesaws, space stations, garbage cans, marketplaces and savage tribes. According to Peters and Waterman, (1982), the excellent companies were able to manage the inherent ambiguity and paradox which are inevitable when large groups of people work together. These authors maintained that a new theory which incorporates ambiguity and paradox will first accept the limits of rationality and take into account: 1) people's need for meaning, 2) people's need for a modicum
of control, 3) people's need for positive reinforcement, to think of themselves as winners in some sense, and 4) the degrees to which actions and behaviors shape attitudes and beliefs rather than vice versa. Two additional ideas which Peters and Waterman stressed were: 1) the notion of companies, especially the excellent ones, as distinctive cultures, and 2) the emergence of the successful company through purposeful but specifically unpredictable evolution. By evolution, they mean that the excellent companies are "learning organizations which create their own internal marketplace." They experimented more, encouraged more tries, kept things small, interacted with customers, encouraged internal competition, and maintained a rich informal environment. A description of the eight attributes follows:

1. **A bias for action**: Excellent companies had an action orientation, a bias for getting things done. They appeared to avoid the bureaucratic network of committees and task forces that inhibit creativity and slow progress. Communication appeared to be central to the action bias; large networks of informal, open communications exist. "Management by Walking Around" is a common facilitator of informal communication. Escalators rather than elevators were used for more face to face contact. Chalkboards and small groups of tables and chairs were set up informally for spontaneous problem solving sessions.
An underlying principle of the action orientation is chunking which means breaking things up to facilitate organizational fluidity and to encourage action. These "chunks" came in the form of champions, teams, task forces, czars, project centers, skunk works and quality circles. Yet, they were not formalized within the organization (Peters and Waterman, 1982).

The small group was the most visible of the chunking devices and formed the basic organizational building blocks of excellent companies. Teams that were made up of volunteers were of limited duration and who set their own goals were found to be the most productive.

Ad Hoc task forces which worked productively in the excellent companies did not get bogged down with bureaucratic mazes and producing 100 page reports. They usually consisted of ten or less people and the reporting level as well as the seniority of its members, was proportional to the importance of the problem (Peters and Waterman, 1982). The task force existed for four months or less and membership was usually voluntary. The goal of these task forces was to get results, to solve a particular problem. Senior management followed up quickly and encouraged fast results; consequently there was very little documentation.

Another quality of the bias for action was incessant experimenting. The excellent companies have had much more success by market testing a new product than improving it
before putting it on the market. Instead of carefully selected experimentation, the excellent companies encouraged small failures. They valued action above planning, doing and thinking, the concrete above the abstract.

2. Close to the customer: The excellent companies faithfully practiced policies of devoted service and attention to customers. In a recent study, Nemeroff (1980) found three major themes of an effective service orientation: a) intensive, active involvement on the part of senior management, b) a strong people orientation and c) a high intensity of measurement and feedback.

Excellent companies were leaders in nichmanship which means dividing a company's customer base into numerous segments so they can provide tailored products and service. Peters and Waterman (1982) found five fundamental attributes of those companies that were close to the customer through niche strategies: a) astute technology manipulation, b) pricing skill, c) better segmenting, d) a problem solving orientation and e) a willingness to spend in order to discriminate.

Where many companies claimed to pay close attention to customer concerns, the excellent companies were in practice, more motivated in customer service than in technology and cost concerns.

3. Autonomy and Entrepreneurship: The key to innovation in the excellent companies was the ability to be big
and yet to act small at the same time. Small groups of eight to ten people referred to as skunk works and bootleggers, worked on innovative ideas, often outproducing product development groups of one hundred or more. Radical decentralization and autonomy accompanied by lack of coordination, internal competition, and chaotic conditions, provided an environment in which the entrepreneurial spirit could grow. germane to the entrepreneurial activity were product champions; individuals who developed a pet project and pushed for its support and completion. In spite of consistent failures of champions, excellent companies supported their numerous tries, in an attempt to succeed more often than their competitors.

In the excellent companies, there were five attributes of communication systems that appeared to encourage innovation: a) communication systems were informal, b) communication intensity was extraordinary, c) communication was given physical supports, e.g. long tables in the dining rooms where strangers may come into contact; blackboards and small conference rooms strategically placed to encourage problem solving and idea exchange, d) forcing devices, such as individuals assigned to shake up the system by introducing new ideas, new methods, new information from other companies and from customers, and e) the intense, informal communication system acted as a remarkably tight control system in that lots of people checked frequently and
informally on projects to see how they were progressing (Peters and Waterman, 1982)

Another aspect of innovation in the excellent companies was a substantial tolerance for failure. However, large unredeemable failure occurred rarely because of the close communication and supervision which was present in virtually all projects.

In a short case history of innovation at 3M, Peters and Waterman (1982) summarized the factors responsible for 3M's innovation success. They reported:

...heroes abound; the value system focuses on scrounging; it's ok to fail; there's an orientation toward nichmanship and close contact with the customer; there's a well understood process of taking small, manageable steps; intense, informal communication is the norm; the physical setting provides plenty of sites for experimentation; the organizational structure is not only accommodating but highly supportive of 3M style innovation; and the absence of overplanning and paperwork is conspicuous, as is the presence of internal competition. That's about a dozen factors. And its all of them functioning in concert over a period of decades that makes innovation work at 3M (Peters and Waterman, 1982, p. 234).

4. Productivity through people: The excellent companies treated people as adults, as partners, with dignity and respect. They managed people by communicating to them that they were the most important aspect of the company. By accentuating the positive, they achieved extraordinary results through ordinary people. Programs which motivated people were numerous and constantly changing in the
excellent companies. They included but were not limited to team building, T-groups, conflict management, MBO systems, quality circles and monetary incentives. The essential quality of these programs, however, was that they were not just lip service or gimmick laden. They were diverse programs initiated and supported by top management.

The language in people oriented companies had many common themes. For example, expressions such as family feeling, open door, rally, jubilee, management by wandering around, and on stage represented the important people aspects inherent in the philosophy of the organization.

Managers in the excellent companies were recruited very carefully and screened intensely. Soon after hiring they were placed in "hands dirty" jobs in the mainstream of the business, and usually at the bottom. (Peters and Waterman, 1982) Part of the management philosophy was to make virtually all company related information available to all employees. In many excellent companies, peer reviews were tools used to encourage internal competition and peer pressure. For example, one company does not demand a certain quantity of production from the division manager. Instead, it brought the manager in for ten days a year, to a pair of five day "Hell Weeks" to trade results on productivity improvement with other division managers. Information, as such, is made available and people responded to it.
Peters and Waterman (1982) also found less obvious structuring and less layering at the excellent companies. They wrote: "Excessive layering may be the biggest problem of the slow moving, rigid bureaucracy" (p. 270). In fact, an important aspect of the excellent companies was their ability to break large organizations into very small productive work groups such as teams, sections or quality circles. Through the creation of small work groups, peer reviews, positive reinforcement, and providing available information to all, the excellent companies practiced daily the belief that people were their most important asset.

5. Hands on, value driven: This attribute described the explicit attention paid to values in the excellent companies and the way in which their leaders developed stimulating environments through personal attention, persistence and direct intervention at all levels of management. Each excellent company was clear on what it stood for and on the importance of shaping values. The excellent companies had rich collections of legends and myths which supported their basic beliefs, and served as sources of inspiration and motivation. Despite varying values among the excellent companies, there were some themes which they all had in common. First, the values were usually stated in qualitative rather than quantitative terms. Financial and strategic objectives were discussed only with regard to other important activities of the company. The notion that profit is a natural
bi-product of doing something well, rather than an end in itself, was stressed by all the excellent companies. A second theme representative of an effective value system was the effort to inspire the people on the lowest levels of the organization. A summary of the dominant beliefs of the excellent companies included: 1) a belief in being the "best", 2) a belief in the importance of the details of execution, the nuts and bolts of doing the job well, 3) a belief in the importance of people as individuals, 4) a belief in superior quality and service, 4) a belief that most members of the organization should be innovators, and its corollary, the willingness to support failure, 6) a belief in the importance of informality to enhance communication, and 7) explicit belief in and recognition of the importance of economic growth and profits (Peters and Waterman, 1982, p. 285).

6. **Stick to the knitting**: Companies performed best when they were skilled and knowledgeable about their particular business. They may have branched out through acquisition or internal diversification, but they must stick very close to their knitting to outperform the others (Peters and Waterman, 1982, p. 293). It appeared that some diversification was a basis for stability through adaptation, but arbitrary or sporadic diversification often failed disastrously. The excellent companies acquired and diversified in small manageable steps, retaining a devotion to their central skills.
7. **Simple form, lean staff:** The excellent companies retained a simplicity of form, which avoided complex matrix organizational structures. According to Peters and Waterman (1982) the excellent companies retained a stable, unchanging form such as the product division, that provided the essential landmark which everyone understood and from which the complexities of day to day life could be approached. In spite of the simplicity regarding its basic form, the excellent companies were very flexible in responding to changing conditions in the environment. By using small, often temporary ad hoc groups, they reorganized more flexibly, frequently and fluidly.

8. **Simultaneous loose-tight properties:** This was the co-existence of firm central direction and maximum individual autonomy. Organizations which made use of the loose-tight principle were rigidly controlled, yet simultaneously insisted upon autonomy, entrepreneurship and innovation from their employees. Loose-tight properties mainly represented the culture of the company and how it contributed to control and motivation at the same time. For example, loose traits included campus-like environments, flexible organizational structures, volunteers, zealous champions, maximized autonomy for individuals, teams and divisions, regular and extensive experimentation, feedback and focusing on positive and strong social networks. Tight properties included rigidly shared values, an action focus, emphasis on extremely
regular communication and almost immediate feedback, concise paperwork, attention to the customer and a focus on realism. It was this combination of loose-tight properties which made innovation and accountability function simultaneously in the excellent companies.

To summarize, the excellent companies were selected according to high financial standards and the ability to be highly innovative. Companies judged to be excellent demonstrated several qualities associated with a non-rational versus a rational model of management; one which embraced and understood the inherent paradox in human interaction. This has sparked new metaphors and a new language for discussing management practices in the excellent companies. The eight basic attributes which characterized the excellent companies were: 1) a bias for action, 2) close to the customer, 3) autonomy and entrepreneurship, 4) productivity through people, 5) hands on, value driven, 6) stick to the knitting, 7) simple form, lean staff and 8) simultaneous loose-tight properties. These attributes, functioning together created conditions which resulted in highly successful and innovative companies.

These attributes described company philosophies and practices which clearly resulted in excellent performance by certain companies. Peters and Waterman's (1982) research was an exploratory study and did not empirically examine organizational climate per se. It is probable that a great
many future studies based on their initial work will yield much more information about how industry can be more productive and creative. However, at this time, there is a scarcity of literature regarding organizational climate and how it specifically affects creativity. In the last section of the literature review, a synthesis of the research is presented and some tentative conclusions regarding organizational climate and creativity are drawn.

Summary of the Literature

What can we conclude about the effects of organizational climate on creativity? Based on the literature, the following conclusions may be drawn. First organizational innovation can be viewed as self design or adaptability (Lawler and Drexler, 1981; Abend, 1979; Weick, 1977; Kimberley and Evanisko, 1981; Moch, 1976; Peters and Waterman, 1982). In this view, organizational climate affected creativity through sustaining an atmosphere which supported and encouraged improvisation, opportunities, invention of new solutions, cultivating impermanence, valuing conflict over serenity, relying on diverse measures to assess performance and continuous experimentation.

Second, corporate creativity was related to occupational rather than organizational identification (Rotundi, 1974). Rotundi's study demonstrated that intrinsic rewards
of creativity were more powerful motivators for R & D personnel, than extrinsic rewards. Intrinsic rewards included professional development, interpersonal competence and participation in decision making.

Third, an optimum climate for research scientists involved the presence of antithetical conditions: security and challenge (Pelz and Andrews, 1976). The security condition offered scientists stability and continuity by providing some protection from environmental demands. The challenge condition referred to an organizational climate in which associates held conflicting views which required periodic disruption of established patterns. These two conditions existing simultaneously (like Peters and Waterman's (1982) loose-tight properties) contributed to an organizational climate in which creativity could flourish.

Fourth, the size and interaction of research teams (five man vs. two man) were significantly related to creativity (Paolillo and Brown, 1978). These authors found that an organizational climate perceived to support the exchange and dissemination of information between R & D personnel was conducive to the adoption of new ideas, techniques or designs. Research found that feedback, communication and intellectual conflict contributed to creativity (Lehr, 1979; Nadler, Mirvis and Cammann, 1976; Paolillo and Brown, 1978).
The major purpose of this study was to determine the extent to which organizational climate (as measured by the Profile of Organizational Practices scales) contributed significantly to explain the variance of high corporate creativity. Based on the previous studies which have been done regarding this research question, several conclusions were drawn.

