FIRM LEVEL HUMAN RESOURCE PLANNING

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By

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CHAPTER I

INTRODUCTION

The primary purpose of this dissertation is to identify the reasons why firms do not have human resource planning programs. Both survey and interview work have been conducted in an effort to identify the factors that determine whether firms have planning programs. Based on that work a number of determinants (namely an orientation to short-run profitability, difficulties in the quantification of the benefits of planning, and limitations on the flow of planning information) have been identified. The single most significant factor is a non-planning orientation on the part of many firm's top management. The non-planning orientation of firms is both a constraint on planning in its own right and a factor which exacerbates the impact of other constraints.

Interestingly, while a significant number of potential determinants were hypothesized the importance of the non-planning orientation of management was not suspected apriori. The importance of the non-planning orientation of firms emerged from the data.
Definition Of Terms

What is Human Resource Planning

A logical first question in a work about firm level human resource planning is what is meant by the term. For the purpose of this dissertation the term firm level human resource planning is used to define those programs that include the prediction of skill-specific internal labor supply, the prediction of skill-specific human resource requirements, and the utilization of the supply and demand information in the selection of human resource policies. Although this definition is more restrictive than the typical "planning for the right numbers and the right kinds of people at the right places at the right times,"¹ the more restrictive definition is necessary in order to differentiate comprehensive human resource planning programs from other things which may be referred to as human resource planning. The problem with the typical definition is that it is a statement of the goals of the planning process but not a description of what the planning process involves.

A human resource planning program needs to contain each of the three components (predicting skill-specific internal supply, predicting skill-specific demand and utilizing the supply and demand information in the selection of human resource policies) referred to in the definition. Predictions of skill-specific internal labor supply provide the firm with information regarding the expected future status of the existing work force. What sort of workforce will be required to carry out the firm's activities is indicated by the predictions of skill-specific human resource requirements. Comparison of these two pieces of data provide an indication of the human resource needs the firm will have to fill. The use of the supply and demand data in the selection of human resource policies is the firm's method of making practical use of the planning process.

The absence of any one of the three components renders the planning process almost useless. Whether a firm should develop human resource strategies designed to secure additional workers with a particular set of skills, or should develop strategies designed to deal with an excess of employees with those skills, is a function of skill-specific demand relative to internal supply. Knowledge of internal supply independent of demand, or demand independent of internal supply, will not indicate what sort of human resource strategies a firm should pursue. "It
seems hardly worth saying that all the work of forecasting is wasted if no action plan stems from it."\(^2\) Clearly, if the information is not utilized the knowledge of supply and demand is of little value to the firm.

The human resource planning process provides the firm with a method of improving the likelihood that the firm's future human resources will be appropriate for carrying out the firm's business. However, a human resource planning program can do much more than equate labor supply and demand. Planning provides a framework for taking inventory of the firm's human resources, improving the utilization of human resources, improving employee motivation and for reducing the cost of meeting human resource requirements.

Other Terms

For the purpose of this dissertation the terms human resources, labor, workers, personnel and employees are used interchangeably to refer to labor inputs in the production process. Human resource policies are defined as those policies of the firm which are designed to influence the development, maintenance, utilization and selection of employees.

\(^2\) D. J. Bell, Planning Corporate Manpower, (London: Longman Incorporated, 1974) p. 76.
Despite their varying definitions the terms prediction, projection and forecast appear to be used almost interchangeably in the literature. A prediction is defined as an attempt to foretell the future and a projection is a prediction based on the extrapolation of current trends by a mathematical formula. In contrast, a forecast is a prediction based either solely on rational analysis or on some combination of projection and rational analysis.

As was discussed previously firm level human resource planning is defined as the generation and use of skill-specific information regarding the firm's future supply of and demand for human resources. In the interest of brevity and readability the firm level part of the term will be deleted and it will be understood that human resource planning refers to firm level human resource planning. Although human resource planning can be done in firms of any size, this dissertation is geared to human resource planning in firms with 500 or more employees. Programs which do not fit the definition of human resource planning will be referred to as non-comprehensive human resource planning programs.
The Discrepancy Between The Levels Of Academic Interest And Practical Application

Although a substantial body of human resource planning literature exists, only a small percentage of large firms have human resource planning programs. Why the discrepancy between the level of academic interest and practical application exists is not clear. The primary motivation for this dissertation is a desire to find out why this discrepancy exists.

That there is a substantial body of literature regarding human resource planning can be clearly seen by the length of the bibliography included in this dissertation. The contention that only a limited amount of human resource planning actually occurs is based on survey results and comments in the literature.

Heneman and Seltzer are among the first who attempted to determine the extent to which firms engage in human resource planning. In 1969 they surveyed 100 Minnesota firms with over 500 employees. Among the 69 responding firms 72 percent predicted future labor needs, but only one in three of these firms used the predictions to plan budgets, establish training levels or determine transfer

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and promotion policies. These results indicate that a majority of the responding firms engaged in some aspect of human resource planning, but that only a minority of the firms made requirements predictions and utilized the information in the selection of human resource policies. Furthermore, the level of disaggregation of the requirements predictions, and whether or not the firms were making any predictions of their internal labor supply was not discussed.

A study conducted by Burack and Gutteridge also shows that only a minority of firms have human resource planning programs. The study involved 34 large firms with an expressed interest in human resource planning. Among this select group, fewer than one-third frequently or regularly forecast future human resource needs.

Bowery conducted a study of 73 large firms located in England, a planning oriented country, and found that fewer than half of them (34) had human resource planning programs. The details Bowery provides do not clarify how many, if any, of the 34 firms have non-comprehensive human resource planning programs.

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The largest reported survey was conducted by James Walker, who asked 1,055 firms each employing over 1,000 workers for a review of their human resource planning programs. Only twenty-one percent of the firms responded, and only 188 (18 percent) of the firms provided a review of their human resource planning programs. It is not clear if the low response rate resulted from the fact that most of the firms did not have human resource planning programs, but in reference to the survey results Walker does note that "Building a comprehensive manpower planning process is by and large an aim for the future."\(^7\)

In a study conducted by DiFranco of 12 large firms in Columbus, Ohio, nine of the firms indicated they were engaged in human resource planning.\(^8\) Based on the firms' descriptions of their planning programs, however, it appears that only one firm was engaged in human resource planning as defined for this work. The firms referred to everything from individual career planning to performance appraisal as human resource planning.

The survey results indicate that although a majority of firms may be involved in something they consider human resource planning, only a small minority have human resource planning.


\(^7\)Ibid., p. 72.

resource planning programs. Except for Walker's work, the surveys' primary limitation is a lack of descriptions regarding the human resource planning programs. Additional descriptive information would help to identify the best practiced planning techniques.

A number of comments in the literature support the contention that only a limited amount of human resource planning occurs. Regarding the management of human resources Mason Haire wrote the following; "we are not on top of the problem we are reactive and opportunistic. We wait to see what the environment presents, and we do the best we can with it."\(^9\) Clearly Haire believes there is a lack of planning. In discussing constraints on human resource planning, James Walker made the following succinct observation, "manpower planning has taken a back seat in most corporations."\(^10\) Although both statements were made in the late sixties, it appears that little has changed since then. In 1978, Burrack and Gutteridge wrote "(we) are frankly skeptical of the claims ... that manpower planning or human resource management is currently or is about to become a pervasive endeavor in a great many business organizations. ... Further, the manpower planning system actually adopted by many organizations often - in


direct contrast to the institutions' professed intentions -
displays only marginal progress beyond traditional
personnel activities and falls far short of a comprehensive
design."11

These comments, in conjunction with the survey
results, indicate that human resource planning is the
exception, not the rule, and presents us with the question
of why the discrepancy exists between the high level of
academic interest and the limited amount of practical
application. In order to explain this discrepancy one must
explore the factors that determine whether human resource
planning occurs.

Potential Determinants Of Whether Firms Have Human
Resource Planning Programs

It is interesting that while there are a number of
works that address the extent to which human resource
planning occurs, almost no literature could be found
specifically discussing what determines whether firms have
human resource planning programs.

Three categories of possible determinants can be
hypothesized: 1) Institutional factors may inhibit the

11Elmer H. Burrack and Thomas G. Gutteridge,
"Institutional Manpower Planning Rhetoric Versus Reality,"
p. 13.
implementation of human resource planning programs; 2) The state of the art may not be sufficiently refined to support the implementation of human resource planning programs; 3) Firms may not engage in human resource planning because it is not cost effective to do so.

Institutional Factors

A variety of institutional factors may be involved in a firm's determination of whether to institute human resource planning. These factors could result either from constraints on the dissemination of information from the academic to the business community, or from conditions inherent in the organizational structure of the firms. If constraints exist on the dissemination of information from the academic to the business community, the appropriate managerial personnel may not have sufficient knowledge of human resource planning techniques to implement a human resource planning program or they may have misconceptions about the cost effectiveness of human resource planning which discourages them from exploring planning's potential benefits. Within the firm it may not be clear which unit of the firm would be responsible for a human resource planning. Some management personnel may resist a planning program out of a fear of a loss of personal authority.
Although a considerable body of knowledge exists in the academic community regarding human resource planning, a number of factors may impede the flow of this information to the extent that firms lack the ability to implement human resource planning programs. Planning information may not be commonly incorporated into university course material, which could be the result of a lack of student interest or a shortage of qualified instructors. Even if courses include planning information, those individuals in a position to institute human resource planning programs may not be taking these courses. In addition to course work, special managerial seminars are additional potential conduits for disseminating information from the academic to the business community; again the lack of managerial interest (and/or qualified instructors) will inhibit this means of information diffusion. In the absence of these methods, reading of the relevant journal articles by the managerial personnel is the primary remaining method of information diffusion. The diversity of scholarly journals in which the human resource planning related articles are published and the constraints on managerial time, however, may prevent managers from obtaining significant amounts of information directly from journal articles.

If management lacks reliable information regarding the state of the art of human resource planning then they may harbor misconceptions about planning's potential value. The
erroneous perceptions of human resource planning as of limited utility may convince firms that human resource planning is not cost effective, which may prevent the firm from seeking more reliable information. The firm's perception of the utility of human resource planning is as important, if not more important, than the actual utility in the firm's determination of whether to institute a planning program.

Within firms there may be no clear delineation of what unit would be responsible for human resource planning. It may be unclear whether the corporate planning unit of the firm or the human resource management office would be responsible for the implementation and operation of a planning program. There are logical reasons why both groups might feel that human resource planning is, or is not, in their domain. An effective human resource planning program would be likely to require cooperation between both of these groups and a lack of rapport between the groups could clearly impede the implementation of a planning program.

Managers who fear that their authority may be usurped as a result of the implementation of a human resource planning program may oppose it.\(^{12}\) Line managers in particular may believe that they would lose some of their

authority relating to decisions regarding promotions and job assignment for their subordinates.

Limitations of the State of the Art

Another possible explanation for the discrepancy between the levels of academic interest and practical application is that the current state of the art may not be sufficiently refined to support the implementation of human resource planning program. Just as is the case with the human resource planning process, the literature can be divided into three areas: the prediction of skill-specific internal labor supply, the prediction of skill-specific requirements, and the utilization of the supply and demand information. Limitations in any of these three areas can render the human resource planning literature useless as a base for practical application, and therefore, constrain the planning process.

Cost Effectiveness

It is logical to assume that if human resource planning is not a cost effective activity firms are less likely to engage in it. Determining cost effectiveness involves comparing the costs of a human resource planning program with the benefits of having such a program.
The planner's time, data collection, and data manipulation are the primary expenses, and of these, the cost of data collection is the most likely to be prohibitive.

Three categories of potential benefits were hypothesized: the avoidance of skill-specific labor shortages and surpluses; reduced labor costs; and an improved ability to select the set of corporate strategies which will most efficiently utilize all of the firm's resources.

Advanced knowledge of skill-specific labor requirements net of internal supply can aid firms in selecting human resource policies which will avoid labor shortages and surpluses. The likelihood of skill-specific labor shortages, as well as the potential cost, has increased as labor inputs have become less interchangeable, training periods have lengthened, and production processes have become more integrated. In addition to helping to avoid labor shortages, human resource planning can help prevent excess internal labor supply. Prior knowledge of future areas of excess internal labor supply will allow firms to institute policies such as retraining and early retirements to eliminate the potential surplus.

Advanced notice of net skill-specific labor requirements allows firms not only to avoid labor shortages and surpluses but also to implement the most cost effective
method of meeting its human resource requirements. Decisions such as whether to pay existing workers overtime, hire already-trained individuals, provide training internally, or encourage external training, can only be made and acted on by firms with advanced knowledge of their skill-specific labor needs.

A human resource planning program should also help firms select corporate strategies which will most efficiently utilize all of the firm's resources. By providing predictions of the net amount of skill-specific labor requirements associated with each of the corporate strategies under consideration a human resource planning program should aid firms in in the determination of the obtainability and relative profitability of the various options under consideration. Profitability being synonymous with the efficient utilization of resources in the production process.

Statement Of The Problem

It is clear that with regard to firm level human resource planning there is a wide discrepancy between the levels of academic interest and practical application. Three categories of potential determinants of whether firms have human resource planning have been hypothesized. The
primary goal of this dissertation is to explore each of these three categories of possible determinants (institutional factors, limitations of the state of the art, and cost effectiveness) to determine what factors inhibit firms from engaging in human resource planning.
CHAPTER II
GOALS OF THE RESEARCH

There are three successive goals of this dissertation: determining the extent to which firms engage in human resource planning, identifying the factors which determine whether firms have planning programs, and suggesting a course of action.