The literature suggested that the Communications, Meeting Effectiveness, Decision Making, Conflict Management and Feedback and Rewards on Performance scales of the POP would correlate highly with corporate creativity. This was based on the studies by Pelz and Andrews (1966) and Peters and Waterman (1982) which indicated the importance of constant and sometimes inharmonious communication among colleagues, superiors and outside sources for stimulating creativity. Since communication appears to be the central issue in stimulating creativity for scientists, it seemed to indicate that all activities which are related to communication would strongly affect creativity.

Based on Pelz and Andrews (1976) Tension 5 (Table 1), it was assumed that the Leadership scale would not contribute to creativity. Leadership is influential only in so far as there is productive communication between management and R & D personnel in which the latter are able to have
influence on key decision making. Empirical studies have demonstrated that leadership is not an inherent trait but a dynamic process which is different with various leaders, followers and situations (Jennings, 1961). After much research on leadership (Tannenbaum and Schmidt, 1957; Katz, Macoby and Morse, 1950; Katz, Macoby, Gurin and Floor, 1951; Cartwright and Zander, 1960; Stogdill and Coons, 1957; Blake and Mouton, 1964) two major issues emerged as central to leadership effectiveness. These were task and relationship issues. No longer are these considered to be mutually exclusive, but they must be combined for effective leadership. Research has explored various continuums of democratic and autocratic leadership styles (Likert, 1961; Halpin and Winer, 1952; Hersey, 1965) in order to identify an ideal leadership style. If leadership process is defined as a function of the leader, the followers, and other situational variables, the quest for a single ideal type of leader behavior appears unfounded (Hersey and Blanchard, 1982).

The focus on effective leadership has shifted from questions of a "best" style, to the most effective styles for a particular situation. Fiedler (1967) in his Leadership Contingency Model, has suggested two leadership styles which may be effective in eight different situations which are based on three central situational variables. These leadership styles, task-oriented and relationship oriented, are extremely limited in terms of describing possible
leadership behavior. To integrate the behaviors of effective leadership style as well as the situational variables involved, Hersey and Blanchard developed the Tri-Dimensional Leader Effectiveness Model. This model was influenced by William Reddin (1970) who was the first to add an effectiveness dimension to the task and relationship dimensions of earlier models such as the Managerial Grid (Hersey and Blanchard, 1982). The Tri-Dimensional Leader Effectiveness Model suggested that certain leader behavior styles were appropriate only in certain situations. According to Hersey and Blanchard, "effective leaders adapt their leader behavior to meet the needs of their followers and the particular environments" (p. 103).

Since the needs and environments of R & D personnel were found to be related to issues of security and challenge (Pelz and Andrews, 1976), effective leadership should provide ample opportunities for stability and autonomy as well as stimulation from other colleagues.

The literature suggests that the Performance Appraisal and Career Development scales will not correlate with creativity. These scales focused more on extrinsic rather than intrinsic rewards. The scales did not include aspects of career development that refer to intrinsic rewards such as peer reviews, inter-divisional competition, involvement in diverse activities, ability to influence key decision makers, freedom to pursue "pet" projects, etc.
The Role Clarity and Standards scale has three subscales: clarity, standards, and expectations. The literature suggested that the clarity subscale will correlate negatively with corporate creativity simply because clearly defined roles have not been found to be relevant to creative performance. The standards subscale, which measures consistency and clarity of policies and objectives may be related to the security issues discussed by Pelz and Andrews (1966) and the tight properties discussed by Peters and Waterman (1982). Research suggested that the standards subscale of the Role Clarity and Standards scale will correlate with corporate creativity as it provides the stability and clear values and philosophy which Peters and Waterman identify as crucial to innovative performance in the excellent companies. The expectations subscale of the Role Clarity and Standards Scale will not correlate with corporate creativity because it measures extrinsic variables related to organizational identification which have been found to be unrelated to scientists' performance (Rotundi, 1974).

To summarize, the literature suggested that the Communication, Decision Making, Conflict Management, Meeting Effectiveness and Feedback and Rewards on Performance scales will correlate more highly with corporate creativity than any other scales. The Communication and Conflict Management scales will correlate the most highly. The Leadership scale will correlate with creativity only if communication and
ability to influence decision making is a part of scientists' perceptions of their leadership. The Performance Appraisal and Career Development scales will not correlate very highly with corporate creativity since they measure extrinsic rather than intrinsic rewards. The clarity subscale of the Role Clarity and Standards Scale will be negatively correlated with corporate creativity since research scientists usually require somewhat ambiguous and unclear roles for high performance. The standards subscale of the Role Clarity and Standards scale will probably correlate with corporate creativity since stability and shared values have been connected to innovative companies. The expectations subscale of the Role Clarity and Standards scale will not correlate with corporate creativity. This is because it measures extrinsic variables related to organizational identification which have been found to be unrelated to scientists performance (Rotundi, 1974). The Role Conflict and Overload scale will not correlate highly with creativity because it measures aspects of role conflict and individual value systems which are unrelated to creativity.

In the next chapter, the design of the study is described. This includes the hypotheses, definitions and procedure as well as the statistics used to analyze the results. It also describes the sample, \( n = 65 \), the variables (organizational climate and corporate creativity) and
the instrumentation (Profile of Organizational Practices) used in the study.
CHAPTER III
DESIGN OF THE STUDY

Hypotheses

This study sought to determine the extent to which the following organizational climate measures, i.e. Communications, Meeting Effectiveness, Decision Making, Leadership, Role Clarity and Standards, Career Development, Conflict Management, Role Conflict and Overload, Performance Appraisal and Feedback, and Rewards on Performance contribute significantly to explain the variance of high corporate creativity as measured by unpublished technical manuscripts, reports or talks inside or outside the organization and technical papers accepted by professional journals.

In examining the P.O.P. instrument, the following hypotheses were tested:

Hypothesis I: High scores on each scale will correlate with high scores on the organizational climate measure as a whole.

This is to determine the extent to which a given scale, when submitted to the same subjects, produces scores corresponding to the total scores which might have been obtained
if all other variable scores were combined (Taylor and Bowers, 1972).

**Hypothesis II:** High scores on one scale will correlate with each of the other scales on the organizational climate measure.

This is to determine that the scales on the organizational climate instrument are representing one phenomenon, defined as organizational climate.

**Hypothesis III:** The Communication, Meeting Effectiveness, Decision Making, Conflict Management and Feedback and Rewards on Performance scales will correlate highly with creativity.

**Hypothesis IV:** The Communication and Conflict Management scales will correlate the most highly with creativity.

**Hypothesis V:** The Performance Appraisal, Career Development, Leadership and Role Conflict and Overload scales will not correlate with creativity.

**Hypothesis VI:** The clarity subscale of the Role Clarity and Standards scale will correlate negatively with creativity.
Hypothesis VII: The standards subscale of the Role Clarity and Standards scale will correlate with creativity.

Hypothesis VIII: The expectations subscale of the Role Clarity and Standards scale will not correlate with creativity.
Organizational Climate

P.O.P. Scales:

Communications

Meeting Effectiveness

Decision Making

Leadership

Role Clarity and Standards

Career Development

Conflict Management

Role Conflict and Overload

Performance Appraisal

Feedback and Rewards on Performance

Corporate Creativity

- unpublished technical manuscripts reports or talks inside or outside organization.
- technical papers accepted by professional journals.

Figure 1. Organizational climate measures and how they may contribute to explaining corporate creativity.
Definition of Terms

Corporate Creativity: New products, new processes which have resulted in published or unpublished technical manuscripts, reports or formal talks (either inside or outside the company) produced by R & D divisions during the period from September 1981 to September 1983 (Adapted from Pelz and Andrews, 1976, p. 271).

Creativity: A quality which characterizes persons and or organizations and enables them to think up or generate novel approaches in situations (Adapted from Mars, 1969).

Innovation: A quality which characterizes persons and/or organizations and enables them to apply novel approaches to situations to reflect new and improved solutions to problems (Adapted from Mars, 1969 and Peters and Waterman, 1982).

Organizational Climate: A relatively enduring quality of the internal environment of an organization that: a) is experienced by its members, b) influences their behavior and c) can be described in terms of the values of a particular set of characteristics (or attributes) of the organization (Tagiuri and Litwin, 1968, p. 27).
Patents: The technological activity of individuals or organizations in which a new product or process is protected by a trademark or a trade name so as to establish proprietary rights to it.

Profile of Organizational Practices (P.O.P.): An instrument developed by Zigarmi Associates and Blanchard Training and Development (1982) which uses the following scales to measure organizational practices: communications, meeting effectiveness, decision making, leadership, role clarity and standards, career development, conflict management, role conflict and overload, performance appraisal, and feedback and rewards on performance. These scales and their corresponding subscales are described in Appendix A.

Procedure

Sample

The subjects in this study consisted of 65 employees from two research and development divisions in two American companies. There were 42 individuals from one company and 23 from the other. Of the subjects, 78.5% had Ph.D.'s, 12.3% had Masters degrees. The rest (7.79%) had bachelor's degrees, high school degrees or specialized technical training. Ages of subjects ranged from under 28 years to over 56 years of age with 7.7% under 28, 26.2% between 29 and 35
years, 33.8% between 36 and 45 years, 20% between 46 and 55 years and 12.3% over 56 years of age. Regarding work experience, 32.3% worked from 1 to 5 years with the company, 33.8% worked from 5 to 15 years, 21.5% worked from 15 to 25 years and 12.3% worked over 25 years with the company.

Data which described the organizational climate and corporate creativity as measured by the P.O.P. and the creativity measure was collected.

Criteria for Selection

Two highly innovative companies were chosen for the study based on the list of innovative (excellent) companies in the study by Peters and Waterman (1982) and the 146 most patent active companies listed in the 1981 publication from the U.S. Department of Commerce report on patent activity. Other criteria for selection included:

1. Companies large enough to be publicly owned so that necessary demographic information was accessible.
2. Companies which had Research and Development divisions with at least 20 employees.
3. Companies whose Research and Development Divisions specialized in areas such as pharmaceuticals, high technology, electronics and electrical equipment; areas which provided ample opportunity for creative products, processes and patents. This eliminated companies such as steel or oil or other companies for which new products are a rare occurrence.
Variables

The Independent Variable was "organizational climate" which was defined as: a relatively enduring quality of the internal environment of an organization that: a) is experienced by its members, b) influences their behavior and c) can be described in terms of the values of a particular set of characteristics (or attributes) of the organization (Tagiuri and Litwin, 1968, p. 27).

Organizational climate was measured by the P.O.P. (Profile of Organizational Practices).

The Dependent Variable was "corporate creativity" and was defined as and measured by the new processes and products which resulted in published and unpublished technical manuscripts, reports or formal talks (either inside or outside the company) during the period from September 1981 to September 1983.

Instrumentation

One instrument was used to assess organizational climate. This instrument was called the Profile of Organizational Practices and was developed by Zigarmi Associates, Inc. and Blanchard Training and Development, Inc. 1982. The P.O.P. was chosen because it measured all of the salient issues inherent in assessing the general climate of an
organization. For example, Taylor and Bowers (1972) developed a standardized questionnaire to survey various dimensions of organizations, one of which was organizational climate. A general definition of organizational climate by Tagiuri and Litwin (1968) which they cited was:

Organizational climate is a relatively enduring quality of the internal environment of an organization that (a) is experienced by its members, (b) influences their behavior and (c) can be described in terms of the values of a particular set of characteristics (or attributes) of the organization (1968, p. 27).

Taylor and Bowers (1972) specifically measured organizational climate on the basis of three premises. 1) The first premise was that groups, rather than isolated individuals, form the basic building blocks of organizations. 2) The second premise was that those groups are interlinked by their functional and hierarchical ties. 3) The third premise was that the functioning patterns existing outside a certain group, usually those above it, affected corresponding functional patterns within that focal group. In effect, organizational climate indicated the accumulated effects of the ways in which other groups actually developed (Taylor and Bowers, 1972, p. 62).

The organizational climate indicators used in Taylor and Bowers' questionnaire were based on Likert's research and included: the character of motivational forces, communication processes, coordination processes, decision making
and goal setting practices and control and influence processes.

The Taylor and Bowers' instrument (1972) was standardized and had been used with a number of companies. Although the cost involved with this instrument prohibited its use in this study, it was used as a model representation of how organizational climate can be effectively measured.

The P.O.P. measured many of the same kinds of factors and conditions as the Taylor and Bowers instrument. It had ten separate scales, with three or more subscales resulting in a total of 156 questions. The first scale in this instrument was **Communications** which measured respondents' perceptions as to how well information was shared among groups. **Meeting Effectiveness** measured respondents' perceptions as to the effectiveness of the meetings they attended. **Decision Making** was a scale designed to measure the perceptions held toward the effectiveness of the decision making process and the amount of input that was allowed in the process. The **Leadership** scale was designed to examine employee perceptions of bosses' competency, helping skills, and ability to motivate. **Role Clarity and Standards** was a scale designed to measure peoples' perceptions about the clarity of the roles and standards set for those roles. **Career Development** was a scale designed to measure respondents' perceptions about opportunities for personal development and career advancement. The scale **Conflict Management**
was designed to assess respondents' perceptions concerning how interpersonal conflict was managed. **Role Conflict and Overload** was a scale designed to measure respondents' perceptions as to the amount of overlapping functions that existed in their jobs. **Performance Appraisal** was a scale designed to assess respondents' perceptions about the company's appraisal process. **Feedback and Rewards on Performance** was designed to measure respondents' perceptions concerning the amount of feedback and appropriateness of rewards for good job performance (Zigarmi Assoc., 1983).

According to the literature reviewed, the P.O.P. appeared to be consistent with measures of organizational climate (Pelz and Andrews, 1976; Mars, 1976; Carney, 1981; Argyris, 1965; Gershinowitz, 1960; Kaplan, 1964; Kottcamp, 1979; Moch, 1976; Raudsepp, 1958; Roberts, 1979). Within each of the scales was a series of subscales; each measured a different aspect of a particular scale. These subscales as well as the scales are described in more detail in the Appendix A. Procedures to measure validity and reliability of the P.O.P. were conducted in the following ways.

First, in an effort to determine construct validity, Zigarmi Associates examined seven other commercial instruments which were designed to assess organizational climate. Next, they ran a factor analysis on the instruments. From a total of 270 items, the factor analysis yielded 13 different factors which were involved in assessing organizational
climate. The factor analysis reaffirmed the categories generated by the P.O.P. minus three scales which were considered redundant and discarded by Zigarmi Associates.

In testing reliability of the P.O.P., a method was used which utilized a single administration of a single form and was based on the consistency of responses to all items in the test. This interitem consistency is influenced by two sources of error variance: 1) content sampling (as in alternate-form and split-half reliability) and 2) heterogeneity of the behavior domain sampled. The more homogeneous the domain, the higher the interitem consistency. The most common procedure for finding interitem consistency was that developed by Kuder and Richardson (1937). As in the split half methods, interitem consistency was found from a single administration of a single test. Instead of requiring two half scores however, this technique was based on an examination of performance on each item. While the Kuder-Richardson formula was applicable to instruments whose items were scored as right or wrong, the P.O.P. was composed of multiple-scored items such as strongly disagree, agree, slightly disagree etc. For instruments such as the P.O.P., a generalized formula has been derived which was called a "coefficient alpha" (Cronbach, 1951). In this formula, the procedure was to find the variance of all individuals' scores for each item and then to add these variances across all items (Anastasi, 1976, p. 117).
To test its reliability, the P.O.P. was distributed to two organizations: Gulf Oil (n = 250) and the Border Patrol (n = 300). Zigarmi Associates then ran the coefficient alpha statistic on the ten scales of the P.O.P. to test internal consistency (reliability) of the instrument. The reliability coefficients of each subscale were:

<table>
<thead>
<tr>
<th>Scales</th>
<th>Subscales</th>
<th>Reliability</th>
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</thead>
<tbody>
<tr>
<td>Communications</td>
<td>Top Management</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td>Boss or Supervisor</td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td>Co-workers</td>
<td>.79</td>
</tr>
<tr>
<td>Meeting Effectiveness</td>
<td>General Attitudes</td>
<td>.87</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>.90</td>
</tr>
<tr>
<td></td>
<td>Group Leader</td>
<td>.83</td>
</tr>
<tr>
<td>Decision Making</td>
<td>General Attitudes</td>
<td>.78</td>
</tr>
<tr>
<td></td>
<td>Boss</td>
<td>.82</td>
</tr>
<tr>
<td></td>
<td>Self</td>
<td>.44</td>
</tr>
<tr>
<td>Leadership</td>
<td>Competency</td>
<td>.82</td>
</tr>
<tr>
<td></td>
<td>Helping</td>
<td>.87</td>
</tr>
<tr>
<td></td>
<td>Motivating</td>
<td>.76</td>
</tr>
<tr>
<td>Role Clarity and Standards</td>
<td>Clarity</td>
<td>.76</td>
</tr>
<tr>
<td>---------------------------</td>
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<tr>
<td></td>
<td>Standards</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td>Expectations</td>
<td>.57</td>
</tr>
<tr>
<td>Career Development</td>
<td>General Attitudes</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>Experience with Career Development Program</td>
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<td></td>
<td>Importance of Career Development</td>
<td>.80</td>
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<tr>
<td>Conflict Management</td>
<td>Intergroup Relations</td>
<td>.79</td>
</tr>
<tr>
<td></td>
<td>Boss or Supervisor</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>Work Group</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td>General Attitudes</td>
<td>.75</td>
</tr>
<tr>
<td>Role Conflict and Overload</td>
<td>Conflict</td>
<td>.72</td>
</tr>
<tr>
<td></td>
<td>Two Group Conflict</td>
<td>.82</td>
</tr>
<tr>
<td></td>
<td>Mixed Messages</td>
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<td></td>
<td>Personal Values</td>
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<tr>
<td></td>
<td>Overload</td>
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<td>Performance Appraisal</td>
<td>General Attitudes</td>
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<td></td>
<td>Boss</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>Self</td>
<td>.89</td>
</tr>
</tbody>
</table>
To determine content validity, the distillation of the items on the commercial instruments was done, followed by the factor analysis as described previously. The P.O.P. was then administered to the Chevron Company. Before results from this company were received, Zigarmi Associates interviewed fifty randomly selected managers at all levels in the company. Managers were asked a series of broad questions about the company such as:

- What do you see as the strengths of this company?
- What do you see as the weaknesses of this company?
- How do you separate poor performers from good performers?
- How clear are you about your job responsibilities?
- What do you like most about your job?
- What do you like least about your job?
- If you could change one thing around here, what would it be?
- How do you know you have done a good job?
- What do you think of the supervisors (leadership) of this company?
Answers to these questions were written up in a report and subsequently compared with results from the P.O.P. instrument to determine the similarities. No knowledge of the P.O.P. results was obtained during the writing of the report. According to Zigarmi Associates, the same issues (positive and negative) which emerged through the interviewing, also showed up in the instrument results. Zigarmi Associates then concluded that the content of the P.O.P. was valid and measured what it purported to measure.

Design

Selection of the companies was the first major step in this study. Criteria for selection included companies which were highly innovative based on the list of innovative (excellent) companies in the study by Peters and Waterman (1982) as well as the 146 most patent active companies listed in the most recent U.S. Department of Commerce reports on patent activity.

Five excellent companies within 1,000 miles of Newark, Delaware were contacted. The author identified herself and described the study to directors of Research and Development and in some cases, directors of personnel. After these initial contacts, directors discussed whether or not to participate in the study with their staffs and returned with an answer within two to three weeks. The author used faculty at the University of Massachusetts as well as the University
of Delaware to facilitate contact with the companies. Two of the five companies agreed to participate in the study. For the companies who did not participate, the reasons given were: 1) financial problems prohibited the time and cost involved in the study 2) belief of the companies' representative that creative individuals will perform regardless of the organizational climate in which they work 3) a great deal of consulting time and money was being spent by the company in the area of creativity and the company saw no need to duplicate its' efforts.

The author visited the two companies who agreed to participate and presented a short (10 minute) presentation which described the purpose and procedure of the study. A question and answer period followed.

At Company X, the author spent 3.5 hours on a rainy Tuesday afternoon with the Director of Personnel. The enthusiasm the director exhibited with regard to creativity was reminiscent of the descriptions Peters and Waterman (1982) made of the excellent companies. The director told many stories about how new products were invented and how sensitive handling of personnel (i.e. putting the right people in the right jobs) resulted in maximum performance. The director told of annual gatherings of Research and Development personnel which attracted executives from all over the company who were in various administrative levels and missed the excitement of R & D. The author was urged to
read books and articles which were written by entrepreneurs of the company in its' early years.

In Company Y, the Central Research Division was a huge conglomerate of buildings sprawled over acres of rolling hills and lush foliage. It clearly resembled the campus-like environments of the excellent companies described by Peters and Waterman (1982). There was a museum on the grounds which the author was proudly shown. The museum contained pictures of inventors and samples of products they had invented. The buildings and grounds had an ambience of space, newness and activity that permeated everywhere. The author met with two individuals in R & D who were excited and enthusiastic about the study. They asked intriguing questions with a candor and directness that was very refreshing.

The P.O.P. questionnaires were left with each company for employees to fill out. For the corporate creativity measure, the author asked each subject the following question:

How many of the following have you produced during the period from September 1981 to September 1983?

Number

unpublished technical manuscripts, reports or formal talks (either inside or outside the company).
technical reports accepted by professional journals.

In addition, each subject was asked to report age, sex, ethnic background, position level in the company, years of experience at the company and level of education.

When all questionnaires were collected and all demographic information obtained, data collection was considered complete. All information was coded to provide anonymity of respondents. Data loss was minimized by a procedure employing: 1) a follow-up letter if the completed Profile of Organizational Practices questionnaire was not received by the researcher within two calendar weeks of dissemination and 2) a follow-up telephone call by the researcher if the completed questionnaire (P.O.P.) was not received within four calendar weeks of dissemination.

Data Analysis and Statistics

The statistic which was used for this study was the correlation coefficient. This statistic measured: 1) the degree of association shared by various scales on the organizational climate instrument and 2) the degree of association between the P.O.P. and corporate creativity.

First, the organizational climate instrument was examined. The purpose of this was to test the instrument itself, and to determine how well it measured what it purported to measure. The goal was to determine whether the
scales correlated significantly enough for it to be treated as one independent variable.

The first analysis of data involved correlations of each scale to the overall organizational climate scale. This was done to determine the extent to which a given scale, when submitted to the same subjects, produced scores corresponding to the total scores which might have been obtained if all the other variable scores were combined.

Next, correlations among the organizational climate scales were performed to determine the extent to which they varied together and in the same direction.

The third analysis of the data examined the correlations between organizational climate and corporate creativity. The corporate creativity measure included: 1) unpublished technical manuscripts, reports or formal talks (either inside or outside the company) and 2) technical reports accepted by professional journals. These components were combined in all data analyses and referred to as corporate creativity. Since the scales on the organizational climate instrument correlated highly enough to be called one variable, the study utilized univariate analysis to determine the results.
CHAPTER IV
RESULTS

This chapter discusses the results of the study. It focuses on 1) an examination of the P.O.P. as a measure of organizational climate, 2) individual scores for Companies X and Y on the P.O.P. and creativity measure, 3) companies mean and standard deviation scores on the P.O.P. and creativity measure, and 4) correlations between organizational climate variables and creative output.

Return rates for the two companies were very high. Company X agreed to distribute 50 questionnaires. Of this number, 42 or 84% were returned. Company Y agreed to distribute 25 questionnaires. Of this number, 23 or 92% were returned.

**An Examination of the P.O.P. as a Measure of Organizational Climate**

The first two hypotheses were concerned with the P.O.P. instrument. These were stated as follows:

1) High scores on each scale will correlate with high scores on the organizational climate measure as a whole.
2) High scores on one scale will correlate with each of the other scales on the organizational climate measure.
Table 2 presents descriptive statistics for the test of the first hypothesis in which each scale or variable positively relates to the whole body of scales on the P.O.P. The variable-to-total correlations were all significant (p < .005). Thus, the first hypothesis was supported.

Table 3 describes the intercorrelation among organizational climate variables. The Pearson-product-moment correlations show that nine out of the ten scales have consistently significant intercorrelations. The only scale which does not have significant intercorrelations is the Role Conflict and Overload scale. For this scale, the intercorrelations ranged from $r = .10$ to $r = .37$ and were consistently insignificant ($p > .09$) for seven out of the nine possible intercorrelations. The only other intercorrelation which was insignificant was the correlation between the Leadership and the Conflict Management scales $r = .21$, ($p > .09$).