Additional verification of the extent to which human resource planning occurs is desirable as a result of the limited amount of literature addressing this question. For those firms with human resource planning programs an effort is made to determine what is included in their programs. An effort is also be made to discover, describe, and evaluate the effectiveness of human resource planning techniques which have not been discussed in the literature but that are in use by firms.

As indicated in the preceding chapter, the primary goal of this dissertation is to identify and ascertain the nature of the determinants of whether firms have human resource planning programs. Each of the three categories of potential determinants (institutional factors,
limitations of the state of the art, and cost effectiveness) is explored.

The third and final goal is the recommendation of a desired course of action. The recommendations explore the need for additional research, educational programs, and/or institutional changes.
CHAPTER III
RESEARCH DESIGN

Three methods of information collection were used: a literature review, a survey, and follow up interviews. The literature review determined the state of the art in human resource planning. The survey was designed to determine the extent and nature of human resource planning and served to explore possible determinants of whether firms have human resource planning programs and identify potential interviewees. The follow up interviews explored in depth the constraints on human resource planning.

Literature Review

In order to assess the strengths and weaknesses of the state of the art in human resource planning the first step in the information collection process was an extensive review of the pertinent literature. A mechanized information search was employed to aid in the location of the largest possible number of relevant references. These
references have been divided into three areas: predicting the internal labor supply, predicting human resource requirements and utilizing the supply and demand information. Each of these areas has been examined to determine if the techniques necessary to support the implementation of a human resource planning have been developed, and if so, whether or not their reliability has been tested.

**A Survey of Firms**

The survey (a copy of which can be found in Appendix A) is designed to assess both the extent and nature of human resource planning, and to provide some indication of the determinants of whether firms plan. The survey also identifies potential interview candidates.

The first step in the survey process was the identification of a universe for the survey. The universe was defined as all of the firms in the State of Ohio in the manufacturing, insurance, banking and utility sectors with over 500 employees. The remaining sectors of the economy were excluded from the study due to the small number of establishments in those sectors with over 500 employees. Based primarily on information provided by the Harris Publishing Company, publishers of the *Ohio Manufacturers*
Directory, 476 establishments were identified which met the requirements. Five of these establishments were out of business or had moved out of the state by the first mailing of the questionnaire. Twenty-three other establishments, including 20 of the 21 General Motors facilities, were deleted from the universe because their human resource planning functions were performed in conjunction with other establishments in the universe. The resulting universe of 449 firms consisted of 23 firms in the banking sector, 18 insurance companies, 14 utilities and 394 manufacturing establishments.

The human resource manager of each of the 449 firms in the universe was mailed a copy of the questionnaire, a return envelope and a cover letter explaining the purpose of the survey. Approximately a 35 percent response rate (159 firms) was obtained from the first mailing. A second mailing increased the response rate to 49 percent (220 firms).

To determine the extent of human resource planning the firms were asked if they have a formal process for human resource planning. Only those firms that indicated that they have a formal process for human resource planning which includes the prediction of both skill-specific internal labor supply and skill-specific demand, were counted as having human resource planning programs.
To check for the possibility of response bias in regards to the percentage of firms with human resource planning programs, 79 (slightly over one-third) of the 229 firms who did not respond to the questionnaire were randomly selected and then called to determine whether or not they have a human resource planning program. In each case the human resource/personnel manager, or their assistant, was asked whether the firm had a formal process for human resource planning and whether predictions of both human resource requirements and internal labor supply were made for skill-specific occupational categories. Those firms which answered affirmatively to both questions were classified as having human resource planning programs.

To determine the nature of human resource planning in practice, those firms that indicated on the questionnaire that they have a formal planning process were asked to indicate which of a checklist of statements apply to their planning programs. The statements include descriptions of what the programs do (predict internal labor supply, predict requirements etc.) and what techniques are being used (mathematical models, subjective judgment, etc.).

The analysis of the survey results which relate to the extent and nature of human resource planning was basically descriptive. The percentage of firms responding to the questionnaire who are engaged in human resource planning
was determined, and an estimate made of the percentage of firms in the universe who are engaged in planning.

Two categories of possible determinants of human resource planning were explored in the survey: cost effectiveness and institutional factors.

All the firms were specifically asked if they viewed human resource planning as cost effective. It should be kept in mind that the responses to this question are an indication of the managers' perceptions of cost effectiveness. A number of questions were asked of those firms without planning programs in order to help determine the extent to which there is a discrepancy between the actual and the perceived cost effectiveness. Those firms without planning programs were asked about the potential benefits of planning and asked how they select recruitment and training levels. These firms were also asked whether they had experienced or expected to experience a labor shortage or surplus. If the firms indicated that they had experienced a labor shortage or surplus they were asked about the resulting impact on the firm.

In order to explore the possible existence of determinants resulting from institutional factors, questions were included regarding what unit has, or would have, the responsibility for human resource planning. Sources of information regarding human resource planning were requested to determine whether constraints exist on
the flow of information from the academic to the business community.

Finally, to aid in the identification of firms willing to participate in the interview process, survey respondents were asked to indicate if they would be willing to discuss their firm's human resource management process in greater detail.

**Interviews**

The purpose of the interviews was to explore the previously hypothesized determinants of human resource planning and to explore issues which the interviewees feel are important to the question of why firms do or do not engage in human resource planning. For those firms with human resource planning programs, the interviews were also used to explore in greater depth what is being done in the planning programs.

Twenty-two interviews were conducted, 12 with firms with human resource planning programs and ten with firms without such programs. The interviewed firms are engaged in a wide range of industries from banking and newspaper publishing to machine tool manufacturing and defense contracting. Although an effort was made to make the sample of firms fairly representative of the universe, no claim is made of representativeness. Considering the
exploratory nature of the research the tradeoff between external validity and well grounded data is acceptable. Because one of the goals of the interview process was the discovery of human resource planning techniques not previously discussed in the literature, several firms were included in the interviews as a result of their appearing to have relatively sophisticated planning programs. The interviews were conducted with the individuals who filled out the questionnaires; generally the firm's human resource manager.

The interviews were relatively unstructured and as friendly as possible. After analyzing the survey results, a set of broad questions were prepared for use in the interviews, (a copy of these questions can be found in Appendix B). The purpose of the questions was to institute the discussion of a particular topic. Follow-up questions were used to help provide boundaries for the interview and to explore points of ambiguity. To encourage discussion of issues which the subjects felt are important to human resource planning, a significant effort was made to assure the subjects that their opinions were of value. After the discussion of a particular topic, I would offer my interpretation of what was said by the interviewees so as to reduce the probability of misinterpretation. Several pretest interviews were conducted to test both the meaning
the interviewees would make of the interview questions, and the meaning interpreting ability of the interviewer.

Whenever possible the interviews were taped. After each interview, the tape of the interview and/or the notes taken during the interview were transcribed. Most of the tapes were not transcribed word for word, instead, the interviewees' responses were reduced in length as much as possible without losing the essence of the answer.

The analysis of both the survey results which explore potential constraints on human resource planning and the interview results were analyzed qualitatively. Qualitative analysis is well suited to this study considering the exploratory nature of the research and the importance of interpreting the meaning others make of a phenomena. In analyzing the data the responses to particular questions were first categorized into groups of similar responses. The groups of responses were then analyzed to determine their implication in regards to the potential determinants of human resource planning. The next step in the analysis was the combination of the survey and interview results which related to a particular determinant. A final assessment was then made of whether or not the potential determinant is in fact a significant determinant, or whether there was insufficient data to make such a determination.
In order to provide a better feeling for the dynamics of the firm's situations as they relate to the question of human resource planning, four case studies are presented.

**Recommendations**

The final step is the making of recommendations for future action. The recommendations involve both calls for additional research, and the suggestion of activities which will help elevate the constraints on human resource planning.
CHAPTER IV
THE STATE OF THE ART IN HUMAN RESOURCE PLANNING

The human resource planning process consists of three interrelated parts: predicting the internal supply of labor, predicting future labor requirements, and using the supply and demand information. The literature is not evenly distributed across these three areas. While there is a substantial body of literature regarding the prediction of internal labor supply, relatively little has been written regarding either the prediction of future human resource requirements or the utilization of supply and demand information.

Predicting The Internal Supply Of Labor

The primary method discussed in the literature for predicting the internal labor supply is the use of Markovian chains. While there is a substantial body of literature regarding the use of Markovian chains to predict
the internal supply of labor, it is largely redundant.¹ This is particularly true of descriptions of how to apply the simple Markovian model.

The Basic Markovian Model

The basic, or simple, Markov chain model assumes that employees can be organized into occupational categories, or states. The employees within a state are assumed to be homogeneous with regard to the probability of moving to other occupational states, and to the probability of leaving the firm. It is further assumed that these

probabilities of movement, or transitional probabilities, are constant over time and that there is independence of movement through the states.

The prediction of transitional probabilities is based on historical data. The predicted probability of moving from state i to state j (EP$_{ij}$), equals the number of individuals who moved from state i to state j during the base period (N$_{ij}$ t), divided by the number of individuals in state i in the period prior to the base period (N$_i$.t-1). If data are available for several periods, the summation of the N$_{ij}$'s over the base periods, divided by the summation of the N$_i$. 's over the periods prior to the base periods, will generate the maximum likelihood estimates of the transitional probabilities.

The multiplication of a predicted transitional probability (EP$_{ij}$) by the number of individuals in the originating state in the base period (N$_i$.t) produces the projected number of employees moving from the originating to the destination state in the next period (EN$_{ij}$.t+1). The summation of these projections for a receiving state, state j in this example, is the firm's projected internal supply of labor for that state. Successive multiplications of the projected internal supply of labor in each state by the predicted transitional probabilities, results in projections of the internal supply of labor in the
outperiods. Projections produced in this manner are referred to as n-step simple Markovian chain projections.

The predicted transitional probabilities can be arranged into a square matrix; with the rows being potential movements from a particular state and the columns being potential movements to a particular state. Raising such a square matrix to the Xth power produces the predicted transitional probabilities from the first to the Xth period.

The basic Markovian model used in predicting the internal labor supply is a semi-open model; semi-open in the sense that movements out of the system are projected, but inflows (recruitment levels) are not considered. Since recruitment levels are one of the policy variables available to the firm, it would be unadvisable to use a model in which recruitment levels were specified, or predicted a priori.

Limited data requirements are an advantage of the basic Markovian model. Many large firms already have management information systems in which employees are categorized into skill-related occupational groupings. If this information is available for each employee over a series of previous periods, then no additional data gathering is required.
Empirical Tests of the Markovian Model

For human resource planning purposes, tests of the accuracy of internal labor supply projections and tests of the stability of transitional probabilities are important. Despite the bulk of literature describing the use of simple Markovian chains to predicted internal labor supply, only a limited number of empirical tests have been reported.

The only reported empirical test of the predictive accuracy of a semi-open simple Markovian model was conducted by Mahoney and Milkovich for the technical and professional employees of an insurance company.\(^2\) Data was collected for the period 1958 to 1968. The 3,246 employees utilized in the study were organized into 24 occupational states. Annual transitional probabilities, estimated for each of the 11 years, were judged not to be constant based on the likelihood ratio criterion.

Two sets of ten year n-step projections were made for the period 1959 to 1968. For the first set of projections the transitional probabilities were predicted based on the 1958 to 1968 data. The use of the entire eleven year data set for predicting the transitional probabilities does reduce the applicability of these findings, since the

future staffing patterns utilized in the prediction of the transitional probabilities would not be known in a planning situation. The transitional probabilities utilized in the second set of projections were predicted based only on the 1958 to 1959 data, and are therefore more realistic. Not surprisingly, the first set of projections were more accurate. The final occupational category for 63.7 percent of the employees was accurately predicted using the first method versus only 53 percent using the second method.

The high inaccuracy rates of the projections raises serious questions of the utility of simple Markov chain models for making long range predictions of internal labor supply. However, three sets of one year projections for the years 1959, 1964 and 1968, based on the previous year's distribution, and the transitional probabilities derived from the 11 year data set, were reportedly very accurate. This finding supports the reliability of the basic model for making short-run predictions.

Both sets of long-run projections overpredicted the number of workers who left the system and underpredicted the number of individuals who did not change occupational states. Based on this finding, Mahoney and Milkovich indicated a need to incorporate in the modeling process the relationship between the length of service with the firm and turnover.
Zanakis, in a 1980 article, presented empirical evidence of stable transitional probabilities in a semi-open simple Markovian model.\textsuperscript{3} Zanakis's study involved 1,000 engineers employed by a large chemical company. A total of 16 occupational states were defined and observations were collected over a four year period. The conclusion of stable transitional probabilities was based on chi-square tests of the similarity of the four sets of one year transitional probabilities.

Empirical tests of completely-open simple Markovian models in which recruitment levels were projected based on historical data have been reported by both Sales and Forbes.\textsuperscript{4} If completely-open simple Markovian models are reliable, it is logical to assume that semi-open models will also be reliable. Removing predictions of recruitment from the open models would not be expected to greatly influence their reliability. The inclusion of predictions of recruitment levels in the models, thereby adding an additional source of variation, would result in predictions


with larger absolute errors. Whether the size of relative errors would increase or decrease is dependent on the relative accuracy of the predictions of recruitment levels and the predictions of transitional probabilities.

Forbes conducted a study using information from the officer job system of the British Women's Royal Naval Service.\(^5\) Four occupational states were defined and annual observations were obtained for the years 1960 through 1967. Transitional probabilities and recruitment levels were based on the 1960 through 1963 data. Future recruitment levels were assumed to equal their estimated historical levels. Accurate n-step projections were made for the period from 1964 through 1967, based on the 1963 distribution. The difference between the 1967 predicted and observed state sizes represented less than seven percent of the observed system size.