With the exception of the Role Conflict and Overload scales, and the intercorrelation between Leadership and Conflict Management scales, the results presented in Table 3 generally support hypothesis II which states that the variables or scales of the P.O.P. were significantly correlated with each other and the relationships were positive. This suggests that the scales on the P.O.P. are highly interrelated and constitute one measure, that of organizational climate.
TABLE 2
Variable-To-Total Correlations For Organizational Climate Instrument

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### TABLE 3

Intercorrelation Matrix Among Organizational Climate Variables

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Comm = Communications  
Mt Eff = Meeting Effectiveness  
Dec = Decision Making  
Lead = Leadership  
Role = Role Clarity and Standards  
Car = Career Development  
Con = Conflict Management  
Over = Role Conflict and Overload  
Per = Performance Appraisal  
Feed = Feedback and Rewards on Performance
Individual Scores for Companies X & Y on the P.O.P. and Creativity Measure

Table 4 shows the individual scores on the P.O.P. and the creative output measure for individuals in Companies X and Y. Individual scores on the P.O.P. consisted of a summed total of the respondent's rating for each item in a given scale. A zero on Table 4 represents a scale which was not completed by the respondent. Respondents were asked to check their degree of agreement or disagreement with a number of statements for each P.O.P. scale. The categories of agreement were: 1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = slightly agree, 5 = agree, 6 = strongly agree, 0 = not applicable, don't know.

The following means given for the scales were the average item means. These were attained by dividing the mean scale scores of both companies by the number of items in each scale.

For the Communications scale, individual scores ranged from a low of 28 ($\bar{x} = 1.86$) to a high of 79 ($\bar{x} = 5.26$). For the Meeting Effectiveness scale, scores ranged from 32 ($\bar{x} = 1.7$) to a high of 88 ($\bar{x} = 4.88$). For Decision Making, scores ranged from a low of 26 ($\bar{x} = 1.73$) to a high of 73 ($\bar{x} = 4.86$). For the Leadership scale, scores ranged from a low of 30 ($\bar{x} = 2.0$) to a high of 87 ($\bar{x} = 5.8$). For the Role Clarity and Standards scale, scores ranged from a low of 27 ($\bar{x} = 2.07$) to a high of 58 ($\bar{x} = 4.46$). The Career
Development scale scores ranged from a low of 30 ($\bar{x} = 2.0$) to a high of 69 ($\bar{x} = 4.6$). The Conflict Management scores ranged from a low of 40 ($\bar{x} = 2.22$) to a high of 90 ($\bar{x} = 5.0$). The Role Conflict and Overload scores ranged from a low of 26 ($\bar{x} = 1.62$) to a high of 76 ($\bar{x} = 4.75$). The Performance Appraisal scores ranged from a low of 30 ($\bar{x} = 1.87$) to a high of 78 ($\bar{x} = 4.87$). The Feedback and Rewards on Performance scores ranged from a low of 21 ($\bar{x} = 1.4$) to a high of 79 ($\bar{x} = 5.26$). The creative output measure which consisted of the number of published and unpublished technical reports and formal talks presented inside or outside the company ranged from a low of 0 to a high of 99.

Table 4 demonstrates that the distribution of high or low scores on the P.O.P. does not correspond with high measures of creative output. For example, ID #12 from Company X has high scores on the P.O.P. ($\bar{x} = 66$) but has produced only 2 published or unpublished reports. Conversely, ID #42 from Company X has a low to average score on the P.O.P. ($\bar{x} = 49$) and has produced 99 unpublished and published reports. Table 4 demonstrates that there is a fairly high consistency to the P.O.P. scores but virtually no pattern to the creative output measure. A scatter-diagram sketched by the author (not shown) reveals P.O.P. scores on the high end of the scale, while creative output measures range from extreme lows of 0 to extreme highs of 99, 80, and 50.
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**Creative Output** = Number of published and unpublished technical reports or formal talks either inside or outside the company.
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<tr>
<td>61</td>
<td>Y</td>
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<tr>
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<tr>
<td>65</td>
<td>Y</td>
<td>58</td>
<td>58</td>
</tr>
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</table>

**Creative Output** = Number of published and unpublished technical reports or formal talks either inside or outside the company.
Companies Mean and Standard Deviation Scores on the P.O.P. and Creativity Measure

Table 5 describes companies' mean and standard deviation scores on the P.O.P. and the creative output measure. Scores on the P.O.P. were generally average to high. Since each of the P.O.P. scales have different numbers of items, the mean of the company scales does not provide an accurate description of highest and lowest scales. The average item mean for Companies X and Y is the mean of each scale divided by the number of items and provides more accurate data regarding the P.O.P. scales. The scale for which companies scored highest was the Communications scale. (average item \( \bar{x} = 3.96 \)). The next highest scales were Leadership (average item \( \bar{x} = 3.91 \)), Feedback and Rewards on Performance (average item \( \bar{x} = 3.90 \)), Role Clarity and Standards (average item \( \bar{x} = 3.78 \)) and Decision Making (average item \( \bar{x} = 3.72 \)). The average item means for the remaining five scales ranged from 3.16 for Performance Appraisal to 3.45 for Career Development. Hypothesis III stated that three of these five scales (Communication, Decision Making and Feedback and Rewards on Performance) would correlate highly with creativity. Although these three scales do not correlate with creativity, it is interesting that the scores are so high in companies already considered to be innovative and hence
excellent. This point will be discussed further in the discussion section.

Table 5 also shows the standard deviations for the P.O.P. scales and the creative output measure. While the SD's are reasonable for the P.O.P., they are very erratic for the creativity measure. The standard deviation for creativity for both companies \((n = 65)\) is 28.81 while the \(\bar{x}\) creativity measure is 21.73. The standard deviation for Company X's creativity score is 30.3 and its \(\bar{x}\) creativity score is 19.64. While no statistically significant conclusions can be drawn from Table 5, it nevertheless demonstrates the scales in which the excellent companies scored highest. It also demonstrates the wide variance of creative output as measured by published and unpublished reports and formal presentations inside our outside the company.

**Correlations Between Organizational Climate Variables and Creative Output**

Table 6 describes the correlations between organizational climate variables and corporate creativity. Corporate creativity refers to published and unpublished reports as well as formal talks inside or outside the company. This measure of creativity combines questions seven and eight on the P.O.P.

Since Career Development was the only scale which significantly correlated with creativity \((r = .40, p < .001)\),
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<table>
<thead>
<tr>
<th></th>
<th>Mean of X + Y</th>
<th>SD</th>
<th>Mean of X</th>
<th>SD</th>
<th>Mean of Y</th>
<th>SD</th>
<th>No. of Items</th>
<th>Avg. Item Mean</th>
</tr>
</thead>
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<tr>
<td>Comm.</td>
<td>59.53</td>
<td>13.11</td>
<td>58.92</td>
<td>15.21</td>
<td>60.65</td>
<td>8.16</td>
<td>15</td>
<td>3.96</td>
</tr>
<tr>
<td>Mt. Eff.</td>
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<td>14.66</td>
<td>58.23</td>
<td>16.53</td>
<td>66.17</td>
<td>8.58</td>
<td>18</td>
<td>3.39</td>
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<tr>
<td>Dec.</td>
<td>55.83</td>
<td>9.87</td>
<td>54.45</td>
<td>11.29</td>
<td>58.34</td>
<td>5.98</td>
<td>15</td>
<td>3.72</td>
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<td>Lead.</td>
<td>58.73</td>
<td>14.35</td>
<td>56.45</td>
<td>16.88</td>
<td>62.91</td>
<td>6.33</td>
<td>15</td>
<td>3.91</td>
</tr>
<tr>
<td>Role</td>
<td>49.16</td>
<td>8.08</td>
<td>47.83</td>
<td>9.26</td>
<td>51.60</td>
<td>4.55</td>
<td>13</td>
<td>3.78</td>
</tr>
<tr>
<td>Car.</td>
<td>51.75</td>
<td>9.26</td>
<td>49.76</td>
<td>9.49</td>
<td>55.39</td>
<td>7.75</td>
<td>15</td>
<td>3.45</td>
</tr>
<tr>
<td>Con.</td>
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<td>11.44</td>
<td>57.90</td>
<td>12.09</td>
<td>64.04</td>
<td>9.11</td>
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<td>3.33</td>
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<tr>
<td>Over.</td>
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<td>10.39</td>
<td>57.45</td>
<td>11.99</td>
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<td>Per.</td>
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<td>11.50</td>
<td>55.66</td>
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<td>7.87</td>
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<td>3.16</td>
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<tr>
<td>Feed.</td>
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<td>11.12</td>
<td>56.92</td>
<td>12.30</td>
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<td>7.87</td>
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<td>Creativity</td>
<td>21.73</td>
<td>28.81</td>
<td>19.64</td>
<td>30.03</td>
<td>25.56</td>
<td>26.66</td>
<td>--</td>
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</tr>
</tbody>
</table>

X = Company X \quad (n = 42)
Y = Company Y \quad (n = 23)
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TABLE 6

Correlations Between Organizational Climate Variables and Creative Output

<table>
<thead>
<tr>
<th>Organizational Climate Variables</th>
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<tbody>
<tr>
<td>Communications</td>
<td>-.06</td>
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<td>Meeting Effectiveness</td>
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<td>Decision Making</td>
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<td>Leadership</td>
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<td>Role Clarity and Standards</td>
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<tr>
<td>Career Development</td>
<td>.40 @</td>
</tr>
<tr>
<td>Conflict Management</td>
<td>.02</td>
</tr>
<tr>
<td>Role Conflict and Overload</td>
<td>.10</td>
</tr>
<tr>
<td>Performance Appraisal</td>
<td>.10</td>
</tr>
<tr>
<td>Feedback and Rewards on Performance</td>
<td>.13</td>
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</table>

@ significant at the .005 level

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hypothesis III and IV were not supported by the data. These hypotheses stated that the Communications, Meeting Effectiveness, Decision Making, Conflict Management and Feedback and Rewards on Performance scales would correlate significantly and that the Communication and Conflict Management scales would correlate the most highly.

Hypothesis V stated that the Performance Appraisal, Career Development, Leadership and Role Conflict and Overload scales would not correlate with creativity. This hypothesis was partially supported in that none of these scales except Career Development correlated significantly with creativity.

The clarity subscale of the Role Clarity and Standards scale correlated negatively with creativity but at an insignificant level. As a result, hypothesis VI was not supported by the data.

Hypothesis VII stated that the standards subscale of the Role Clarity and Standards scale would correlate with creativity. Statistics showed an insignificant correlation existed, thus hypothesis VII was not supported.

Hypothesis VIII stated that the expectations subscale of the Role Clarity and Standards scale would not correlate with creativity. This hypothesis was supported by the data since there was no significant correlation between the expectations subscale and creativity.
Since the results revealed little if any information regarding how organizational climate contributes to explaining creativity, some additional analyses were performed. These analyses examined specific items or subscales on the P.O.P which, based on the literature appeared to be related to corporate creativity. They were examined to see if they yielded significant correlations with creativity.

The first subscale examined was the co-worker subscale of the Communications scale. There was no significant relationship found (r = -.07) between creativity and communication with co-workers in the sample.

The second item examined was the third question (C) in the general attitudes subscale of the Meeting Effectiveness scale. This item stated: "Some very creative solutions came out of this group." The correlation between this question and creativity was significant (r = .28, p < .01). This suggests that highly creative people strongly agreed with the statement.

The third analyses examined the relationship between the first item (A) in the general attitudes subscale of the Decision Making scale. This item stated: "Decisions in this organization are based on logic and the weight of evidence rather than other considerations." The correlation between this statement and creativity was a negative one (r = -.13) but not at a significant level.
In the Leadership scale, the helping subscale was examined to see if a helpful boss contributes to explaining creativity. This subscale included statements such as: "My boss helps me with my professional growth and development... with work related problems...discover problems before they get too bad." There was no significant correlation between this item and corporate creativity (r = -.01) which suggests that the perceived help of bosses contributes nothing significant to creativity.

Also in the Leadership scale, item D in the motivating subscale was examined. This item stated: "I would like to be more involved in decision-making than my boss makes possible." (Since this is a negative question the responses were reversed in the computations for correlation.) No significant correlation was found between this item and corporate creativity. There was a slight negative correlation (r = -.12) which may suggest that subjects who wanted to be more involved in decision making also tended to score high in the creativity measure. This correlation was not significant enough to draw any definitive conclusions.

Three items (C, D and E) of the general attitude subscale of the Conflict Management scale were examined. These items stated that disagreements were used in ways that stimulate understanding and new ideas, that disagreement is used to demonstrate interest in improving things and that people can get into heated arguments with one another and be best
of friends the next day. These items did not yield any significant correlations with creativity.

The feedback subscale of the Feedback and Rewards on Performance Scale was also examined. This subscale included statements such as: "The feedback I get compares my work to a clear standard of performance...is so delayed that it really doesn't make much difference." There was no significant correlation between this subscale and corporate creativity (r = .09). This demonstrates that feedback as measured on the P.O.P. does not contribute to corporate creativity.