Based on both graphs of the transitional probabilities over time and contingency table analysis, Forbes concluded that the transitional probabilities were stable and that some relationship exists between the promotion rates in two of the states; which indicates that the assumption of independence of movement through the system may not be valid.

\(^5\) A. F. Forbes, "Markov Chain Models for Manpower Systems".
Sales conducted a similar study based on the Scientific Officers Class in the British Scientific Civil Service. Data on six system states was collected for the time period 1963 to 1968. Sales used the 1963 to 1965 period data to predict the transitional probabilities. Recruitment levels were assumed to equal the average over the 1963 to 1965 period, or to vary randomly with the mean and variance estimates based on the 1963 to 1965 data. Under both recruitment assumptions, n-step projections were made for 1966 through 1968. Regardless of the assumption made regarding recruitment, the predictions for 1966 were inaccurate, while the 1967 and 1968 predictions were fairly accurate. Sales attributed the innaccuracy of the 1966 results to an exogenous increase in the demand for scientific oriented civil servants. Why the 1967 and 1968 forecasts were fairly accurate, when they were based on the inaccurate 1966 forecast, is unclear. Sales concluded that the transitional probabilities were stable, based on a comparison of a set of transitional probabilities predicted based on each individual years data, with transitional probability predictions based on the entire data set.

6P. Sales, "The Validity of the Markov Chain Model for a Class of the Civil Service".
A number of empirical tests of completely-open Markovian models have been reported by Stewman. In these models recruitment is set equal to predicted movement out of the system plus observed system growth. The future relative size of occupational categories and not the internal supply of labor is being predicted. In addition to predicting something other than internal labor supply these models require information regarding future levels of total employment which would not be known with certainty in a planning framework. The results of tests of this sort of model have little or no relevance to the question of the applicability of Markovian models to the prediction of the internal supply of labor.

Modifications of the Basic Markovian Model

To improve the accuracy and realism of the basic Markovian model two kinds of refinements have been proposed. These refinements involve the relaxation of the assumptions of homogeneity of transitional probabilities

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for workers within an occupational state and independence of movement through the states. The appropriateness of these assumptions was called into question in the analysis of the empirical evidence regarding the simple Markovian model. Renewal, or vacancy models, are based on the elimination of the assumption of independence of movement through the states. The modification of the homogeneity of classes assumption involves models in which the occupational classes are subdivided into groups which are more likely to be more homogeneous in regards to transitional probabilities.

A wide variety of variables including duration of stay in the class, age, level of education, participation in training, sex, marital status, a qualification index, college grade-point average, rank in graduate school, and leadership ability have been proposed to subdivide classes.8

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Spilerman, in a 1972 article, proposed an interesting method of using multiple regression equations to determine which of a group of characteristics is responsible for the heterogeneity of transitional probabilities.\textsuperscript{9} If there are \( m \) states then a series of \( m \) equations are estimated for each occupational state. The dependent variables are "dummy" variables equal to one if an individual moved from a particular originating state in question to another particular state, and equal to a zero if the individual did not move to that particular state. The independent variables are the group of characteristics under consideration as bases for the subdivision of occupational states. The type four sums of squares and partial \( R^2 \) values indicate which of the characteristics (independent variables) are responsible for the within-states heterogeneity. The primary limitation of this method is the relatively large sample size required to estimate the necessary number of equations.\textsuperscript{10} No applications of this technique were reported in the literature.

\begin{itemize}
\item \textsuperscript{10} In most cases two way movements will not occur between all states, so that the number of equations required will be significantly fewer than the maximum possible (ie. the number of states squared).
\end{itemize}
Despite the number of articles suggesting variables to be used in the subdivision of classes, empirical tests have only been reported in cases where the states have been subdivided by the duration of stay in the state.

Young and Almond conducted a test in which the states were defined by both occupational groupings and the number of years of seniority within each occupational group.\textsuperscript{11} After aggregation by seniority to eliminate states where only a few cases were reported, 30 states were defined. Transitional probabilities were predicted based on data covering the period 1949 to 1959. Projections were made for 1957, 1958 and 1959. Whether these were three one-step projections or a one-step, a two-step, and a three-step projection, was not reported. The projections were described as very accurate for all but one occupational category. Unfortunately, neither the projections, or any measures of their accuracy, were presented. Young and Almond concluded that a simple Markovian model modified by duration of stay in the occupational category would be reliable for making predictions regarding the internal supply of labor over a five year period.

In two later articles Young reported additional tests of a simple Markovian model modified by duration of

Data for these tests were drawn from university faculties and a variety of private firms. The results of these tests reportedly supported the conclusion of model reliability. However, very limited details were provided.

Hedberg, in a 1961 article not directly concerned with Markovian models, provided empirical evidence of the inverse relationship between length of service and turnover.¹³

Renewal, or vacancy chain models, are based on the relaxation of the assumption of independence of movement through the states.¹⁴ In these models, it is the flow of job vacancies, not the movement of individuals, which is modeled. The predictions of renewal models involve the nature of the flow of vacancies. While these models have some interesting descriptive powers, they are not of


interest here since they do not generate predictions of internal labor supply.

**Non-Markovian Models**

Several authors have suggested methods of predicting internal labor supply which are less sophisticated than Markovian models. Walker proposed the use of succession charts and/or the subjective judgment of line managers to predict internal mobility. These methods are more applicable to smaller firms than to larger ones. The use of either a single average separation rate, or an age-specific separation rate has been proposed as an easy method of predicting turnover. Unfortunately no tests of the reliability of any of these methods have been reported.

The United States Civil Service Commission, in a 1977 handbook, reported that for a given cohort of employees, separation rates tend to follow a log normal probability curve. The mechanics of fitting observed separation

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rates to a log normal curve were well described in the handbook. Once a curve has been fitted the projected separation rates can be read off the curve. While this technique provides projections of separation rates for those workers who have been with the firm a number of years, no information is provided which is directly relevant to workers who have been recently hired or to employees hired in the future. Another limitation of this approach is that private sector firms usually do not hire workers in groups, or cohorts, which makes the application of this technique difficult. The absence of any reported tests of the accuracy of this technique presents an even more serious constraint on its utility for the prediction of internal labor supply.

Conclusions.

As was noted previously, there has been a substantial amount written regarding the use of Markovian chains to predict the internal supply of labor. The mechanics of using Markovian chains has been well developed and amply described. The literature also provides a limited amount of empirical evidence regarding the reliability of projections based on Markovian models. The available evidence consistently supports the reliability of the simple Markovian model for making predictions in the one-
to-four year range. In this time frame projections of the internal labor supply are accurate and the transitional probabilities are stable. The reliability of the Markovian method would be expected to deteriorate as the number of employees in the firm decreases, and correspondingly, as the size of the occupational states declines. It should be noted that a number of these studies were based on relatively hierarchical military and civil service systems. The applicability of these findings to private sector firms can be questioned. In the one study with a longer time frame, the projections of internal labor supply were inaccurate and the transitional probabilities were found to be unstable, raising serious questions regarding the reliability of the simple Markovian model for making long-run projections.

The evidence further indicates that the subdivision of occupational states by seniority within each state provides a more realistic representation than the unmodified, simple Markovian model. Unfortunately, no directly comparable applications of the modified and the simple Markovian model have been reported. While limited evidence indicates that the assumption of independence of movement through the system states may not be realistic, a method of relaxing this assumption in the framework of predicting internal labor supply has not been reported.
Clearly, the most reliable available method of predicting skill-specific internal labor supply for large firms involves the use of Markovian chains. In general, the state of the art with regard to the prediction of skill-specific internal labor supply is well enough developed to support the implementation of human resource planning programs.

Predicting Human Resource Requirements

Mathematical models and more qualitative methods of predicting human resource requirements have been reported. The nonmathematical-based methods tend to rely on the expertise and foresight of the firm's management personnel, while the mathematical models are based on either the extrapolation of past trends, or on the relationship between human resource requirements and other variables.

Non-Mathematical Models

In a 1972 article, Milkovich and others reported on the application of the Delphi procedure to the prediction of human resource requirements in a large retail
organization. Seven of the firm's managers attempted to forecast the firm's demand for buyers for the next year. Five questionnaires were filled out by the seven managers over an eight week period. Milkovich reported that the range of the forecasts decreased significantly over the course of the process and that the Delphi based prediction was more accurate than forecasts based on simple regression equations. The simple regression equations contained independent variables such as retail sales and number of retail outlets. The numbers involved in this exercise, however, were very small with actual employment of buyers 37, the Delphi based prediction 38, and the reported regression results ranging from 43 to 49. A significant limitation of this technique is the technique's human resource requirements. To go through the forecasting


18 The first questionnaire asked what information was required to make a prediction. The second questionnaire provided the requested information, asked for a prediction and if any additional information was required. The third questionnaire provided all the information requested and requested a revised prediction. The fourth questionnaire provided all the information requested by all the participants as well as the interquartile range of the predictions and a request for a new prediction. The fifth questionnaire provided the interquartile range of the previous set of predictions and requested a final prediction. How the final Delphi prediction was distilled from the seven final predictions was not reported. For a more complete discussion of the Delphi Method see: Harold A. Linstone and Murray Turoff, The Delphi Method (Reading, Massachusetts: Addison-Wesley Publishing Company, 1975).
procedure for each of a firm's occupational categories would take an excessive amount of management time.

Based on his observations in a large British high-technology firm, Gascoigne reported on the accuracy of management-based predictions of human resource requirements. For a number of years the firm's management had been making employment predictions for each of the firm's departments, the procedure by which these predictions were developed was not reported. The predictions were apparently based on management's subjective judgment and not on mathematical models. The predictions were not very accurate, with relative errors of between five and 20 percent for predictions two years in the future. Based on these findings Gasconie concluded that more rigorous methods were desirable. As a first step in this direction correlations were computed between the firm's aggregate human resource requirements and the capital stock, time, physical volume of sales, gross trading receipts, and profits. The resulting correlations were all low. The highest correlation (31) was between human resource requirements and the previous year's profits. Gascoigne speculated that higher correlations may have been found if dissaggregated measures of human resource requirements had been used.

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Mathematical Models

Two basic mathematical methods have been proposed for projecting human resource requirements. In the first method human resource requirements are predicted directly. Using the second method an existing prediction of output levels is converted to labor requirements.

Both exponential weighted averages and multiple regression techniques have been used to predict human resource requirements directly. Of the two techniques the use of multiple regression models is more widely discussed and appears to be more realistic than the use of exponential weighted averages. The primary limitation of the method of exponential weighted averages is its complete reliance on historical data.\(^\text{20}\) No account is taken of expected future levels of output, sales, etc. and in the rapidly changing business environment an absolute reliance on historical trends is questionable. However, Young and Vassiliou reportedly obtained satisfactory

results using the method of exponential weighted averages
to predict human resource requirements.21

When using regression equations it is possible to take
into account an estimate of the impact of expected changes
in the levels of the variables believed to influence the
demand for human resources. In 1963, Drui reported on the
use of multiple regression equations to predict human
resource requirements.22 He believed that over time firms
acquire more human resources than efficiency requires. Drui
suggested using predictions of human resource requirements,
generated by multiple regression equations, as a basis for
decisions regarding reductions in staff. Data were
collected on employment levels in six functional areas of
the firm and on 65 volume of work measures, such as sales
levels and number of reports processed. This information
was collected quarterly over an eight year period.
Separate regressions were estimated for each of the
functional areas using as independent variables the three
or four volume of work measures with the highest simple
correlation to the level of employment in that particular
functional area. The regressions were estimated using the

21A. Young and P. Vassilou, "A non-Linear Model on the
Promotion of Staff," Cited by D. J. Bartholomew and Andrew
F. Forbes, Statistical Techniques for Manpower Planning

22Albert B. Drui, "The Use of Regression Equations to
Predict Manpower Requirements," Management Science 9 (July
first six years of the data. High $R^2$ values of between .87 and .98 were reported. It should be kept in mind that these were non-adjusted $R^2$ values, so that with the large number of independent variables relative to the number of data points, high $R^2$ values were almost inevitable. Once the regression equation coefficient values had been estimated the equations were used to predict employment in the last two years for which data were available. The projected employment levels were consistently below the actual employment levels by between 41 and four percent.

Despite the fact that Drui expected the multiple regression based projections to be lower than the actual employment figures, the discrepancy raises questions regarding the utility of multiple regression equations for projecting human resource requirements. Furthermore, in an actual planning situation the values of the independent variables (volume of work measures) would not be known with certainty, introducing an additional source of variance into the model. Livingstone and Montgomery, in a 1966 comment on Drui's article, suggested the use of lagged variables to eliminate the need for the prediction of independent variable values, and to reduce some of the
autocorrelation which is common when using time series data.\textsuperscript{23}

A number of authors have suggested using existing projections of total output and converting the output projections to human resource requirements.\textsuperscript{24} It is assumed that firms will already have predictions of output levels which cover the human resource planning period. Two basic methods of converting output predictions to human resource requirements have been proposed. In the first method an output-to-labor ratio is multiplied by the predicted output figure. Alternatively, the work-study method involves breaking output down to the kind and number of tasks required to produce each unit of output, and then breaking the tasks down by manhour requirements. In effect the result is a production function with labor dissagregated by skill.

The primary advantage of the work-study method is that the predictions of human resource requirements can be


produced at disaggregate levels. This method relies to a large extent on the expertise of the firm's management in determining the relationships between output, tasks, and manhour requirements.

Future output-to-labor ratios can be predicted based on historical data. A simple trend line of the labor-to-output ratio over a five to ten year period can be used to determine changes in the ratio over time. These changes should be analyzed to determine both what caused the changes and what impact those causes are likely to have in the ratio over the planning period.