Since the Career Development scale was the only scale to correlate significantly with creativity, it was examined in its entirety. This scale has three subscales: general attitudes, experience with career development program, and importance of career development. For the general attitudes subscale, items C, D, E and F significantly correlated with creativity. Item C stated: "Job openings are always posted within the organization before they are advertised in the newspapers and trade magazines" (r = .40, p < .001). Item D stated: "The clear career paths of this organization make it easy to guide the people I supervise" (r = .36, p < .004). Item E stated: "Training opportunities I have had here have helped me advance my career" (r = .30, p < .01). Item F stated: "This organization really tries to find ways to encourage employees to develop their job
skills in order to enhance their possibilities for job advancement" \( (r = .26, p < .03). \)

None of the items in the experience with career development program subscale correlated significantly with creativity. Item A of the importance of career development subscale was the only item in this subscale to correlate significantly with creativity. Item A stated: "It is important to me as an employee that the organization I work for provide me with opportunities to develop my skills and abilities." When this item was correlated with creativity, the result was a negatively significant correlation \( (r = -.22, p < .05). \) The data demonstrated that highly creative employees disagreed with this statement. This suggests that creative employees did not consider it important that the organization they work for provide them with opportunities to develop their skills and abilities.

**Summary and Conclusions of Results**

In conclusion, results generally supported hypotheses I and II which tested the P.O.P. instrument. Organizational climate as measured by the P.O.P. had significantly high variable to total correlations (hypothesis I). With the exception of the Role Conflict and Overload scale all scales had significantly high intercorrelations which suggests that
the scales refer to the same realm of content, or domain (hypothesis II).

Regarding the relationship between organizational climate and creativity, only one scale, Career Development, correlated significantly with corporate creativity. As a result, hypotheses III, IV, V, VI and VII were not supported by the data. Hypothesis VIII was supported by the data. This hypothesis stated that the expectations subscale of the Role Clarity and Standards scale would not correlate with creativity.

Other significant results indicated that highly creative employees perceived very creative solutions coming out of their groups (Meeting Effectiveness scale) and that creative employees did not consider it important that the organization they work for provide them with opportunities to develop their skills and abilities (Career Development scale).

In addition, certain aspects of Career Development appeared to contribute substantially to explaining corporate creativity. One of these is the posting of job openings before they are advertised in newspapers and trade magazines. Clear career paths which make it easy to guide supervisees appear to contribute to creativity. In addition, training opportunities and job advancement appear to contribute substantially to explaining corporate creativity.
CHAPTER V

DISCUSSION AND IMPLICATIONS FOR FUTURE RESEARCH

This study sought to determine the extent to which organizational climate as measured by the P.O.P. scales contributed significantly to explain the variance of high creative output as measured by unpublished technical manuscripts, reports or talks inside or outside the organization and technical papers accepted by professional journals. The Profile of Organizational Practices was distributed to members of R & D divisions of two excellent companies.* Out of the 75 P.O.P.'s administered (50 for Company X and 25 for Company Y) a total of 65 people (85% return rate) participated in the study. This chapter discusses the results of the study and the implications for future research. First, the author will evaluate the independent and dependent variable measures. Second, the major findings of the study will be interpreted. Third the author will speculate on the meaning of the high scores (average item mean) for the Communications, Decision Making and Feedback on Rewards and Performance scales of the P.O.P. Fourth, the overall management of innovation as a synergistic process in the excellent

*excellent companies were chosen from the forty-three American companies which passed all hurdles for excellence according to Peters and Waterman, (1982).
companies will be discussed. Finally, conclusions of the study will be drawn.

**Evaluation of the Independent and Dependent Variable Measures**

The results generally did not support the main hypothesis which was that the scales of the P.O.P. would contribute to various extents in explaining corporate creativity in two excellent companies. With the exception of the Career Development scale, none of the P.O.P. scales correlated significantly with creativity. This raised several questions regarding the study. First was the accuracy of the measures, organizational climate and corporate creativity. Based on the definition by Tagiuri and Litwin (1968) organizational climate was assumed to measure the "relatively enduring quality of the internal environment of an organization that (a) is experienced by its members, (b) influences their behavior, and (c) can be described in terms of the values of a particular set of characteristics of the organization" (1968, p. 27). The highly significant intercorrelations among nine out of ten scales on the P.O.P. and variable-to-total correlations demonstrated that the instrument measured one domain, that of organizational climate. Drexler's (1977) research indicated that descriptive measures of organizational climate characterize
organizations. Therefore, based on the statistical evidence and the previous research with organizational climate measures (Survey of Organizations, Taylor and Bowers, 1972), the P.O.P. appears to be a reliable measure of organizational climate.

The dependent variable, corporate creativity, was measured by unpublished technical manuscripts, reports or formal talks and technical reports accepted by professional journals. This measure of creativity was adapted from a questionnaire by Pelz and Andrews (1966) as a way of measuring creative output. Pelz and Andrews used various methods to examine creativity. Some were aimed at individual, rather than organizational measures of creativity. For example, a creativity test, The Remote Associates Test (Mednick and Mednick, 1966) was used to assess individual scientists' creativity. The use of the RAT to measure creative ability was a poor predictor of performance (Pelz and Andrews, 1966). More importantly, the use of the RAT or any other creativity test, does not measure creative performance in an organization. It only measures individual's abilities. According to Andrews, (1975) creative ability is an input to the creative process, but outputs of the creative process are products such as scientific papers, artistic drawings, musical compositions, reports, devices, processes and substances. The highly innovative outputs open new possibilities for further research, development or
utilization, whereas, highly productive outputs allow significant advances along established lines (Ben David, 1960).

In studies by Pelz and Andrews (1966) and Rotundi (1974), creativity was measured by U.S. patents, invention awards, trade publications, technical reports and formal talks. In the Pelz and Andrews study, the contribution and usefulness of a paper, patent or report was measured by judges considered to be experts in a given field. This allowed for close examination of creative output and appeared to be the most sophisticated way that creativity has been measured in R & D to date. Measurement of creativity as the number of published and unpublished reports, technical manuscripts and formal talks was used in the present study. The quality, usefulness and other forms of creativity were not explored. The generally poor quality of the creativity measure raises several very important issues. First is the question of individual versus corporate creativity. The present study measured the number of published and unpublished reports and talks by individuals. Therefore the summed total of reports, journal articles and talks remains an individual, not a corporate measure of creativity. It will heretofore be referred to as creative output. Furthermore, individuals who write and/or publish reports or give formal presentations may not be the same individuals who are thinking up or championing new ideas. Measures of
corporate creativity need to explore group efforts, ad hoc
task forces and overall management of creativity in R & D.

Another weakness of the creativity measure was its' time limited nature. Respondents were asked to report the numbers of reports, etc. they had produced within a two year time period (September 1981 to September 1983). Since it may take up to ten or twenty years for an idea to be developed into a usable product, a longer time period than two years is needed to assess creative output in R & D. The many stages of development of an idea and the scientist's activities during those ten or twenty years are fertile areas for future research. Indeed in the present study, there may have been misinterpretations of the questions on creative output. For example, a few respondents reported unusually high numbers of creative output. It is difficult to conceive of a scientist producing 99 or 96 published articles, unpublished technical manuscripts or formal talks in the space of two years time. Possible respondent errors such as these may have contributed to the inconsistency of the creativity measure and its unusually high standard deviations.

Another limitation of the creativity measure was that there were no reference or anchor points from which to judge it. A comparison of creative output between excellent and non-excellent companies was originally considered for study. However, the logistics of gaining entrance to non-excellent
companies for purposes of comparison made this possibility prohibitive. Also, there was no consistent way to compare excellent companies with each other, considering differences in types of products and numbers of research scientists, as well as individual differences in general management of innovation in each company.

To summarize evaluations of the instruments, the organizational climate instrument, (except for the Role Conflict and Overload Scale) appeared to accurately measure organizational climate. The creativity measure was inadequate because it measured creative activity during too short a period of time, only measured one dimension of creativity (reports and presentations) and measured only quantity, not quality of creative output. Furthermore, it measured individual, not corporate creativity.

**Interpretation of the Major Findings**

Considering the inadequacy of the creativity measure, how can the results be interpreted? Significant results revealed that creative employees: 1) perceived some very creative solutions coming out of their group; 2) agreed that job openings are posted within the organization before they are advertised in newspapers and trade magazines; 3) agreed that clear career paths of their organizations made it easy to guide the people they supervised; 4) agreed that training
opportunities have helped them advance in their careers; 5) agreed that their organization tries to find ways to encourage employees to develop their job skills in order to enhance their possibilities for job advancement and 6) did not agree that it was important to them that their organization provide them with opportunities to develop their skills and abilities.

The first finding raises more questions than it answers. Since none of the items or subscales concerning meeting effectiveness, decision making or communication correlated significantly with creativity, little detail regarding the finding was provided. Evidently, something is occurring within the groups which resulted in high creative output but this was not measured or examined by the study as it was designed. The author suspects that the overall management of creativity in the excellent companies provides clues and these will be discussed shortly.

The second finding when examined closely, is almost a true/false statement. If a company posts job openings, this is a fact obvious to all who know where to look for them. This may indicate that highly creative employees are attentive to job postings and that the postings may serve as a motivator by encouraging job opportunities.

The third finding, that highly creative employees perceive clear career paths which make it easy to guide supervisees is difficult to explain. One speculation may be that
this keeps supervisees out of their way so they may pursue their own work. Based on previous literature, it is difficult to imagine how clear career paths for supervisees affect creative output of supervisors.

The fourth finding makes sense in light of previous research. Researchers have generally found that training and educational opportunities tend to increase creative output in R & D divisions (Paolillo & Brown, 1978, Pelz and Andrews, 1966). Some authors have observed that involvement in a variety of activities (teaching, administration, research) contributed to creative output (Andrews, 1975; Abend, 1979).

The fifth and sixth findings indicated that extrinsic rewards (i.e. development of skills in order to enhance possibilities for job advancement) were more powerful in contributing to creative output than intrinsic rewards (i.e. the importance of an organization providing opportunities to develop skills and abilities). These results were surprising since research on creativity in R & D showed creative employees identifying more with intrinsic rather than extrinsic rewards (Rotundi, 1974).

To summarize interpretations of major findings, the results which were significant, were generally disappointing. It makes sense for job opportunities, clear career paths and job advancement to contribute to creativity. That these factors (plus training opportunities) were
the only ones which contributed significantly to explaining corporate creativity is puzzling.

It appears that the overall lack of significant correlations between the P.O.P. scales and creative output is a result of two factors. One is the inadequacy of the creativity measure. The other is that the P.O.P. does not go far enough in assessing the climate of R & D. There is clearly so much more to the excellent companies' superb management of innovation than was measured by published and unpublished reports or formal talks. While the P.O.P. accurately measures organizational climate, it does not, by itself go far enough in exploring how innovation is managed and encouraged. One of the basic assumptions this study makes is that companies which are highly innovative are also excellent. (Peters & Waterman, 1982). In the next discussion, the following issues will be addressed: 1) the high scores on crucial scales of the P.O.P. and their possible implications, and 2) the overall management of innovation in the excellent companies.

**Meaning of High Scores on Three Scales of the P.O.P.**

The present study did not examine specifically how innovation and creativity were managed by the excellent companies. According to Peters and Waterman (1982) there are certain strategies and practices which the excellent
companies use to manage innovation. In general these involve a philosophy firmly established and maintained by top management that incorporates all of the eight attributes of the excellent companies. Of those eight, two are most associated with innovation management; a bias for action and autonomy and entrepreneurship. Inherent in these two attributes are many of the issues that led to the hypotheses for this study. For example, hypotheses III stated that the Communications scale would correlate highly with creativity. As the data in Table 6 shows, this was not the case.

In Pelz and Andrews' study (1966) some of the factors most related to creativity included frequent interaction with colleagues especially with those who had different styles or points of view. The Communications scale (especially the co-workers subscale) and the Conflict Management scale on the P.O.P. were aimed at these factors, yet yielded no significant correlations with creativity. It is difficult to explain this. For example, items in the general attitudes subscale of the Conflict Management scale stated: "Our disagreements here are used in ways that stimulate understanding and new ideas" and "people can get into heated arguments with one another and be best of friends the next day." These items described fairly specifically the kinds of dither and intellectual challenge that Pelz and Andrews refer to as existing among creative scientists. In addition, the co-workers subscale of the
Communications scale measured employees' perceptions regarding the ease with which their co-workers shared information. Still, there was no correlation with creativity. One reasonable explanation is that apparently communication with co-workers and how disagreements are handled do not contribute to explaining creativity for subjects in this sample. Another explanation is that the dither or intellectual conflict which may correlate with creativity is exclusive only to the scientists within certain groups. The P.O.P. refers to co-workers in general and may have been interpreted to include co-workers at all levels and types of employment. This is clearly a speculation, but may be significant in explaining why such obvious factors as clear, honest interaction, ideas sought and used by fellow workers and disagreements used to stimulate new ideas and understanding had no correlation with creativity.