In a 1971 Conference Board publication, the old Standard Oil company of New Jersey reported using a modification of the output-to-labor method to predict its' human resource requirements. The predictions were made for functional and sub-functional levels of the firm, such as fuel products, petroleum specialties, and administration. Business factors which were related to employment levels in each area were identified and their future values predicted. The ratios of the employment levels in the functional areas, divided by the values of the business factors, were then plotted over time and projected over the planning period. The projected ratios were modified based on managements' knowledge of factors

such as major planned modernizations which would be expected to distort the historical trends. The modified ratios were then applied to the predicted business factor values, to obtain forecasts of human resource requirements.

No tests of the accuracy of predictions of human resource requirements produced by either of the two methods of converting predictions of output levels to human resource requirements have been reported in the literature. A significant disadvantage of these methods is their reliance on predictions of output levels which may be of questionable reliability. The work-study method does have the advantage of producing dissaggregate projections.

Conclusions

The literature regarding the prediction of human resource requirements provides only limited empirical evidence regarding the reliability of such methods. The lack of empirical evidence can be partially attributed to the fact that the factors influencing human resource requirements are, and therefore any method of predicting requirements must be, firm specific. As Bartholomew and Forbes noted "any attempt at demand forecasting must be intimately related to the special features of the application in view....whereas we can expect to develop a
methodology of supply forecasting which is widely applicable the same can not be said of demand forecasting.\textsuperscript{26}

In light of the lack of empirical evidence it is difficult to determine the reliability of the available methods of predicting human resource requirements. The available evidence does tend to indicate that predictions based on either the Delphi procedure or exponential smoothing are reliable in the short-run, and that multiple regression based predictions are not reliable. As was previously noted, no tests were reported of the accuracy of predictions based on the conversion of output levels to human resource requirements.

In addition to having unproven reliability, most of the available methods of predicting human resource requirements do not predict requirements by skill-specific categories. While the Delphi procedure can produce forecasts by skill-specific categories, the associated requirements of managerial time make this method unusable. The work-study method appears to be the most promising technique for predicting requirements by skill-specific categories.

The state of the art of predicting skill-specific human resource requirements is not well enough developed to support the implementation of a human resource planning program. What is needed is either a reliable method of predicting total labor requirements and of disaggregating those predictions by skill-specific categories, or a reliable method of directly predicting human resource requirements by skill-specific categories.

**Utilizing The Supply And Demand Information**

Though there are potential uses of human resource supply and demand information in the selection of corporate strategic plans, the most commonly referred to use of the supply and demand information is in the selection of human resource policies designed to satisfy the firm's human resource requirements. In balancing the supply and demand equation of human resources, a substantial list of policy variables including: training, overtime, temporary hires, sub-contracting, layoffs, recruitment, compensation, promotion and job assignments have been suggested as potentially useful.
The Selection of Human Resource Policies

Both cost benefit analysis and linear programing have been suggested as methodologies for using the supply and demand information in the selection of human resource policies.

Despite the general popularity of cost-benefit analysis, no rigorous effort has yet been made to utilize this approach in the selection of a set of human resource policies designed to equate human resource supply and demand. Although Cheak, in a 1973 article, developed a method of ranking human resource management programs based on their technical feasibility ease of implementation, expected economic benefits, and risk of inaction, only limited specifics were developed regarding the determination of the expected economic benefits. The difficulties involved in predicting benefits severely limits the utility of Cheak's methodology. Cascio developed a methodology for applying cost-benefit analysis to a number of human resource management issues such as turnover, absenteeism and employee attitudes. Unfortunately, he did not discuss the selection of the most


cost effective method of meeting human resource
requirements.

A number of authors have suggested the use of linear
programming models as a method of selecting human resource
policies. 29 Most of these models attempt to minimize human
resource costs subject to a set of constraints. 30 Costs
are defined as the summation of direct labor costs
(salaries and fringes) and indirect labor costs (training,
hiring, recruiting, etc.). In one of the models the costs
associated with human resources also include predictions of
the costs involved in an oversupply or an undersupply of
labor. 31 Some of the constraints which have been suggested
include occupation-specific labor requirements and some

29 See for example: A. Charnes, W. Cooper and R.
Niehaus and D. Sholtz, "A Model and a Program for Manpower
Management and Planning," paper prepared for presentation
to The Joint Engineering Management Conference,
Philadelphia, Pennsylvania, October 1968; Richard C.
Grinold and Kenale T. Marshall, Manpower Planning Models,
Scott, "Optimality and Manpower Planning," in Corporate
Manpower Planning ed. A. R. Smith (Westmead: Gowler Press,
1980) pp. 70-88; Alan L. Platz, "Linear Programing Applied
to Manpower Management", Industrial Management Review 11
(Winter 1970):31-38; Wesley Weber, "Manpower Planning in a
Hierarchical Organization A Computer Simulation Approach,"

30 In A. Charnes et al. , "A Generalised Network for
Training Recruiting Decisions in Manpower Planning," in
Manpower and Management Science eds. D. Bartholomew and A.
Smith (Lexington: D.C. Heath and Company, 1971) pp.115-130,
Charnes suggests a model in which employment is maximized
up to some goal level, subject to a set of funding
constraints.

31 Alan L. Patz, "Linear Programing Applied to Manpower
Management".
combination of limitations on the numbers of new recruits, trainees, retrainees, and involuntary separations, and/or the money spent on them. The output of these models is both a prediction of human resource costs and a prescribed set of policies which will equate supply and demand.

So that several objectives of varying importance can be considered simultaneously, several authors have suggested the use of goal programming. Some of the proposed goals include cost minimization, establishing a stable age profile, stable recruitment levels, good promotion possibilities, levels of minority employment and flexibility for future change. Walker has suggested that corporate strategic planning goals be considered when selecting and establishing priorities in human resource policy objectives.

In the articles describing the various linear and goal programming models the human resource costs are identified by broad categories (training, salaries, fringes, etc.) but no information is provided on how to predict these costs. Elsewhere in the literature, however, there is some

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discussion of methods of predicting the various indirect human resource costs used in the models. In a 1969 article Thomas and others provide a detailed list of the component costs associated with in-house training.\textsuperscript{34} Cascio provides some guidelines for estimating the cost of existing recruitment and training programs.\textsuperscript{35} A fairly detailed list of both direct and indirect human resource costs was provided by Bell in 1974.\textsuperscript{36} Unfortunately, however, no methodology can be found for predicting future indirect human resource costs.

Cascio presents, as others have, a methodology for predicting the direct human resource costs for employees covered by a labor contract,\textsuperscript{37} but no discussion could be found with regard to the prediction of direct labor costs for either time periods or for those employees not covered by labor contracts.

Though not included in any of the linear or goal programing models, the external supply of labor has a definite impact on how firms would optimally equate supply


\textsuperscript{35}Wayne F. Cascio, \textit{Costing Human Resources: The Financial Impact of Behavior in Organizations}.

\textsuperscript{36}D. J. Bell, \textit{Planning Corporate Manpower} (London: Longman Inc. , 1974) pp. 148-149.

\textsuperscript{37}Wayne F. Cascio, \textit{Costing Human Resources: The Financial Impact of Behavior in Organizations}.
and demand. Even though The United States Bureau of Labor Statistics was commonly suggested as a source of information about the external labor supply, how to use this information was not discussed in the literature.

The Selection of Corporate Strategies

The possibility of using predictions of internal labor supply and total labor requirements as an input into the selection of corporate strategies has apparently been ignored in the corporate planning literature. When a linkage between corporate and human resource planning is discussed in the literature it is usually presented as a one way flow of information from the corporate planning to the human resource planning process. Unexplored in the literature are the critical linkages between corporate strategy and human resource requirements and between the nature of those requirements net of internal labor supply and human resource costs.


Conclusions

There are currently two serious limitations to the utilization of the supply and demand information. The first is that although methods of determining the set of human resource polices which satisfy human resource requirements with a minimum of costs have been proposed, these methods assume an ability to predict future human resource costs which has not been developed. The second limitation is the lack of a methodology for incorporating the human resource supply and demand information in the selection of corporate strategies.

Conclusions

To some extent the literature base is deficient in all three areas of human resource planning: predicting the internal labor supply, predicting human resource requirements, and using the supply and demand information. Although the limited available evidence supports the reliability of Markovian chains for the prediction of short-run internal labor supply, the utility of this technique for long-run predictions is in question. With regard to predicting human resource requirements the literature is deficient in two ways:
first there is insufficient empirical evidence to support the reliability of the techniques suggested to predict human resource requirements and second, the predictions of human resource requirements are not skill-specific enough to be of significant value in human resource planning. Concerning the use of supply and demand data, although models exist for selecting human resource policies that equalize supply and demand, methods are not available for predicting the various direct and indirect costs of human resources necessary as inputs into these models. Finally, no methodology exists for using human resource planning to help formulate corporate strategic plans.

Several comments in the literature indicate an awareness of these limitations of the state of the art. Bowery notes that "the techniques of manpower planning are not viewed enthusiastically by many managers and it has been suggested that there is a gap between the theory and practice of manpower planning."40 Lewin sums up the situation as follows: "None of the available literature seemed to provide a sufficient basis for long term manpower planning in a large firm."41 This assertion is also true for short-run human resource planning.

In general the state of the art of human resource planning is a potential limitation to the implementation of human resource planning programs.
CHAPTER V

THE EXTENT AND NATURE OF

HUMAN RESOURCE PLANNING

The Extent Of Human Resource Planning

Based on the results of a survey and follow-up phone contacts it is clear that over two-thirds of the large firms in the State of Ohio do not engage in human resource planning.

Of the 220 survey respondents only 71 (32.3 percent) indicated that they currently have a formal process for human resource planning which includes making predictions of both requirements and internal labor supply for skill-specific occupational categories. One-hundred and seventeen (53.2 percent) of the respondents indicated that they do not have a formal process for human resource planning. The remaining 32 firms (14.5 percent) have a formal planning process which must be defined as non-comprehensive because they do not include predictions of human resource requirements and internal labor supply by skill-specific occupational categories.
### Table One

**The Extent Of Human Resource Planning**

<table>
<thead>
<tr>
<th></th>
<th>Firms With Planning Programs</th>
<th>Firms With Non-Comprehensive Planning Programs</th>
<th>Firms Without Planning Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentages of all 299 Respondents</td>
<td>31.8</td>
<td>13.8</td>
<td>54.8</td>
</tr>
<tr>
<td>Percentages of the 220 Questionnaire Respondents</td>
<td>32.2</td>
<td>14.5</td>
<td>53.2</td>
</tr>
<tr>
<td>Percentages of the 79 Phone Respondents</td>
<td>30.4</td>
<td>10.1</td>
<td>59.5</td>
</tr>
</tbody>
</table>

Of the 79 firms in the phone survey of questionnaire non-respondents, only 24 (30.4 percent) have human resource planning programs. A total of 47 (59.5 percent) of the firms do not have a human resource planning program while eight firms (10.1 percent) have planning programs which must be defined as non-comprehensive.

A 95 percent confidence interval was constructed around the proportion of phone respondents without
human resource planning programs.\textsuperscript{1} The confidence interval runs from 78.2 percent to 61 percent. Clearly the 67.7 percentage rate for the questionnaire respondents is within the 95 percent confidence interval for the randomly selected phone sample. Contingency table analysis indicated that whether a firm is a phone or a survey respondent is independent of whether or not the firm has a human resource planning program. This indicates that the two sample proportions are not significantly different and that there is not a significant response bias in the questionnaire with regards to whether firms have human resource planning programs.

\textsuperscript{1}The confidence interval was constructed using the following formula, the proportion of the firms in the phone sample without comprehensive human resource planning programs (69.6) plus or minus 2 (2) times the estimated standard error of the proportion (.0429). Due to the small size of the universe relative to the sample size, the finite population correction factor was included in the estimation of the standard error of the proportion. The estimation of the standard error was based on the following formula, the square root of (the expected proportion of firms without comprehensive human resource planning programs, .67, times the expected proportion of firms with such programs, .33, divided by the number of firms in the sample, 79, times the square root of (the number of firms in the universe, 229, minus the number of firms in the sample, 79, divided by the number of firms in the universe minus one, 228,). The expected proportions of firms with and without planning programs was based on the questionnaire results.

\textsuperscript{2}Based on the comparison of the observed chi-square value of .12 with the critical value of 3.84 (at the 95 percent confidence level DF=1) the hypothesis of independence can not be rejected.
The finding that the majority of firms do not engage in human resource planning supports the conclusions of the previous studies, which were discussed in the introduction.

What Kinds of Firms Engage in Planning

To help determine what kinds of firms are engaged in planning, the firms have been divided into categories (based on the number of employees, the size of the largest local city and the firms' industry) and the percentages of firms who engage in planning compared across the categories.

As the data in Table Two indicates, firm size is related to the probability of having a human resource planning program. Based on contingency table analysis the hypothesis was rejected that firm size is independent of whether the firm is engaged in planning. \(^3\) Less than one in four of the firms with under 1,000 employees engage in human resource planning, while over two-thirds of the responding firms with over 3,000 employees have such programs. The possibility that firm size is related to actual and/or perceived cost effectiveness is discussed in Chapter VI.