Although the hypothesis regarding the Communication scale was not supported, it is worth noting that scores on this scale were higher than any other scale on the P.O.P. As shown in Table 5, the average item mean (the mean scale score divided by the number of items in the scale) is highest for the Communications scale (3.96). Although no statistical conclusions can be drawn from this data, some descriptive analyses will be presented.

High scores on the Communications scale are consistent with the research on organizational climate and creativity
(Pelz and Andrews, 1976; Paolillo and Brown, 1978; Rotundi, 1974; Peters and Waterman, 1982). For the excellent companies, communication is the key to productivity at all levels. It takes the form of frequent but short reports, one page or one sentence idea memos, small task forces of short duration which meet for the purpose of solving a problem or achieving a goal. Communication includes constant experimenting and then discussing results, implications and failures with superiors and colleagues. The atmosphere in the excellent companies is informal and open and utilizes physical objects such as chalkboards, escalators, and long tables in the cafeteria to encourage communication. Unfortunately, the present study did not examine these collective organizational aspects of communication that lead to high innovation in the excellent companies. The P.O.P. scale measured how well information was shared among groups. To gain more specific information on how excellent companies utilize and manage this communication, more research is needed. More assessment, interviewing and experimenting could be done with R & D groups to dig deeper into the enigmas of the intense communication on which everyone seems to thrive. One particular area of concentration might be the communication between the R & D scientist and the customer. Peters and Waterman (1982) discuss at length, the special relationship between researcher and customer in the excellent companies. It would be useful to
conduct an experiment which compared an R & D unit which works closely with the users of their product and one that does not. The author speculates that the customer, acting as a generator and tester of ideas may provide inspiration and incentives which spur scientists and engineers on to new heights of creativity.

In addition to the Communications scale, the Decision Making scale (average item mean = 3.78) was also high. This was a scale along with Communication that was hypothesized to correlate highly with creativity. The Decision Making scale represented aspects of group process and small group processes and appeared to be of crucial importance in the excellent companies. According to Peters and Waterman (1982) eight to ten person research teams (known as skunk works) were responsible for many new products. Peters and Waterman pointed out several qualities of these research teams which were not examined in this study. One of these qualities included the individual who has championed the idea. The champion was a vital force in launching a new project. At Eastman Kodak Company, an office called the Photographic Division's Office of Innovation (PDOI) has been put together for the specific purpose of nurturing champions. Rosenfeld (1983) of Kodak explains that ideas need a "home" or sponsor. He describes two main environments for an idea: 1) those areas of the company capable of evaluating the idea, and 2) the originator of the idea.
Either of these environments may include other members in different capabilities such as engineering, marketing, etc. The goal of the innovation system at Kodak is to evaluate and nurture ideas through sponsors who are not the originator's regular supervisors. Kodak recognizes that a new idea causes complications and problems for the manager simply because they are diversions from an already busy schedule. Kodak distinguishes between the stages when an idea is newly formed and the way it is presented to management. Most problems with innovation management occur at the second stage. Ideas in the first stage usually encounter sharp resistance because managers are usually trained to make judgmental decisions. The idea must get strongly promoted, if this resistance is to be overcome. The promoters must work through informal rather than formal channels in the organization and when the dust has settled, one person usually stands out as the champion of the idea. Rosenfeld (1981) states that innovation ideas for existing product lines are much more easily assimilated than those for venture ideas. The idea champions are the keys to developing these ideas.

To summarize, Kodak's innovation management system begins with the originator taking his idea to a facilitator where it is discussed informally. The idea is then evaluated by a group of people (consultants) in various positions and divisions throughout the company. At this point,
a general direction for the idea is decided. The idea is further evaluated and tested. If it passes the preliminary stages and a champion for it is identified, the idea then follows normal managerial channels through technical developments, marketing, and manufacturing.

Future research on innovation management may benefit from a closer inspection of Kodak's process. The system set up there to manage new ideas is a part of the general organizational climate. Future studies may benefit from augmenting organizational climate instruments such as the P.O.P. with additional questions or instruments. These may be designed to explore already existing organizational systems which deal specifically with creative output and innovation management.

In effect, the innovation system at Kodak is a complex decision-making system involving many different people at various stages of authority. Generally when teams were formed to work on a new idea in the excellent companies, members were almost always drawn to the project by their own interests and motivations. Also, depending upon the progress of the research, members were added or subtracted from the team. This served as valuable and immediate feedback to the success of the project. The physical conditions under which the research teams thrived were often poor. Yet it appeared that support for champions and their teams resulted in significant new innovations. The meetings that
were attended by the teams were extremely goal-directed and activities and processes were indigenous to the members and the project.

Based on the design of the present study and its' use of the P.O.P., there was no way to distinguish between decision making groups. For example, the study did not explore decision making groups that engaged in the creative problem solving described by the "skunk works" in Peters and Waterman (1982). Because these groups were often formed quickly and were of short duration, respondents may not have been considering them in their responses on the P.O.P. In addition, team members were encouraged to follow their new product to the marketplace so they could identify with the success of the product and experience risks and failures associated with movement out of the laboratory and into the marketplace. In future research, special attention should be given to these ad hoc groups.

To summarize, the scores on the Decision Making scale were generally high although they do not correlate with creativity. The activities of the excellent companies which involve decision making are characterized by qualities which include but go beyond aspects of decision making as measured by the P.O.P. It may be useful for future research to study these groups in action while they work on a project to examine them more closely.
The scores on the Feedback and Rewards on Performance scale were also high (average item mean = 3.90) although they did not correlate with creative output as it was measured in this study. This scale addressed general feedback on job performance, how it compared to a clear standard of performance and whether improvements got noticed. Generally, feedback is a part of the constant communication in the excellent companies. Frequently rewards and recognitions (monetary and otherwise) are a part of the management process. Incentives include grand celebrations of new product launchings and dual career ladders (scientific and administrative) for advancement in the laboratories. The constant informal meetings that occur daily provide direct and immediate feedback on ideas and experiments under progress.

The fact that different strategies for feedback and rewards on performance are practiced in the excellent companies, helps to explain its' relatively high average item score. The author next proposes some other phenomena that may be occurring in excellent R & D divisions.

Creativity generally requires different thinking processes which are by themselves often extraordinary. These thinking processes may be self-reinforcing and may be providing internal feedback and rewards on performance to the R & D scientists. For example, creative or lateral thinking seeks to open new pathways and makes jumps instead
of progressing in an orderly step-by-step fashion (deBono, 1970). Lateral thinking does not acknowledge the negative and focuses on generating alternatives rather than evaluating them. It involves fluidity, flexibility and originality. Often the great "aha" of insight is a very satisfying experience. Divergent or creative thinking employs forced associations which sometimes lead to solid new ideas. Several stages of creativity have been suggested (Osborn, 1963). They include preparation, analysis, incubation and synthesis. Creative endeavors involve hard work and usually mysteries to unravel. The author suggests that the self-reinforcing satisfaction of the creative thinking process may act as a powerful internal reward system for research scientists. It may even be that a group process of creative problem solving in the ad hoc groups is also satisfying to its' members and providing internal feedback. Along with the individual satisfaction that team members may experience, there is a comraderie and sense of unity that may be working as a very substantial feedback system.

To summarize, the scores on the Feedback and Rewards on Performance scale were relatively high although the scale did not correlate significantly with creativity. Future research needs to go beyond the items measured by the P.O.P. to uncover more about feedback and rewards and how they encourage innovation.
The overall management of innovation in the excellent companies appears to be central to their success. There is a potpourri of strategies and philosophies which add up to a uniquely functional system of innovation (Peters and Waterman, 1982). In a study by Andrews (1975) creative ability was more positively related to innovativeness of output in the following kinds of settings: 1) when the scientist perceived himself as responsible for initiating new activities; 2) when the scientist had substantial power and influence in decision making, 3) when the scientist felt rather secure and comfortable in his professional role; 4) when his administrative superior "stayed out of the way"; 5) when the project was relatively small with respect to the number of professionals involved, budget and duration; 6) when the scientist engaged in other activities (teaching, administration, and/or other research) in addition to his work on the specified project; and 7) when the scientist's motivation level was relatively high. When several of these factors were considered simultaneously, very substantial and significant effects were found.

The present study did not examine how innovation and creativity was managed in excellent companies. Innovation management is a process which incorporates the whole organization. Joshua Abend (1979) has developed a flow chart
(see figure 2) which illustrates "the synergy of innovation as a total organizational process." In this chart, there are four major components of innovation planning and management. These include: 1) process (i.e. methods of innovation, problem solving, etc.; 2) ideas (i.e. selection, evaluation, training, climate, etc.; 3) organization (i.e. screening, environment, market needs, etc.) and 4) people (i.e. objectives, venture structure, R & D organization, etc.) Abend's chart demonstrates concisely the interfacing of organizational process for innovation.

Important aspects of innovation management in the excellent companies include risk taking and experimentation. Their philosophy is to experiment with many ideas in a hit-or-miss strategy. This quality of the excellent companies is instrumental to creating an atmosphere where failure is tolerated and accepted as a part of success. Internal competition is another strategy through which excellent companies successfully motivate their work forces. In many excellent companies there are strong relations between industrial R & D and academic departments. This coordination between philosophy and practice is described as synergy by Abend (1979) and clearly reflects the interactional nature of innovation management. Without strong support and encouragement from top management, an organizational process of innovation would not function very effectively.
Figure 2
The Synergy of Innovation as a Total Organizational Process

PROCESS
Methods of:
Innovation
Creativity
Problem-Solving
Idea-Generation
Conceptualization
Forecasting

IDEAS
Selection
Evaluation
Training
Climate
Rewards
Acceptance Finding

PEOPLE
Objectives
Company Policy
Venture Structure
Idea Transfer
R&D Organization
Innovation Management

ORGANIZATION
Screening
Product Futures
Environment
Direction Finding
Concept Assessment
Market Needs
Competition

This support includes training and education and lots of each. Excellent companies use MBO systems, have quality circles, team building, etc. but the training is constant and not scattered. Management's philosophies of risk taking, toleration for failure, experimentation, internal competition, ties to academia, and constant training are intriguing qualities of organizational climate that were not captured by the P.O.P. or the creativity measure in this study. The research by Peters and Waterman (1982) has literally opened a Pandora's Box for research in organizational psychology. Studies are needed which examine more closely and empirically, the organizational climate and management of innovation endemic to the excellent companies.

Conclusions and Recommendations

In conclusion, the P.O.P. (except for the Role Conflict and Overload scale), appeared to accurately measure organizational climate. The creativity measure was generally narrow in scope, represented individual rather than corporate creativity, had few reference points from which to evaluate it and was subject to misinterpretation by the respondents. As a result, the only P.O.P. scale to correlate significantly with creative output was Career Development. Items on this scale relating to postings of job opportunities, clear career paths for supervisees of respondents, job
advancement and training were found to correlate significantly with creative output. Interestingly, P.O.P. scores were high for three out of five scales hypothesized to correlate significantly with creativity. They were: 1) Communications, 2) Decision Making, and 3) Feedback and Rewards on Performance. Consistent with the research on excellent companies, these scales seem to represent the organizational practices which lead to innovation in the excellent companies. The author suggests that future research in organizational climate and creativity examine the total organizational effort towards innovation, rather than separating organizational climate from creativity. Creative activity in an organization may not be limited only to tangible products. It may include all of the aspects, activities and attributes of companies which represent innovation.
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Raven, B. H., & Rietsema, J. (1957). The effects of varied clarity of group goal and group paths upon the individual and his relation to his group. Human Relations, 10, 29.


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APPENDIX
APPENDIX A

Definition of POP Scales and Subscales

Communications
(15 questions) This scale is designed to measure respondents' perceptions as to how well information is shared among groups. Communication is defined as listening to concerns, as well as the ease with which ideas are exchanged among groups and cliques. The total scale shows how well employees think top management, their boss and co-workers communicate ideas and job-relevant information.

1. Top Management (5 questions) This subscale is designed to assess employees' views as to how well top management attempts to regularly communicate what is happening in the organization (i.e. This organization's top management does a good job communicating their decisions to employees).

2. Boss (5 questions) This subscale is designed to measure peoples' perceptions as to how well their boss shares information with them (i.e. My boss keeps me well informed about what is happening in my organization.

3. Co-Workers (5 questions) This subscale is constructed to assess employees' perceptions as to how
easily their co-workers share information (i.e. Ideas of individual co-workers are sought and used by fellow workers).

Meeting Effectiveness

(18 questions) This scale is designed to sense respondents' perceptions as to the effectiveness of the meetings they attend. This scale also measures group leaders' effectiveness in conducting meetings.

4. General Attitudes (5 questions) This subscale is designed to measure peoples' attitudes toward productivity of the meetings they attend (i.e. Group meetings are usually productive around here).

5. Description (8 questions) This subscale assesses the employees' perceptions about the way meetings are generally conducted (i.e. When meetings end, we are clear about who should do what next).