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\(^3\) Based on the comparison of the observed chi-square value of 23.25 with the critical value of 9.49 (at the 95 percent confidence level DF=4) the hypothesis of independancy was rejected.
Table Two

Percentage Of Planning Firms By Firm Size

<table>
<thead>
<tr>
<th>Number of Employees</th>
<th>500</th>
<th>1,000</th>
<th>1,500</th>
<th>3,000</th>
<th>5,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>to</td>
<td>to</td>
<td>to</td>
<td>to</td>
<td>and</td>
</tr>
<tr>
<td></td>
<td>1,000</td>
<td>1,500</td>
<td>3,000</td>
<td>5,000</td>
<td>Over</td>
</tr>
<tr>
<td>Number of</td>
<td>173</td>
<td>52</td>
<td>55</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Responding Firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentages With</td>
<td>22.5</td>
<td>32.6</td>
<td>47.2</td>
<td>63.6</td>
<td>75.0</td>
</tr>
<tr>
<td>Planning Programs</td>
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<td></td>
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</tr>
</tbody>
</table>

To obtain an indication of whether the size of the local labor market is related to the likelihood of planning firms were compared based on city size. Firms located in a city within 15 miles of a larger city were treated as if they were located in the larger city. No consistent relationship appears to exist between planning and city size. Contingency table analysis supported this conclusion. The proportion of planning firms is lower among firms in cities of under 10,000. This may, however, be the result of the concentration of larger firms in the larger cities.

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4 Based on the comparison of the observed chi-square value of 7.048 with the critical value of 9.49 (at the 95 percent confidence level DF=4) the hypothesis of independancy can not be rejected.

5 Of the 74 questionnaire respondents with 1,500 or more employees, 91.9 percent are located in or near cities with populations in excess of 10,000. See appendix D for a breakdown of respondents by city and firm size.
Table Three
Percentage of Planning Firms By City Size

<table>
<thead>
<tr>
<th>Population of the Local City</th>
<th>Under 5,000 to 10,000</th>
<th>10,000 to 50,000</th>
<th>50,000 to 100,000</th>
<th>100,000 and Over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Responding Firms</td>
<td>25</td>
<td>19</td>
<td>81</td>
<td>31</td>
</tr>
<tr>
<td>Percentages With Planning Programs</td>
<td>20.0</td>
<td>10.5</td>
<td>37.0</td>
<td>38.7</td>
</tr>
</tbody>
</table>

Comparison of the percentages of firms with planning programs within two digit Standard Industrial Classification (SIC) divisions does not reveal any strong relationship between industry and the propensity to plan. While a few SIC's have no firms with planning programs and a few have a high proportion of planners the small cell sizes in these cases reduces the significance of the proportions.\(^6\)

\(^6\) The small cell size also prevents the use of contingency table analysis of this table.
Table Four

Percentage Of Planning Firms By

Standard Industrial Classification (SIC)

<table>
<thead>
<tr>
<th>Two Digit Sic</th>
<th>Number of Responding Firms</th>
<th>Percentage With Planning Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>15</td>
<td>27.7</td>
</tr>
<tr>
<td>22</td>
<td>4</td>
<td>0.6</td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td>0.0</td>
</tr>
<tr>
<td>24</td>
<td>2</td>
<td>0.0</td>
</tr>
<tr>
<td>25</td>
<td>8</td>
<td>0.0</td>
</tr>
<tr>
<td>26</td>
<td>4</td>
<td>50.0</td>
</tr>
<tr>
<td>27</td>
<td>7</td>
<td>28.6</td>
</tr>
<tr>
<td>28</td>
<td>13</td>
<td>38.5</td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>75.0</td>
</tr>
<tr>
<td>30</td>
<td>13</td>
<td>30.8</td>
</tr>
<tr>
<td>32</td>
<td>14</td>
<td>35.7</td>
</tr>
<tr>
<td>33</td>
<td>25</td>
<td>28.0</td>
</tr>
<tr>
<td>34</td>
<td>33</td>
<td>24.2</td>
</tr>
<tr>
<td>35</td>
<td>48</td>
<td>35.4</td>
</tr>
<tr>
<td>36</td>
<td>30</td>
<td>26.7</td>
</tr>
<tr>
<td>37</td>
<td>31</td>
<td>41.9</td>
</tr>
<tr>
<td>38</td>
<td>6</td>
<td>66.7</td>
</tr>
<tr>
<td>39</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>48</td>
<td>4</td>
<td>100.0</td>
</tr>
<tr>
<td>49</td>
<td>7</td>
<td>28.6</td>
</tr>
<tr>
<td>60</td>
<td>15</td>
<td>20.0</td>
</tr>
<tr>
<td>63</td>
<td>11</td>
<td>27.3</td>
</tr>
</tbody>
</table>

The Nature Of Human Resource Planning

The next step is to explore the nature of the human resource planning programs. Both the survey and interview results are utilized in the process of describing the planning programs.

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7 Appendix C contains a description of the two digit SIC's.
Survey Based Findings

To provide an indication of the nature of human resource planning there are questions in the survey that deal with who is included in the plans, the time frame the planning process covers, who does the planning, and what the planning process includes.

Of the 71 survey respondents with human resource planning programs, slightly over 70 percent (50 firms) include all types of employees in their planning process. The large percentage of firms that include all types of employees is a little surprising given the number of articles in the literature which are directed at planning only for managerial personnel. Nearly all (20) of the 21 firms who do not include all types of employees in the planning process do include both managerial and

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professional-technical workers. Twelve of the 21 firms include salespersons in the planning process. Only a small number of these firms, four and three respectively, include service and production workers in their human resource plans.

The median time frame of the human resource planning programs is four years. Almost one-third (23) of the planning programs only covered one year or less. Twelve of the firms have planning programs that covered two or three years. Slightly over one-third (26) of the planning programs attempt to plan for the firm's human resource needs five years out. Six programs have time frames of ten or more years.

The variously titled human resource, personnel or employee relations department is the most common unit within the firm to be responsible for human resource planning. This unit is in charge of human resource planning in 46 (64.8 percent) of the 71 firms with planning programs. A separate human resource planning unit exists in four (5.6 percent) of the firms. In four other firms the corporate planning unit has some responsibility for human resource planning, and in two of these the corporate planning unit has sole responsibility, while in the other two responsibility is shared by the corporate planning and human resource management units of the firm. The human resource management unit and the line managers share
responsibility for human resource planning in 13 of the firms. Four of the responding firms did not indicate which unit of the firm was responsible for their human resource planning program. In the vast majority of the firms (82.6 percent) human resource planning is not the primary responsibility of the unit which has responsibility for the planning program.

Table Five

Components Of The Planning Programs

<table>
<thead>
<tr>
<th>Components</th>
<th>Percentages of the Planning Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career planning, replacement charts, performance appraisal or compensation systems</td>
<td>91.5</td>
</tr>
<tr>
<td>Prediction of human resource requirements based on subjective judgements</td>
<td>57.7</td>
</tr>
<tr>
<td>Prediction of internal labor supply based on subjective judgements</td>
<td>52.1</td>
</tr>
<tr>
<td>Prediction of human resource requirements based on mathematical models</td>
<td>14.1</td>
</tr>
<tr>
<td>Prediction of internal labor supply based on mathematical models</td>
<td>8.5</td>
</tr>
<tr>
<td>External labor markets are analyzed to determine the external availability of labor</td>
<td>50.7</td>
</tr>
<tr>
<td>The impact of corporate strategic options on human resource requirements is determined</td>
<td>66.2</td>
</tr>
</tbody>
</table>
Each respondent was given a checklist of potential components of human resource planning programs and asked to indicate which of the components is included in their program. Sixty-five of the 71 firms (91.5 percent) indicated that their planning program involve one or more of the following: career planning, replacement charts, performance appraisal, and compensation systems. Future human resource requirements are predicted based on the subjective judgements of either the line managers or the personnel managers in 41 (57.7 percent) of the firms. In 37 of the firms (52.1 percent) the future internal supply of human resources is predicted based on the subjective judgements of either the line managers or the personnel managers. Only ten (14.1 percent) and six (8.5 percent) respectively of the firms use mathematical models to predict their future human resource requirements and internal labor supply. Given the emphasis in the literature on the use of mathematical models for predicting internal labor supply, the small percentage of firms using such models is surprising and says something about the diffusion of planning information, the sophistication of the average planner or the perceived quality of the models. Thirty-six of the firms (50.7 percent) indicated that as part of their planning programs external labor markets are analyzed to determine the external availability of human resources. In 47 of the firms (66.2 percent) the
human resource planning system is in some way used to
determine the impact on human resource requirements of
strategic options under consideration.

Interview Based Findings

Although the interviews provide additional information
relating to the nature of human resource planning programs
through an in-depth look at a limited number of firms, it
should be kept in mind that the sample of firms included in
the interview process may not be representative of the
universe of firms.

The most common facet of the interviewed firms' human
resource planning programs is career and succession
planning. These programs attempt to influence job
assignments with the firm, the selection of training
programs and in some cases the firm's compensation
system. Despite the similarities, two notably different
orientations to the career and succession planning programs
emerged from the interviews.

The majority of the interviewed firms with human
resource planning programs are primarily oriented to the
identification of fast track individuals and to assuring
that the firm has a qualified replacement for each critical
position. The human resource planning programs of these
firms are generally geared to management-level personnel.
These firms tend to view all but top management personnel as easily replaceable inputs in a production process. Surprisingly, there is little or no linkage between most of these career and succession planning programs and the projection of future internal labor supply or human resource requirements. The orientation is to have replacements ready for existing positions. The programs are not perceived by management as having an impact on employee morale or motivation. One manager made the comment "low morale is something that human resource planning can not address".

In contrast, a number of the firms view the career planning process as a critical part of employee motivation. In the words of one human resource manager, "If you take on the attitude that through this process (planning) you are participating with people in a very crucial aspect of their lives - their job - and you are planning out, and you have a lot of data, and you are increasing your ability to advise or to make the right decisions about people, you will have less negative impact on these people, therefore the whole attitude building process is right there. They (firms with quality human resource planning programs) understand what the human resource planning process does for peoples' attitudes and perceptions about the personnel department and about the company. They believe that the impact on productivity is
tremendous for them." Efforts are made in these firms to move workers that are not needed in one area to another area of the firm and also to provide out-placement services for those employees whose jobs are to be terminated. In these firms, the career planning process is designed to aid the employees in their career development and not just to assure replacements for key positions. In general, the people-oriented firms have more sophisticated human resource planning programs and have more linkage between the projections of net human resource requirements and career planning.

The career planning process in one of these people-oriented firms is such that every two years, employees, with the guidance of their managers, identify positions within the firm that they feel prepared to move into. Typically the positions are upward moves, but lateral moves are possible. A validation committee, made up of top management determines if the employee is qualified for the position. If the committee does not validate the move, they identify the skills the employee needs to acquire or improve. The employee and manager then draw up a development plan to satisfy the identified needs. If the employee is validated for the position his or her name is entered on a computerized system and this pool of validated employees is supposedly given priority consideration when a opening occurs. In reality approximately four out of ten
positions are filled outside the system, as the result of managers who desire to fill positions with a particular individual, usually a favored co-worker.

Among the interviewed planning firms the prediction of future human resource requirements and internal labor supply receive much less time and attention than the career and succession planning processes, but there is still a significant variation in the approaches to the prediction of human resource requirements and internal labor supply.

In the prediction of internal labor supply, none of the interviewed firms used mathematical models to project movements within the firm. Several firms indicated that all hiring was done at the entry-level positions, and therefore, they feel no method of projecting internal movements is required. A few firms only predict internal movements for top management individuals and only on the basis of subjective judgements. Movement out of the firm is most commonly based on establishment-wide turnover rates, with age and years of service with the firm as key predictors. Two of the firms make turnover predictions by occupation.

The majority (10) of the interviewed firms base their requirements predictions on output level predictions supplied by either top management or the strategic planning unit of the firm. Most (eight) of these firms convert output level predictions to predictions of total human
resource requirements based on either subjective judgement or the extrapolation of output to labor ratios. In these firms total labor requirements are then converted to skill-specific requirements based on the present occupational profile modified by subjective judgement. Two firms convert output levels directly to skill-specific human resource requirements by identifying the kind and amount of labor inputs required to produce each unit of output (the work-study method). Two of the firms reported that since their human resource requirements are static their requirements predictions equal their existing work force.

When asked about tests of the reliability of their prediction methods, all but one firm reported that no tests of reliability have been performed. The one firm simply compared their one year old prediction of employment (3500) with their actual employment (3400). This firm bases their prediction of total human resource requirements on an output level prediction converted to total employment. Several of the firms commented that within a year or two the situation usually changes significantly enough so that tests of the accuracy of their predictions would be rendered meaningless. This appears to be an admission of the unreliability of their projection processes. The most commonly noted cause of the inaccuracy in the prediction process is the unreliability of predictions of both total output and the general level of economic activity.
The internal labor supply and total human resource requirements information is primarily used by the interviewed firms in the development of recruitment strategies. In those firms with linkages between the projections process and the career planning process, the supply and demand information is also used in the selection of job assignments, training programs, and compensation systems.

While the majority of the interviewed planning firms indicated that projecting human resource costs would not be a serious problem, only one of the 12 firms make projections of costs as part of the planning process. The firms indicated that human resource cost predictions could be produced based on labor contracts and the present compensation levels multiplied by historical rates of increase in compensation levels. The one firm that considered human resource cost prediction to be a part of the planning process predicts human resource costs based on the summation of existing salaries multiplied by the expected salary increases for each individual plus indirect labor costs, which are assumed to equal a fixed percentage of the salary costs.

Two human resource planning techniques were discovered in the interview process which had not previously been
discussed in the literature.\textsuperscript{9} One of the firms uses a two track planning program to deal with the unreliability of predictions of total output. A second development which has not been reported in the literature involves the prediction of internal labor supply. One firm uses the variable (whether a long time resident of the local area) to subdivide workers into groups in an effort to increase the homogeneity of turnover probabilities.