6. Group Leader (5 questions) This subscale measures the employees' perceptions about what the group leader does to make meetings effective (i.e. People who lead our meetings work to facilitate the contributions of all group members).
Decision Making
(15 questions) This scale is designed to measure the perceptions held toward the effectiveness of the decision making process and the amount of input that is allowed in the process.

7. General Attitudes (5 questions) These items focus on respondents' attitudes toward how decisions are reached in the organization (i.e. Decisions in this organization are based on logic and the weight of evidence rather than other considerations).

8. Boss (5 questions) This subscale gauges the respondents' perceptions of their bosses' role in decision making (i.e. My boss tries to include me in decision making if the decision will affect me).

9. Self (5 questions) This subscale measures employees' attitudes about how important it is to have input into decisions (i.e. I wish I had more opportunity to have input into the decisions that will affect me.

Leadership
(15 questions) This scale in combination with other subscales throughout the instrument describes managers' interactions with employees. Specifically, this scale examines
employee perceptions of bosses' competency, helping skills, and ability to motivate.

10. Competency (5 questions) This subscale assesses employees' perceptions of their bosses' competency in the areas of planning, technical knowledge, and administration (i.e. My boss knows the technical parts of his/her job extremely well).

11. Helping (5 questions) This set of questions is designed to measure employee attitudes toward their bosses' ability to help them in the job setting (i.e. My boss helps me solve work-related problems).

12. Motivating (5 questions) This subscale is focused on the employees' perceptions of their bosses' skills in motivating people to perform well (i.e. My boss encourages innovation and calculated risk-taking in others).

Role Clarity and Standards
(13 questions) This group of questions is used to measure peoples' perceptions about the clarity of the roles and standards set for those roles.

13. Clarity (5 questions) This subscale is structured to sense peoples' attitudes toward job clarity and priorities (i.e. People around here clearly understand their exact job responsibilities).
14. **Standards** (3 questions) This subscale is designed to measure employees' perceptions about how clear organizational policies are (i.e. Our organizational policies and guidelines are clear and consistent).

15. **Expectations** (5 questions) This subscale assesses employees' perceptions about how easy or difficult it is to meet the standards for job performance that have been set (i.e. Around here, co-workers set high standards of achievement for themselves).

**Career Development**

(15 questions) This scale is designed to assess respondents' perceptions about opportunities for personal development and career advancement. This scale will show if employees think that there is a future with the Company and if the Company has a visible program for employee development.

16. **Experience with Career Development Program** (6 questions) This subscale measures employees' views as to the emphasis and opportunity placed on career development by the organization (i.e. This organization has an active, well publicized career development program for its employees).
17. **General Attitudes** (6 questions) These questions focus on the attitudes held toward the Company's career development program as a result of the program (i.e. Because of this organization's career development program, I am clear about the steps I have to take to advance in this organization).

18. **Importance of Career Development** (4 questions)
These questions focus on what and how much importance the employee attaches to the Company's career development program (i.e. I think it is important that the organization I work for provides personnel to periodically counsel me about my future career steps).

**Conflict Management**
(18 questions) This scale is designed to assess respondents' perceptions concerning how interpersonal conflict is managed. This scale describes prevailing attitudes employees have about informal and formal procedures for resolving conflicts and disagreements. This scale also measures how much conflict exists between organizational groups, between bosses and subordinates, and within the work group.

19. **Intergroup Relations** (5 questions) This subscale assesses the respondents' perceptions as to whether
there is inter-departmental conflict and whether this conflict makes job performance difficult (i.e. There is little evidence of significant unresolved conflict between departments in the organization).

20. Boss (5 questions) This subscale measures respondents' perceptions as to how tolerant their bosses are to divergent points of view (i.e. We are encouraged to speak our minds, even if it means disagreeing with our boss).

21. Work Group (3 questions) This subscale assesses peoples' perceptions of the conflict that exists within their immediate work groups (i.e. People in my work group don't try to "win" arguments, instead they work for the best solution).

22. General Attitudes (5 questions) This set of questions measures respondents' perceptions about whether conflict is seen as positive or negative and how conflict is dealt with (i.e. When two or more persons have a disagreement or misunderstanding there are clear and effective procedures for us to follow to resolve the situation, or people who express disagreement openly here are regarded as being interested in improving things).
Role Conflict and Overload

(16 questions) This scale is designed to measure respondents' perceptions as to the amount of overlapping functions that exist in their jobs. This scale shows the amount of perceived conflict among job demands relevant to certain inter-departmental positions, as well as to the amount of overload employees perceive in relation to certain jobs.

23. **Intersender Conflict** (3 questions) This subscale measures employees' perceptions of the amount of overlap or incompatible requests existing in their job (i.e. I work under compatible requests from two or more people).

24. **Two Group Conflict** (3 questions) This subscale assesses employee attitudes concerning the amount of accountability they feel from having to serve two groups (i.e. Because I work in two groups, I feel like I have more than one boss and that confuses me).

25. **Intrasender Conflict** (3 questions) This subscale measures employees' perceptions concerning the frequency of mixed messages received from their bosses (i.e. My boss will often ask me to do something and then sometime later ask me to do the exact opposite).
26. **Personal Values** (3 questions) This group of questions is designed to assess employees' views concerning being asked to do job-related tasks that may go against their personal values (i.e. In order to meet my supervisor's expectations I have to do things that seem wrong to me).

27. **Overload** (4 questions) This subscale assesses respondents' attitudes toward the amount of work that is expected (i.e. It is very hard to keep up with the workload around here).

**Performance Appraisal**

(16 questions) This scale is designed to assess respondents' perceptions about the Company's performance appraisal process. This scale asks about general attitudes toward performance appraisal and the boss/employee needs in the process.

28. **General Attitudes** (5 questions) This subscale measures employees' perceptions concerning the fairness and appropriateness of certain aspects of the performance appraisal process (i.e. The performance appraisal process used in this Company is clear and easy for me to understand).

29. **Boss** (6 questions) This subscale is designed to reveal respondents' perceptions about boss/employee
performance appraisal interactions. Areas such as frequency of interaction and the communication of standards are examined (i.e. During my performance review session it is easy to get both negative and positive feedback about my performance on the job from my boss).

30. **Self** (5 questions) This subscale is designed to assess employees' perceptions about the level of satisfaction and importance related to the performance appraisal process (i.e. As a result of my appraisal, I am more involved and interested in my job).

**Feedback and Rewards on Performance**

(15 questions) This scale is designed to measure respondents' perceptions concerning the amount of feedback and appropriateness of rewards for good job performance. This scale shows if employees think that good job performance is reinforced through the judicial use of positive and negative rewards.

31. **Feedback** (5 questions) This subscale assesses employees' views concerning how much feedback is given on job performance (i.e. The feedback I get compares my work to a clear standard of performance).
32. Consequence of Poor Performance (5 questions) This subscale examines respondents' views concerning what happens to poor performance (i.e. Managers of this organization keep poor performers from getting rewarded). This subscale also assesses peoples' opinions about what is rewarded: controlling costs, sound reasoning, or the expression of new ideas (i.e. It pays for me to help control costs).

33. Salary and Promotion (5 questions) This subscale measures the respondents' opinions about whether or not good performance is tied to salary and promotion (i.e. In my organization salary decisions are based upon good performance).
In this section we ask a number of general questions about your background. This information will allow comparisons among different R & D groups and comparisons among different organizational groups. We appreciate your help in providing this important information.

1. Are you: 1. male  2. female

2. How long have you worked:
   a. for your present company  _______ months
   b. on your present job  _______ months
   c. for your current boss  _______ months
   d. in your current location  _______ months

3. Current age:  _______ years

4. Highest level of education:
   1. high school
   2. specialized/technical training
   3. some college
   4. associate or other 2 year degree
   5. bachelor's degree
   6. master's degree
   7. Ph.D.
   8. Ph.D.

5. Circle the category which best describes your position level in the organization:
   1. management & professional
   2. technical
   3. technical

6. Ethnic group:
   1. American Indian
   2. Black
   3. Caucasian
   4. Hispanic
   5. Oriental

How many of the following have you produced during the period from September 1981 to September 1983?

1. _______ Unpublished technical manuscripts, reports or formal talks (either inside or outside the company).

2. _______ Technical reports accepted by professional journals.
COMMUNICATIONS

HOW MUCH DO YOU AGREE OR DISAGREE?

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# MEETING EFFECTIVENESS

## GENERAL ATTITUDES

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<td>A. Group meetings are usually productive here.</td>
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<td>B. The purpose of our meetings is usually clear.</td>
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<td>C. Some very creative solutions come out of this group.</td>
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<td>D. People usually get recognized when they contribute to productive meetings</td>
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<td>E. When people receive notice there will be a meeting they usually think about ways to legitimately find an excuse not to attend.</td>
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<td>A. In meetings I attend there is as much effort to listen to others as to be heard and be influential.</td>
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<td>B. In meetings I attend many people remain silent.</td>
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<td>C. In meetings I attend there is a good deal of jumping from topic to topic—it is unclear where the group is on the agenda.</td>
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<td>D. In meetings I attend there are many problems which people are concerned about which never get on the agenda.</td>
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<td>E. When problems come up in meetings they are thoroughly explored until everyone understands what the problem is.</td>
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<td>F. In meetings I attend the group discusses the pros and cons of several different alternative solutions to a problem.</td>
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<td>G. The group discusses and evaluates how decisions from previous meetings have worked out.</td>
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<td>H. When meetings end we are clear about who should do what next.</td>
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## GROUP LEADER

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<tbody>
<tr>
<td>A. Leaders plan our meetings carefully so as to accomplish the objectives of the meeting in the time allowed.</td>
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</tr>
<tr>
<td>B. Leaders ask for attendance at meetings only if it is important to be there.</td>
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<tr>
<td>C. Leaders let people know the agenda of our meetings prior to coming.</td>
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<tr>
<td>D. People who lead our meetings work to facilitate the contributions of all group members.</td>
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</tr>
<tr>
<td>E. People who lead our meetings ask for constructive criticism to improve their leadership.</td>
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</tr>
</tbody>
</table>

## DECISION MAKING

### GENERAL ATTITUDES

**A.** Decisions in this organization are based on logic and the weight of evidence rather than other considerations.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**B.** In this organization there is a willing acceptance of top management decisions.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**C.** Around here a conscientious attempt is made to consider other points of view before an important decision is made.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**D.** In this organization people are encouraged to reach decisions through a blending of ideas rather than through force.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**E.** Decisions are made around here without asking the people who have to live with them.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

### BOSS

**A.** My boss gives me clean-cut decisions when I need them.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**B.** My boss has the authority to make decisions for his/ her unit.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**C.** My boss tries to include me in decision making if the decision will affect me.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**D.** My boss tries to get as much information as possible before making a decision.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**E.** My boss encourages people to speak up when they disagree with a decision.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

### SELF

**A.** I wish I had more opportunity to have input into the decisions that will affect me.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**B.** I feel that I have the expertise and information to aid in the decisions made in this organization.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**C.** I feel I do not really want to be involved in decisions that will directly affect me.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**D.** I am satisfied with how decisions are made by top management.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6

**E.** It is my job to implement decisions, not be involved in the decision making process.

- Strongly disagree: 1
- Disagree: 2
- Somewhat disagree: 3
- Somewhat agree: 4
- Agree: 5
- Strongly agree: 6
# LEADERSHIP

<table>
<thead>
<tr>
<th>COMPETENCY</th>
<th>HOW MUCH DO YOU AGREE OR DISAGREE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. My boss knows the technical parts of his/her job extremely well</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>B. My boss handles the administrative parts of his/her job extremely well</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>C. My boss does a good job influencing upward in this organization</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>D. My boss keeps cutting things off me she just lets things slide</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>E. My boss is a good planner</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HELPING</th>
<th>HOW MUCH DO YOU AGREE OR DISAGREE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. My boss helps me discover problems before they get too bad</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>B. My boss sees that I have the things I need to do my job</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>C. My boss helps me solve work-related problems</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>D. My boss helps me with my professional growth and development</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>E. If I believe there is a better way to do things, I can talk with my boss and my ideas will be carefully considered</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MOTIVATING</th>
<th>HOW MUCH DO YOU AGREE OR DISAGREE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. My boss does a good job in motivating me to do my job</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>B. My boss encourages innovation and calculated risk-taking in others</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>C. My boss puts lots of energy and enthusiasm into directing programs around here</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>D. I would like to be more involved in decision-making than my boss makes possible</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
<tr>
<td>E. My boss sees that employees are properly trained for their jobs</td>
<td>1 (1) 2 (2) 3 (3) 4 (4) 5 (5) 6 (6)</td>
</tr>
</tbody>
</table>
## CONFLICT MANAGEMENT