The interviews and questionnaires indicate that firms are oriented to career and succession planning and are doing a relatively unsophisticated job of projecting internal labor supply and human resource requirements. It is clear from the interviews that a significant number of firms view the planning process as a means of assuring that the firm has the right kinds of people to fill the existing key positions should those positions become open. In contrast, a few firms view the planning process as a critical component in motivating all of their employees.

\textsuperscript{9}See case study number one in Chapter VII for a further discussion of each technique.
CHAPTER VI
FACTORS THAT DETERMINE WHETHER FIRMS HAVE
HUMAN RESOURCE PLANNING PROGRAMS

As was discussed in the introduction, the potential determinants of whether firms have human resource planning programs can be divided into three categories: cost effectiveness, institutional factors and limitations of the state of the art. The information obtained from the interviews and the questionnaires has been explored in order to identify, describe and evaluate the relative importance of the potential determinants in each of these three categories.

The Cost Effectiveness Of Human Resource Planning

The cost effectiveness issue involves the trade off between the benefits and the costs of human resource planning. Beyond the cost effectiveness question, the pay back period involved in the institution of a human resource planning program and the difficulties involved in
measuring the benefits of planning emerged from the interview process as cost effectiveness related constraints on human resource planning.

Cost Effectiveness

To conclude that cost ineffectiveness is a constraint on human resource planning it would be necessary to demonstrate that perceptions regarding the cost effectiveness of planning are a factor in firms not having planning programs and that the perception of cost ineffectiveness is accurate (the possibility that misconceptions regarding cost effectiveness constrain human resource planning is evaluated later in this chapter).

Clearly, cost effectiveness is a significant issue when a firm is determining whether or not to implement a human resource planning program. Of the questionnaire respondents with planning programs, a vast majority (63 out of 71) believe that their planning program is cost effective. A number of those who indicated that their program is not cost effective volunteered that their programs are new and that they anticipated their being cost effective in the future. Interestingly, of the 117 non-planning respondents, 43 (36.8 percent) believe a planning program would be cost effective in their firm. An additional 50 (42.7 percent) of these firms are not sure
whether a human resource planning would be cost effective. **The anticipation of cost effectiveness appears to be a necessary, but not a sufficient, condition for the implementation of a human resource planning program.**

The size of the firm appears to be a factor in the perception of human resource planning as cost ineffective. Of the 23 non-planning firms who view human resource planning as cost ineffective 78.3 percent have fewer than 1,000 employees and 91.3 percent have fewer than 1,500 employees. Two of the four interviewed firms who perceive planning as cost ineffective indicated that their small size is a factor in their belief that they can manage their human resources more efficiently without a formal planning program. One of the managers stated "I do all of that (planning) in my head." It is however, unclear what relationship exists between firm size and the actual cost effectiveness of human resource planning.

It is difficult to assess the accuracy of some firms' belief that human resource planning would be cost inefficient for them. Given the difficulties involved in measuring the cost and the benefits of an in place human resource planning program, it would be almost impossible to predict the costs and benefits of instituting a planning program in a particular firm. Lacking this sort of prediction the accuracy of the firms perception is difficult to evaluate. The generally low level of
knowledge which human resource managers have regarding the capabilities of human resource planning programs casts doubt on their ability to evaluate the cost effectiveness of such a program. More knowledgeable human resource managers are convinced that human resource planning would be an extremely cost effective component of the human resource management process of any large firm, which brings the perception of such planning as cost ineffective further into question.

Whether a human resource planning system would significantly increase the effectiveness with which these firms consider the human resource implications of corporate strategic decisions is unknown.

It is unclear to what extent those firms without planning programs could reduce the cost of their human resources if they had a planning program. Many of the human resource managers recognize that some savings would result from lower turnover and higher productivity. What many of the firms appear not to recognize is the potential impact of a human resource planning program on employee morale and productivity. Nine of the 22 interviewed firms did not mention employee morale as a benefit of human resource planning. Some of the benefits of planning would come in the form of eliminating existing costs. As one manager bluntly stated, "management now makes all of these blunders which cost a hell of a lot of money because they
don't plan for these damn things. So what were doing is wiping out that cost. ... The law suits went way down because we understood and we documented and we weighed the risk. We use to spend hours and hours with EEO (the Equal Employment Opportunities Commission).

It is clear that the majority of the non-planning firms are able to avoid serious problems with labor shortages and/or surpluses. Many of the non-planning firms believe that the kinds of human resources they require will always be available, which causes them to view planning as unnecessary. When asked why they do not have a planning program, 56.4 percent of the firms indicated that they have no problem finding the human resources they need. The majority (78.6 percent) of those non-planning firms who responded to the questionnaire indicated that they had not experienced a labor shortage in the last five years. While 72.6 percent of the firms indicated that they had experienced an over supply of labor, 69.8 percent of these firms indicated that the surplus had only an insignificant or a minor impact on their firm.

In assessing the costs of human resource planning most firms perceive the costs as minimal. Six of the 12 interviewed firms with planning programs mentioned that the costs of their programs are minimal. The most commonly mentioned (mentioned by 13 out of the 22 interviewed firms) cost was the planner's time. Quoting one of the
interviewees "I would say that the costs will be mainly just the time you spend on it, the materials and the computer and those things are already in house." Several of the firms volunteered that human resource planning would not have to be an individual's only responsibility. Quoting again, "I don't think we're talking about a whole person, I don't think you would take a person and give that to him as his duties."

Clearly the perception of cost effectiveness is an important factor in the determination of whether to implement a human resource planning program. The available evidence does not indicate whether the perception of cost ineffectiveness is an accurate perception in many of the firms. While most firms without human resource planning programs have been able to avoid problems resulting from labor shortages or surpluses, a significant number of firms appear to be ignoring potential reductions in the cost of human resources that could result from the implementation of a planning program. It is therefore, unclear whether cost ineffectiveness is a determinant of whether firms implement a human resource planning program.

*The Pay Back Period*

A number of firms indicated that while the costs of maintaining a human resource planning program are perceived
to be minimal, they would expect high start up costs if they were to implement a planning program. Data collection and management time consumed in the development and implementation of the program are the primary start up costs. The two interviewed non-planning firms who believe a planning program would be cost effective indicated that high start up costs is one of the primary reasons why their firm does not implement a planning program. A strong orientation to short-run profitability was mentioned by 11 of the 22 firms when asked why more firms do not engage in human resource planning. Several of these firms indicated that the orientation to short-run profitability is exacerbated during recessions. Two additional firms cited the difficulty in seeing short-run results as a constraint on human resource planning. A number of firms indicated that some of the benefits of human resource planning do not occur until a few years after the program has been implemented. The combination of high start-up costs, long-range benefits and an orientation to short-run profits, emerges as one of the primary factors that explains why firms do not have human resource planning programs.

Inability to Quantify the Benefits of Planning

In the exploration of the benefits of human resource planning it became apparent that the benefits are difficult
to quantify. Only two of the 12 interviewed planning firms were able to identify specific dollar savings that resulted from the planning programs. In each case the savings were substantial ($500,000); in reduced overtime in one case and in the other case in lower costs as the result of a change in recruitment policies. A number of firms specifically mentioned that the benefits are hard to measure. The most commonly mentioned benefit (mentioned by 13 of the 22 interviewed firms) was employee morale or productivity. A similar number (12) of the firms indicated that a major benefit of planning is having the right people on board when they are needed. These benefits are difficult to put a dollar value on. Reduced turnover, relocations, and outside hires were each mentioned as benefits of planning by two of the interviewed firms.

A number of both the planning and the non-planning firms indicated that difficulties in quantifying the benefits of planning make it more difficult to sell human resource planning to top management. Eight of the 22 firms interviewed indicated that a major reason why more firms are not engaged in human resource planning is the inability of the human resource management department to measure and effectively present the benefits of planning. As one of the human resource managers put it "the problem is the people in the personnel department don't know how to go
down to the business office and tell them how to save money."

Difficulties involved in the quantification of the benefits of planning is a second factor that explains why firms do not have planning programs.

Within the area of cost effectiveness there appear to be two factors which determine whether firms have human resource planning programs. First, there are firms who regard human resource planning as cost effective for them in the long-run, but who do not want to undergo the implementation costs of a program with primarily long-run benefits. Secondly, difficulties in the measurement and articulation of the benefits of human resource planning has made planning hard to sell to top management. The available evidence does not indicate if human resource planning's cost effectiveness is a determinant of whether some firms will have planning programs.

Institutional Constraints On Human Resource Planning

Four institutional factors were previously identified as potential determinants of whether firms have human resource planning programs: uncertainty over what unit of the firm would have responsibility for planning, limitations on the flow of human resource planning
information to the business community, misconceptions regarding the cost effectiveness of planning, and political factors resulting from line managers' fear of losing authority. A fifth potential institutional factor, that firm management does not support a planning orientation, emerged from the interview process.

Uncertainty Regarding Responsibility for Program Implementation and Operation

Uncertainty over what department would be in charge of a human resource planning program does not appear to be a significant determinant of whether firms plan. Only six (five percent) of the non-planning questionnaire respondents indicated that uncertainty over what unit of the firm would develop and implement a planning program is a factor in their not having a planning program.

In the vast majority of firms, human resource planning is perceived as part of the domain of the human resource management department and nine of the ten non-planning firms interviewed indicated that there is no question that if a human resource planning program was implemented it would be the responsibility of this department. Of the 71 planning firms who responded to the survey, 46 (64.8 percent) of the firm's planning programs are the responsibility of the human resource management
department. Of the 21 remaining firms who indicated which department is responsible for the planning program, 15 indicated that the human resource management department has at least partial responsibility.

The Flow of Planning Information

Apparently there are constraints on the flow of human resource planning information to the business sector. Of the survey respondents from non-planning firms only a limited percentage have been exposed to human resource planning in undergraduate (29.5 percent) or graduate (21.5 percent) coursework. Furthermore, of the 22 interviewed individuals only one had taken a course whose primary topic was human resource planning. Of the non-planning survey respondents 43 percent have been exposed to human resource planning through seminars and 69.8 have been exposed by the reading of journal articles. In the interview process it was determined that the journals that are read are either popular business magazines or firm oriented personnel journals. Few of the human resource managers read the scholarly oriented journals containing most of the articles that discuss the sophisticated planning techniques and empirical evidence of the reliability of these techniques.

Indicative of the constraints on the flow of information is the low level of expertise the typical human
resource manager has concerning human resource planning. As was discussed in the previous chapter, the majority of planning programs are not very sophisticated and only a small minority of firms utilize any mathematical models in the prediction of human resource requirements or internal labor supply. When individuals from non-planning firms were asked in the questionnaire to describe their knowledge of human resource planning techniques, 60.7 percent described their knowledge as limited, cursory or nonexistent. While 36.8 percent described their knowledge as good, only two individuals (1.7 percent) felt they had extensive knowledge of human resource planning techniques. Nine of the ten interviewed individuals from non-planning firms remarked that they do not know what the state of the art is in human resource planning and 16 of the entire 22 interviewed individuals indicated that they do not know what the state of the art is or gave a non-responsive answer when asked to describe the information available from a state of the art program. In response to a question regarding the reliability of human resource planning techniques one of the human resource managers stated "I don't know if they are reliable, or even if there even are models available to help us do the kind of research we think probably would need to be done."

Commenting on the typical personnel departments ability to do human resource planning one of the interviewees noted
that "the people in the personnel field don't have the expertise or the knowledge, unless they have worked for one of these companies that have it (human resource planning). ... The rest are trying to play catch up, and they are not perceived in their own organization (as able) to carry something like this (human resource planning) out."

Five of the 22 interviewed firms remarked that the lack of skills and abilities on the part of human resource managers to do human resource planning is a reason why more firms do not have planning programs. The fact that the lack of planning expertise is a determinant of whether firms implement planning programs is evident in the following comment, "It would be, not impossible, difficult to bring somebody in to human resource planning from within the organization, because it is a strict discipline a knowledge. ... So you would have to go outside (the organization). Which opens up another area of justification." Clearly this individual views the lack of in house human resource planning skills as a reason why his firm does not implement a planning program.

The lack of expertise on the part of the human resource managers in regard to human resource planning techniques is a constraint on the implementation of human resource planning programs.
Misconceptions Regarding Cost Effectiveness

Whether misconceptions regarding the cost effectiveness of human resource planning is a determinant of whether firms implement planning programs is difficult to determine. As was discussed earlier, it is clear that firms' perception of human resource planning as cost ineffective is a significant constraint on planning, and that based on the available evidence it is impossible to conclude whether the perception of cost ineffectiveness is accurate in at least some firms. Now the question is whether we can conclude that the perception of human resource planning as cost ineffective is inaccurate in some cases.

Based on: the limited nature of most human resource managers knowledge of human resource planning techniques, the potential morale/productivity benefits which appear to be ignored by some firms, and the conviction of the more knowledgeable human resource managers that human resource planning is a profitable activity for all firms, it appears likely that some firms harbor misconceptions regarding the cost effectiveness of human resource planning. However, considering the indirect nature of the available evidence, only a tentative conclusion can be reached that misperceptions of the cost effectiveness of human resource
planning are a determinate of whether firms implement a human resource planning program.

**Opposition of Line Managers**

Political considerations which result when line management oppose human resource planning in order to prevent the lessening of their authority does not appear to be a significant determinant of whether firms plan. Only one of the ten interviewed non-planning firms believe that their line managers would object to a planning program for this reason. The human resource manager of this firm does not feel that the opposition of the line managers is a significant factor in the firms not having a planning program. Interestingly, in one-third of the interviewed planning firms the line managers did, in fact, oppose the programs before they were implemented. Obviously, the opposition did not play a dominant role.