### INTERGROUP RELATIONS

<table>
<thead>
<tr>
<th>A. There is evidence of significant unresolved conflict between departments in this organization</th>
<th>(1) Strongly Disagree</th>
<th>(2) Disagree</th>
<th>(3) Neutral</th>
<th>(4) Agree</th>
<th>(5) Strongly Agree</th>
<th>(6) Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. The attitude of top management is that conflict between competing units and individuals can be very healthy</td>
<td>(1) Strongly Disagree</td>
<td>(2) Disagree</td>
<td>(3) Neutral</td>
<td>(4) Agree</td>
<td>(5) Strongly Agree</td>
<td>(6) Don't Know</td>
</tr>
<tr>
<td>C. Deadlocks between parts of our organization seem impossible to resolve</td>
<td>(1) Strongly Disagree</td>
<td>(2) Disagree</td>
<td>(3) Neutral</td>
<td>(4) Agree</td>
<td>(5) Strongly Agree</td>
<td>(6) Don't Know</td>
</tr>
<tr>
<td>D. There are groups in this organization that seem to be fighting with each other</td>
<td>(1) Strongly Disagree</td>
<td>(2) Disagree</td>
<td>(3) Neutral</td>
<td>(4) Agree</td>
<td>(5) Strongly Agree</td>
<td>(6) Don't Know</td>
</tr>
<tr>
<td>E. My work group has difficulty doing its job because of conflict with other work groups</td>
<td>(1) Strongly Disagree</td>
<td>(2) Disagree</td>
<td>(3) Neutral</td>
<td>(4) Agree</td>
<td>(5) Strongly Agree</td>
<td>(6) Don't Know</td>
</tr>
</tbody>
</table>

### BOSS OR SUPERVISOR

| A. We are encouraged to speak our minds even if it means disagreeing with our boss | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| B. Employees may disagree with their bosses without being penalized | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| C. Criticism of administrative policies and priorities is encouraged | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| D. When people here disagree with an administrative decision, they work to get it changed | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| E. People avoid direct clashes with the administration at all costs | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |

### WORK GROUP

| A. My work group has difficulty doing its job because of conflict among group members | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| B. People in my work group don't try to win arguments instead they work for the best solution | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| C. In my work group, rivalries are fairly common | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |

### GENERAL ATTITUDES

| A. When two or more persons have a disagreement or misunderstanding, there are clear and effective procedures for us to follow to resolve the situation | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| B. When there are disagreements at work, they tend to be swept under the rug and avoided | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| C. Our disagreements here are used in ways that stimulate understanding and new ideas | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| D. People who express disagreement openly here are regarded as being interested in improving things | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
| E. People can get into heated arguments with one another and be best of friends the next day | (1) Strongly Disagree | (2) Disagree | (3) Neutral | (4) Agree | (5) Strongly Agree | (6) Don't Know |
### ROLE CONFLICT AND OVERLOAD

**HOW MUCH DO YOU AGREE OR DISAGREE?**

<table>
<thead>
<tr>
<th>CONFLICT</th>
<th>STRONGLY DISAGREE</th>
<th>MILDLY DISAGREE</th>
<th>SLIGHTLY DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>NOT APPLICABLE</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. I receive incompatible requests from two or more people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>B. I am in a bind. If I do what my direct boss wants, I cannot meet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>expectation from others</td>
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<td></td>
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<tr>
<td>C. In order to do my job well, I have to do some things that will conflict</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
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<tr>
<td>with organizational policy</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TWO GROUP CONFLICT</th>
<th>STRONGLY DISAGREE</th>
<th>MILDLY DISAGREE</th>
<th>SLIGHTLY DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>NOT APPLICABLE</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. I work with two or more groups who operate quite differently</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>B. The problem with working in two groups is that I receive incompatible</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>requests</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C. Because I work in two groups, I feel like I have more than one boss</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>and it confuses me</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>MIXED MESSAGES</th>
<th>STRONGLY DISAGREE</th>
<th>MILDLY DISAGREE</th>
<th>SLIGHTLY DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>NOT APPLICABLE</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. I work under incompatible policies and guidelines</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>B. My boss will often ask me to do something and then sometime later ask</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>me to do the exact opposite</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. I receive incompatible requests from my boss</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERSONAL VALUES</th>
<th>STRONGLY DISAGREE</th>
<th>MILDLY DISAGREE</th>
<th>SLIGHTLY DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>NOT APPLICABLE</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Many times I am asked to do things that are against my personal values</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>B. In order to meet my supervisor's expectations I have to do things that</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>seem wrong to me</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. My value system and those of my co-workers don't seem to match</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OVERLOAD</th>
<th>STRONGLY DISAGREE</th>
<th>MILDLY DISAGREE</th>
<th>SLIGHTLY DISAGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
<th>NOT APPLICABLE</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. I have too much to do and too little time to do it</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>B. I feel overqualified for the work I do</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>C. It is very hard to keep up with the workload</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>D. Getting ahead in this organization requires intensive outside work in</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>addition to doing your regular assignments</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### ROLE CLARITY AND STANDARDS

#### CLARITY

<table>
<thead>
<tr>
<th align="left">A. People around here generally know what the priorities are on their job (so they know what is more or less important)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(0)</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">B. People around here clearly understand their exact job responsibilities and tasks</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>B</td>
</tr>
<tr>
<td align="left">C. My boss and I agree on what represents good performance on my job</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>C</td>
</tr>
<tr>
<td align="left">D. Others I work with seem unclear about what my job is</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>D</td>
</tr>
<tr>
<td align="left">E. My direct supervisor and I have a mutual understanding about what I am to do and how I am supposed to do it</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>E</td>
</tr>
</tbody>
</table>

#### STANDARDS

<table>
<thead>
<tr>
<th align="left">A. Our organizational policies and guidelines aren't clear and consistent</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(0)</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">B. Management's objectives are not well understood by people around here</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>B</td>
</tr>
<tr>
<td align="left">C. I feel uncertain as to how much authority I have</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>C</td>
</tr>
</tbody>
</table>

#### EXPECTATIONS

<table>
<thead>
<tr>
<th align="left">A. Managers above me provide a good example of commitment to high performance standards</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(0)</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">B. Around here co-workers set high standards of achievement for themselves</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>B</td>
</tr>
<tr>
<td align="left">C. Relative to similar organizations I know about, ours has excessively high performance expectations for its employees</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>C</td>
</tr>
<tr>
<td align="left">D. Doing a good job is an important element for promotion in this organization</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>D</td>
</tr>
<tr>
<td align="left">E. Expectations for performance are not particularly hard to achieve in this organization</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(0)</td>
<td>E</td>
</tr>
</tbody>
</table>
### CAREER DEVELOPMENT

#### GENERAL ATTITUDES

<table>
<thead>
<tr>
<th></th>
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<th>HOW MUCH DO YOU AGREE OR DISAGREE?</th>
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<tr>
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<td></td>
<td></td>
<td>ENDORSE</td>
</tr>
<tr>
<td>A. Starting from the recruitment interview when I joined this organization, it was made very clear what career opportunities were available to me.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>B. This organization has an active, well-published career development program for its employees.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>C. Job openings are always posted within the organization before they are advertised in the newspapers and trade magazines.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>D. The clear career paths of this organization make it easy to guide the people I supervise.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>E. Training opportunities I have had here have helped me advance my career.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>F. This organization really tries to find ways to encourage employees to develop their job skills in order to enhance their possibilities for job advancement.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
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#### EXPERIENCE WITH CAREER DEVELOPMENT PROGRAM

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<td></td>
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<td></td>
<td>ENDORSE</td>
</tr>
<tr>
<td>A. I have had opportunities in this organization to take on job assignments that broaden my job experience and knowledge.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>B. During my performance appraisal interview with my boss we talk about specific career development goals for me.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>C. Because of this organization's career development program, I am clear about what steps I have to take to advance in this organization.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>D. Because of this organization's career development program, I knew what I would like to be doing in this organization five years from now.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>E. If I were to have difficulty relating to my boss, confidential counseling would be available for me in this organization.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
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#### IMPORTANCE OF CAREER DEVELOPMENT

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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ENDORSE</td>
</tr>
<tr>
<td>A. It is important to me as an employee that the organization I work for provide opportunities to develop my skills and abilities.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>B. It is very important to me as an employee that the organization I work for provide clear avenues and opportunities for promotion.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>C. I think it is important that the organization I work for periodically counsel me about my future career steps.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>D. I think it is important that the organization I work for provide clear, well-publicized information about job openings within the company.</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>
**PERFORMANCE APPRAISAL**

**GENERAL ATTITUDES**

<table>
<thead>
<tr>
<th>A. Performance appraisal is fairly and honestly done in this organization.</th>
<th>(1) (2) (3) (4) (5) (6)</th>
<th>0</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Advancement and promotion are based upon clear performance indicators which are discussed with me through a performance appraisal process.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>B</td>
</tr>
<tr>
<td>C. The current performance appraisal practices provide accurate feedback to employees in this organization.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>C</td>
</tr>
<tr>
<td>D. The performance appraisal process used in this company is clear and easy for me to understand.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>E. The performance appraisal process in this unit helps everyone work toward the same objectives and standards.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>E</td>
</tr>
</tbody>
</table>

**BOSS**

<table>
<thead>
<tr>
<th>A. My boss coaches me appropriately for the tasks I take on.</th>
<th>(1) (2) (3) (4) (5) (6)</th>
<th>0</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Performance review sessions with my boss do not occur frequently enough to meet my needs.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>B</td>
</tr>
<tr>
<td>C. It is easy to know when I have done a superior job because performance objectives and standards are determined in the performance appraisal session with my boss.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>C</td>
</tr>
<tr>
<td>D. If I have a performance appraisal report which I do not agree with, I can appeal it to my boss with no fear of reprisal.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>E. During my performance review session it is easy to get both negative and positive feedback about my performance on the job from my boss.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>E</td>
</tr>
<tr>
<td>F. My boss has high performance standards for me and communicates an enthusiasm as to the importance of attaining those standards.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>F</td>
</tr>
</tbody>
</table>

**SELF**

<table>
<thead>
<tr>
<th>A. The appraisal reviews cover most of the issues that are important to me.</th>
<th>(1) (2) (3) (4) (5) (6)</th>
<th>0</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. I can influence the goals that are set during my performance appraisal interview.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>B</td>
</tr>
<tr>
<td>C. I know exactly when and how I will be evaluated for my work.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>C</td>
</tr>
<tr>
<td>D. I feel good about the way my last appraisal was conducted.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>E. As a result of my appraisal, I am more involved and interested in my job.</td>
<td>(1) (2) (3) (4) (5) (6)</td>
<td>0</td>
<td>E</td>
</tr>
</tbody>
</table>
# FEEDBACK AND REWARDS ON PERFORMANCE

## FEEDBACK

<table>
<thead>
<tr>
<th></th>
<th>HOW MUCH DO YOU AGREE OR DISAGREE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>I get enough feedback on my job performance to know how well I am doing.</td>
</tr>
<tr>
<td>B</td>
<td>The feedback I get compares my work to a clear standard of performance.</td>
</tr>
<tr>
<td>C</td>
<td>The feedback I get on my work is so delayed that it really doesn't make much difference.</td>
</tr>
<tr>
<td>D</td>
<td>Improvements in performance get noticed in this organization.</td>
</tr>
<tr>
<td>E</td>
<td>The only time you get feedback on your job performance is when you have done something wrong.</td>
</tr>
</tbody>
</table>

## CONSEQUENCES

<table>
<thead>
<tr>
<th></th>
<th>HOW MUCH DO YOU AGREE OR DISAGREE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>There are usually no consequences to poor performance for employees of this organization.</td>
</tr>
<tr>
<td>B</td>
<td>The managers of this organization keep poor performers from getting rewarded.</td>
</tr>
<tr>
<td>C</td>
<td>It pays for me to help control costs.</td>
</tr>
<tr>
<td>D</td>
<td>Sound reasoning is rewarded here, even though it may lead to unpopular conclusions.</td>
</tr>
<tr>
<td>E</td>
<td>It pays for me to voice new ideas and suggestions.</td>
</tr>
</tbody>
</table>

## SALARY AND PROMOTION

<table>
<thead>
<tr>
<th></th>
<th>HOW MUCH DO YOU AGREE OR DISAGREE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>In my organization salary decisions are based upon performance.</td>
</tr>
<tr>
<td>B</td>
<td>How much I get paid has nothing to do with how well I do my job.</td>
</tr>
<tr>
<td>C</td>
<td>Pay around here depends upon how well you perform.</td>
</tr>
<tr>
<td>D</td>
<td>Doing a good job is an important element for promotion in this organization.</td>
</tr>
<tr>
<td>E</td>
<td>Getting promoted in this organization depends upon who you know, not on how well you do your job.</td>
</tr>
</tbody>
</table>