**A Non-Planning Management Orientation**

While the opposition of line managers does not appear to be a major determinant of whether to implement a planning program, human resource planning not fitting into the culture of the firm does appear to be a most important determinant. Three of the interviewed non-planning firms
specifically mentioned their lack of a planning orientation as a significant factor in their not having a planning program. Another of these firms indicated that the information generated by a planning program would not be used; presumably the anticipated lack of use indicates something regarding the orientation of the firm to planning. Six of the 22 interviewed firms suggested that not having a planning orientation as part of the management culture is a factor in more firms not having human resource planning programs. Interestingly, a full 40 percent (47) of the non-planning survey respondents indicated that the possibility of instituting a human resource planning program had never been seriously considered by them. The lack of consideration of the possibility of doing human resource planning says something about the firm's overall orientation to planning. One of the human resource managers made the following observation regarding the planning orientation of most firms, "There are very few companies that have foresight, those companies that have foresight (went) ahead with some of these programs which will really be beneficial in the long-run. The United States, as far as long-run planning goes are babes in the woods and the Japanese and other people are far ahead of us in long-run future planning." Another human resource manager made the following comments on the same subject in regard to his firm, "You take a more short-term oriented
company like ours and planning was never well received here, and therefore if planning as a high level abstraction is not well received human resource planning programs will not be that well received."

**Clearly a non-planning oriented management is a primary factor in more firms not having human resource planning programs.** In addition, all of the previously noted determinants of whether firms plan are exacerbated by a non-planning orientation in firms. An emphasis on short-run profitability and short pay back periods is symptomatic of firms not oriented to the long run. A planning oriented management culture would encourage managers to be more curious about the state of the art in planning, and would therefore greatly reduce (if not eliminate) constraints on human resource planning which result from limitations on the flow of planning information and misperceptions of the cost effectiveness of planning. The inability to quantify the benefits of planning would not be such a concern to management if they had a better understanding of how the planning process can produce benefits.

**Conclusions**

Two of the institutional factors (uncertainty over what unit of the firm would be responsible for the program and political considerations resulting from line managers
fear of loss of authority) do not appear to be significant determinants of whether firms have planning programs. Indirect evidence indicates that a third potential institutional factor (misconceptions regarding cost effectiveness) may be a significant factor. While a fourth institutional factor (limitations on the flow of human resource planning information to firms appears to be a notable determinant the most significant determinant of whether firms have human resource planning programs is the management's orientation to planning.

Constraints On Human Resource Planning Resulting From Limitations Of The State Of The Art

Discussed in Chapter V is the fact that there are significant limitations of the available human resource planning techniques. The question is whether these limitations are a factor in firms not implementing human resource planning programs. The relatively limited nature of the knowledge most firms have of human resource planning techniques indicates that limitations of the state of the art are not a significant reason why firms do not plan. Only a limited percentage (17.1) of the non-planning survey respondents indicated that the lack of development of
reliable human resource planning techniques is descriptive of why they do not have a planning program.

It is clear from the interviews, however, that an inability to accurately predict human resource requirements greatly reduces the effectiveness of existing planning programs. Several of the firms had well developed human resource plans which were rendered inoperative by inaccurate predictions of human resource requirements.

Conclusions

Uncertainty over which department would be responsible for a human resource planning program, opposition from line managers who fear a loss of authority, and limitations of the state of the art do not appear to be significant determinants of whether firms implement planning programs. It is unclear whether the cost ineffectiveness of planning is a determinant of whether firms have human resource planning programs. It does appear that misconceptions regarding cost effectiveness, an orientation to short-run profitability, difficulties in quantifying the benefits of planning and limitations on the flow of information regarding planning techniques are factors which determine whether firms will implement human resource planning programs. Above all, the non-planning management
orientation of many firms appears to be a determinant in its own right and also a contributing factor to the impact other determinants have.
CHAPTER VII

CASE STUDIES OF SELECTED FIRMS

Four case studies are presented in order to help further understand the nature of, and the determinants of whether firms have, human resource planning programs. In the first case study one of the best human resource planning programs is described and the firm's situation analyzed in order to determine why the firm has such a quality program. The three remaining case studies demonstrate how the lack of a planning orientation on the part of management can determine whether the firm implements a human resource planning program.

Case Study One

The subject of this case study is a medium size facility of a large defense contractor. Three things can be learned from analyzing this firm: 1) that a good example is provided of how a quality human resource planning program can be operated; 2) that the reasons the firm has a
quality program are the commitment of top management to the concept of planning and the competency of the individual in charge of the program; 3) that there appears to be no reason why this firm's success in the area of human resource planning can not be duplicated by other firms.

The Planning Program

This firm's planning program has all the necessary components (predicting requirements, predicting internal labor supply followed by utilization of the supply and demand information) of a human resource planning program. The planning program is relatively new with parts of the program still in the implementation stage.

Transitional probabilities are used to predict retirements and other movements out of the firm over the firm's three year planning time frame. Separate transitional probabilities are predicted for groups of workers classified by whether there is a strong external demand for the worker's skills, whether the individual is a long-time resident of the local area and either the length of service with the firm, or the employee's age (age is used when the employee is over 55).

While the firm provided no empirical evidence of the utility of their classification criteria, the criteria are intuitively appealing. The existence of a strong external
demand for an individual's skills increases both the ease and the potential financial reward of changing employers. Conversely, the attachment of an individual to a locality, which thereby limits the worker to the local labor market, reduces the ease with which individuals can switch employers. As was noted in Chapter V, there is evidence that a relationship exists between turnover and length of service. It is logical that as retirement age approaches, age will become a more important predictor of turnover than length of service.

The movements of workers within the firm are not predicted apriori, but are examined as a policy goal in the selection of a set of human resource policies.

This firm uses a modification of the work-study approach to predict it's human resource requirements. In response to the unreliability of predictions of total output, a two track approach is used in the prediction of human resource requirements; one track assuming significant increases in output, and the other assuming significant decline. In the words of the human resource planner; "In human resource planning you have to have plans for both ... We redefined the must responsibilities that we have to carry out in order to function. ... Now there are other responsibilities, luxury responsibilities that you would have if we were in a growth period (in personnel for example) more training, more recruitment ... more employee
activities. Staff would grow, as a result of the luxury things you would add to the function. ... The idea is that for good times we plan what it is that we would do - the type of talents and people that we would need. Then we do the reverse, what luxuries can we get rid of if we had to go down in business and down in manpower."

"(Then) you attach people to each one of these plans, who are the people who are going to stay with the core responsibilities and who are the people who have the luxury responsibilities. ... That is the start of it once you have done that you really start thinking about people. You start saying OK this person has a variety of skills and a variety of capabilities and can cover these kinds of things. It's a checkers and chess game kind of thing. Were you first think about taking care of all of your present employees, and with any new growth, what you can do to develop them through that new growth. ... A new organizational chart for growth (might for example) show that you are going to have a new manager. Who is the most likely person to fill into that new management (position)? ... If you find out that you want to cross train someone ... knowing this is coming down the road (you) send them off to a seminar or something like that. The reverse of that, if you are going in a down turn, is simply ... to go back to your core responsibilities. Who is capable of handling those, and the rest of the people
are extra. Then you decide on a performance basis who is going to go out the door."

"If a new business venture is going to happen ... what we do is go through our normal planning process of proposing all the technology and the people to go with that technology. ... (We) see how the firm structure will be. ... What in-house people we have to transfer over and what amount of people and what kinds of people we would need to find."

Why This Firm Has a Quality Human Resource Planning Program

This firm has a quality planning program as a result of having a commitment to planning and a skilled planner. Three years ago top management decided that the facility needed a human resource planning program and as a result of this decision, a position was established with the sole responsibility of human resource planning. The present human resource planner was selected for the position as a result of his experience with human resource planning at other firms. In addition to being skilled in the techniques of human resource planning, he places emphasis on in his words, "Being able to tie the personnel function in to the business side of what is going on in a company," and his ability to "be a change agent." His commitment and excitement for human resource planning is apparent; I
believe he would have gladly talked about his planning program for days.

The potential constraints to human resource planning have been overcome by the planner's skill and the support of top management. After identifying a half a million dollars in savings, which resulted from a planning motivated change in the recruitment process, the finance department of the firm has been strongly supportive of the planning program. The commitment of the finance department effectively eliminates the cost effectiveness issue. Despite the identification of significant dollar savings as a direct result of the planning program, the human resource planner is convinced that the largest benefit of human resource planning is in the area of employee motivation. The human resource planner's job description has eliminated constraints on planning which can result from uncertainty over which department is responsible for human resource planning. The planner's skills and creativity, as exemplified by his unique two track approach to predicting human resource requirements, have eliminated constraints which result from either a lack of information regarding the planning process or limitations of the state of the art of human resource planning. Top management's commitment to the planning process and the planner's diplomatic skills have prevented opposition by other managers from derailing the planning process. The human resource planner made the
following response to a question regarding the opposition of line managers, "the only group that was not (opposed) was the group that we really needed to get the ball rolling the president of the company and the finance department." He went on to state that "learning how to negotiate change is extremely crucial to being successful about doing human resource planning." In short, a commitment from the top management to the planning process and a skilled planner appear to be the necessary ingredients to a quality human resource planning program.

Applicability Of This Program To Other Firms

There do not appear to be any factors which would prohibit the profitable duplication of this firm's human resource planning program in other firms. Firm size does not distinguish this firm from many of the firms without planning programs; in fact this firm fits into the smallest size class of 500 to 1,000 employees. This firm being a defense contractor, which therefore makes output levels more dependent on political than economic market forces, does not tend to make predicting output any easier. The single potential limitation to the duplication of this firms activities by a significant number of firms is a shortage of qualified planners.
Case Study Two

The subject of the second case study is the corporate headquarters of a large (40,000 employee) manufacturer of electronic components. In this firm a limited human resource planning program exists, but the human resource manager's desire to use and expand the program is frustrated by the non-planning culture of the firm's management.

The human resource manager described the firm's human resource planning process as follows; "At (company name) there is no such function as human resource planning, as the literature might define it. We have bastardized it in several different ways. The closest thing that we have to human resource planning would be our management review process, which in essence is the succession planning system, the continuity planning system. It's primarily geared to exempt personnel and it is not a human resource planning process from the perspective of projections, number crunching, computerized models not of that. ... We're not interested in how many engineers were going to need in 1990. But we are interested in taking a look at the incumbents and the incumbents' positions, and seeing how those positions are changing so we can begin to identify the training and development of successors. So they are ready to move into those positions in time. ...
Typically we focus on the critical performers, just how much depth is there in the organization in terms of manpower, who may need what kind of assignment to give them greater flexibility. ... That is about as close as we get to human resource planning.

We thought it (looking at replacements for the critical positions) would be valuable only because culturally speaking we knew we could not say let's do human resource planning. Because we come from an environment where number crunching has been frowned upon. Culture says what are the issues, what are the threats, what are the variables, we are willing to talk about those. ... Don't hassle me with making me think of numbers. From that perspective we have been able to gear ourselves up to looking at the occupations, but this is really the first year we have been able to swing it."

Based on the availability of workers to fill positions individual career plans are developed. The career plans identify the training and job assignments necessary to prepare individuals for a particular position. As a result of the opposition of line managers and the lack of support from top management, the career plans which involve changes in job assignments are generally ignored. The human resource manager described the typical reaction of a plant manager to the suggestion that one of his subordinates be considered for a new job assignment to facilitate the
the individual's career development, "I understand that you are looking at my guy to see if he should be moved to another division not in my area, and for Christ sakes what benefit is that to me. I got a guy who is promotable, you take him from me, what do I get out of it. Are you going to relieve me of my bottom line responsibilities. ... What is the advantage of providing people to corporate." The orientation to having a smooth operation in the present prohibits the use of job assignments as a means of preparing employees to meet future human resource requirements.

In several ways the non-planning orientation of the firm's management prevents the human resource manager from improving the planning system. In regard to why mathematical models are not used the human resource manager indicated that; "We did have someone try a couple of years back to go the mathematical models route, and he is no longer with the company. He was eaten alive, the process was eaten alive, laughed at, stepped on, thrown around, and just it's really a joke. So when anybody talks about what they perceive human resource planning was we quickly have to say no no no it is not what he was doing. ... Because numbers will not fly around here. ... You do what you can do, and what you can afford to do in your organization, what can live in your organization. It (the old human resource planning program) went counter-culture that was
the biggest problem." The low esteem the strategic planning process is afforded, makes any linkage between the human resource planning and strategic planning processes both undesirable (as a result of the latter's unreliability) and unwise politically. The human resource manager made the following response to a question regarding the possibility of linkages between the human resource planning and strategic planning process, "Not at this time. The strategic planning process is in a state of flux. It is so badly thought of that what we would have been doing was really linking ourselves to a sinking ship. So in essence, while that has been in a state of flux, we decided to go our own way at this point in time. There is the potential of having some linking pins but at this point we don't want to label anything. We want to do it very very covertly." Despite the fact that this is a high technology firm with over 40,000 employees, top management's opposition prevents the human resource management department from having a computerized skills inventory system, or access to computer facilities for use in the human resource planning process and in the words of the human resource manager, "the fact that we don't have data processing (capabilities) is a serious problem."

The single factor which limits the scope and quality of this firm's human resource planning program is that within the firm planning is "counter culture". In response
to a question regarding why more firms are not involved in planning the human resource manager indicated that "everything is so dependent on the culture of the organization, there are severe limits put on what you can do. ... In doing any sort of human resource planning one has to be aware of where the political power is, where the culture of your organization, where the values are."

Case Study Three

The subject firm of this case study is a good size employer (over 3,500 employees) in the light manufacturing industry. While the firm has no human resource planning program, the manager of human resources believes a planning program would be cost effective and has been working to institute such a program. However, opposition by the top management has frustrated his efforts.

Clearly, the manager of human resources thinks a planning program is needed, and I quote; "I think it can be very costly to a company not to have the right kinds of technical expertise in place when needed. I think we have to do an effective job of looking into the future, determine what the personnel needs are going to be in terms of numbers and the kinds of people, so that when we do have need for them we can get them in place, able to effectively
carry out what is required of them. I know it costs money to be able to do that kind of planning, without any tangible evidence I have a strong feeling that it will pay off in the end. That it does pay off. ... From an employee motivation factor knowing that management is concerned about the future of the company, thus they are concerned about the future of the individuals within the company. ... To know that the company cares enough to look at them as individuals in terms of future planning, and to know that there is a role for them to play in the future of the company and that the company is willing to commit time and money to see that the employee is developing so that they will be capable of fulfilling a future role, I think is a tremendous motivator. So employee motivation is key."

Despite the human resource manager's conviction that human resource planning is desirable and cost effective, no planning program exists. When asked why there is no program, he stated; "Well I hate to say it this way because it's willingness to spend the bucks. ... I am not so sure that they (top management) think it is cost effective. If I could have some tangible proof that if we invested 100,000 dollars in the long-run we would save 150,000 dollars they would buy it tomorrow. But I do not have that kind of tangible evidence other than conceptually we think it is good. ... Until I can have more tangible proof that
it is going to be cost effective, I think I have the struggle. ... We haven't been able to initiate the kinds of programs, we haven't been willing to devote the time nor the money to do an effective job of human resource planning." The human resource manager also indicated that his proposals for a planning program are not very expensive, "If you want to put it in terms of dollars I would say perhaps an investment of 100,000 to 150,000 dollars." Considering that the firm incurred manufacturing costs of almost 500,000,000 dollars in 1982, this does not appear to be a exorbitant request.

In this firm the short-run orientation of top management has prevented the manager of human resources from instituting a planning program. In his words, "It (human resource planning) should be done in all organizations, and it can be a very viable and cost effective part of any corporation's operation. It behooves us all to get that concept impressed on our senior management, so that is what we are trying to do here."

Case Study Four

In many ways the firm in this case study appears to be representative of the average non-planning firm. The lack of a planning orientation is a primary factor in the firm's
not having a human resource planning program. There is no question of the firm's non-planning orientation as revealed in the words of the director of employee relations, "we do not have business planning." The firm is geared to getting the day's production out smoothly. The personnel department's function is viewed as hiring individuals and filling out the necessary company and government paper work, and all at a minimum of cost.

In the words of the interviewee; "We don't have the time, nor could I justify at this time putting someone on who could get in that area (human resource planning). Some how you have to justify the paybacks to sell the program, and that's tough. The paybacks are tough to sell, ... and we're kind of a hard nuts practical company, also it's just tough. I can sell a better order entry system, I can sell a better product, I can sell a cost reduction, human resource planning is kind of a warm fuzzy feeling, everybody knows we ought to have it but to hell with it, how about the next staff meeting we're running kind of short." Planning is simply not a priority item in this firm.
Conclusions

These four case studies graphically indicate the critical role that management support plays in the human resource planning process. In the first case study top management supports the planning process and played a leading role in the institution of the planning program; the result being a quality planning program. The management culture of the second firm prevents the firm's human resource manager from improving and utilizing the limited human resource planning program that exists. In the third firm, the human resource manager's desire to institute a planning program has been frustrated by the opposition of top management. In the final case study neither the director of employee relations or the firm's top management view human resource planning as necessary; therefore it is not done. The key to the institution of a human resource planning program appears to be the attitude and culture of the firm's management.
Chapter VIII

CONCLUSIONS AND RECOMMENDATIONS

Four basic conclusions of this work can be identified: 1) there are significant limitations in the state of the art of human resource planning; 2) the majority of large firms in Ohio do not engage in human resource planning; 3) the majority of planning firms do not have very sophisticated programs and; 4) while several factors that determine whether firms have human resource planning programs have been identified the dominate factor is management's orientation to planning.

Based on these conclusions several areas in need of additional research can be identified. Improvements are needed in the state of the art of human resource planning. Work needs to be undertaken to verify the conclusions of this dissertation in regards to the factors that determine whether firms have human resource planning programs. In order to encourage firms to implement human resource planning programs, research and educational efforts should be undertaken to improve firms' ability to quantify the benefits of planning and improve firms'
familiarity with both human resource planning in particular, and the planning process in general.

The State Of The Art

Despite the fact that limitations of the state of the art are not presently a constraint on human resource planning, improvements in the state of the art are desirable to enhance the quality of existing planning programs and to prevent the limitations from constraining human resource planning in the future.

As was noted in Chapter V, all three areas of human resource planning (predicting the internal labor supply, predicting human resource requirements and utilizing the supply and demand information) have significant limitations. In the area of predicting internal labor supply, additional empirical tests need to be conducted on the reliability of the Markovian chain technique for long-run predictions. The limitation of the state of the art which appears to be causing the most significant problem for existing human resource planning programs is the inability to accurately predict future human resource requirements. However, part of firms' inability to predict human resource requirements is the result of firms not using existing mathematical techniques for the predictions of output. The primary methodological difficulty in this
area is the lack of reliable techniques for the prediction of cyclical variations in output levels and/or aggregate human resource requirements. If reliable methods of predicting cyclical variation can not be found, the utility of using a multi-track approach based on potential output levels should be explored. The use of The United States Department of Labor's predictions of industry-wide future occupational profiles in the disaggregation of total human resource requirements to skill-specific occupational groupings should also be explored. In the final area, the utilization of the supply and demand information, the primary methodological limitation is the absence of techniques to predict the various costs incurred in the employment of human resources. Finding improved methods of predicting these costs should aid in the development of methodologies for the incorporation of human resource planning information into the corporate planning process. The inability to combine human resource planning and corporate planning is a significant limitation of existing human resource planning programs.

Verification of the Conclusions of this Work

Additional research is needed to further identify and determine the relative importance of the constraints on human resource planning. The research conducted as part of
this dissertation was exploratory in nature and additional support of the conclusions is desirable. Whether cost effectiveness and misconceptions regarding the cost effectiveness of planning are significant constraints on human resource planning remains uncertain. Considering the difficulties involved in quantifying the costs and the benefits of human resource planning, the development of a research design which will determine both the importance of cost effectiveness and misperceptions of cost effectiveness appears to be a significant problem.

Encouraging Human Resource Planning

The key to the removal of constraints on human resource planning is an improved ability to quantify the benefits of planning and an increase in the familiarity of management with both the human resource planning process and the planning process in general.

The motivational aspect of human resource planning is the benefit of human resource planning which appears to be the most difficult for managers to quantify. Methods of measuring productivity changes that result from the implementation of a planning program should be developed. Empirical tests of the impact should then be conducted and publicized to allow firms who are deciding
whether to implement a planning program to predict the anticipated impact on productivity.

In attempting to improve a firm's knowledge of human resource planning all potential conduits of information dissemination should be explored. However, since the most common source of firms' information regarding human resource planning information is articles in personnel related journals, particular efforts should be made to improve the quality of these articles. Human resource managers need to become familiar with the empirical evidence regarding the reliability of prediction methods as well as descriptions of how to use both the projection methods and the information they generate. Given the complexity of the planning process, more human resource planners need to be trained by the educational institutions and utilized by the private sector.

In order to encourage a planning orientation in firms, information regarding the potential pitfalls of placing too great an emphasis on short-term profitability and the advantages of general planning need to be disseminated to top firm management. Both seminars and journal articles may be instrumental in this effort.

The bottom line is that, firms will be motivated to institute human resource planning programs when they perceive it to be in their best interest to do so. Those in the academic community need to be certain that the human
resource planning techniques they are developing will be of benefit to firms and then go an additional step to help firms to understand the importance and the benefits of planning.
Appendix A: The Survey Instrument

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QUESTIONNAIRE.

Does your firm have a formal process for human resource planning? Yes 46.8% If so please complete only part II
No 53.2% If not please skip to part II (page 3)

Part I

1. Does the planning process cover all types of employees? Yes 70.4% No 29.6%

   If not, please indicate the type of employees that are covered. Managerial 28.2% Service 5.6% Sales 5.6%
   Professional and Technical 28.2% Production 4.2%

2. What time frame does the planning process cover? 5 years-36.6% 1 year-32.4%

3. What unit of the firm is responsible for human resource planning? Human Resource Management-64.8%

4. Is human resource planning this unit's primary responsibility? Yes 17.4% No 82.6%

5. If there is an individual(s) whose primary responsibility is human resource planning, please indicate the individual's sources of training in human resource planning. (Please check all that apply)
   Undergraduate coursework 29.6% Graduate coursework 29.6%
   Special seminars 39.4% Journal articles and books 29.6%
   None 1.4%
   (Other please specify) General Experience-16.9%

1 All numbers are percentages. The percentages in part one are for the 71 firms with comprehensive human resource planning programs. The percentages in part two are for the 117 firms without such programs. For the opened questions the most frequent responses are reported.
6. What are the primary benefits to your firm of human resource planning? (Please check all that apply)
   avoidance of labor shortages 63.4
   avoidance of labor surpluses 49.3
   reduce cost of meeting human resource requirements 80.3
   improve ability to select recruitment levels 73.2
   improve ability to determine the need for training 87.3
   other Career planning and promotability analysis - 8.5

7. Which of the following statements apply to your human resource planning system? (Please check all that apply)
   91.5 The planning process involves one or more of the following: career planning, replacement charts, performance appraisal or compensation systems.
   0 No attempt is made to predict the firm's future human resource needs by occupational categories.
   57.7 Future human resource requirements are predicted based on the subjective judgments of either the line managers or the personnel managers.
   52.1 The future internal supply of human resources is predicted based on the subjective judgments of either the line managers or the personnel manager.
   14.1 Mathematical models (such as shift share models and or multiple regression equations) are used to predict the firm's future human resource requirements.
   8.5 Mathematical models (such as Markovian chains) are used to predict the firm's future internal supply of human resources.
   100 The predictions of both requirements and internal supply are made for skill specific occupational categories.
   50.7 External labor markets are analyzed to determine the external availability of human resources.
   66.2 In the corporate strategy making process, the human resource planning system is used to determine the impact on human resource requirements of strategic options under consideration.
8. Do you believe your human resource planning program is cost effective? Yes 87.3  No 9.9

9. What institutional factors, if any, have created problems in the implementation and operation of your human resource planning system?
   Lack of interest, support, and utilization of the planning program-14.1
   Data Limitations-8.5

10. What technical factors, if any, have created problems in the implementation and operation of your human resource planning system?
    Inability to accurately predict output-9.9
    Inability to predict changes in the economy-5.6
    Inability to predict human resource requirements-5.6
    Inability to predict technological change and it's impact-5.6

11. Would you, or someone else in your firm, be available to discuss your firm's human resource planning process in greater detail? Yes 50.7  No 33.8

Name/Title of respondent______________________________

Phone Number______________________________

Thank you for completing this questionnaire. Please return the questionnaire in the envelope provided. Your time and assistance in this research project are appreciated.

---

Part II

If your firm does not have a formal process for human resource planning, please fill in the remainder of this questionnaire.

1. Has your firm experienced a labor shortage in the last five years? Yes 21.4  No 78.6
   If the shortage had a negative impact on your firm how would you describe the impact?
   Major 4.3  Minor 12.8  Insignificant 3.4

2. Has your firm experienced a labor surplus in the last five years? Yes 22.6  No 25.6
   If the surplus had a negative impact on your firm how would you describe the impact?
   Major 17.9  Minor 22.2  Insignificant 18.8
3. What sources of information regarding human resource planning have you been exposed to. (check all that apply)
   Undergraduate coursework 30.8 Graduate coursework 15.4
   Special seminars 47.9 Journal articles and books 80.3
   None 11.1
   Other (please specify) Experience with other firms-5.1

4. How would you describe your knowledge of human resource planning techniques? Extensive 1.7
   Good 36.8 Limited 46.2 Cursory 11.1 Nonexistent 3.4

5. Do you believe human resource planning would be cost effective for your firm? Yes 36.8 No 19.7
   Do not know 42.7

6. Which of the following describe why your firm does not have a human resource planning program? (check all that apply)

   56.4 We do not anticipate having any difficulty finding the human resources the firm requires.
   11.1 There is no one presently in the firm who has the skills required to develop and implement a human resource planning program.
   5.1 It is not clear what unit in the firm would be responsible for the development and implementation of a human resource planning program.
   17.1 Human resource planning techniques are not well enough developed to produce reliable and useful information.
   40.2 The possibility of instituting a human resource planning program has never been seriously considered.
   Other (Please specify) We are too small-3.4

7. Briefly describe how your firm determines how many individuals to recruit and what skills to look for in those recruits.
   Recruit for immediate openings-37.6
   Recruit based on predictions of output-13.7
   Determined by line managers-10.3
   Based on expected turnover-8.5
8. Briefly describe how your firm determines the need for training programs.
   - In response to immediate need or problem areas-21.4
   - Based on a review of individual workers-12.8
   - Determined by line managers-12.8
   - We don't-10.3

9. In the corporate strategy making process is there a formal procedure for determining the impact of strategic options on the firm's human resource costs and/or needs? Yes 12.8 No 73.5

   If so, briefly describe this process.
   - Informal discussions-4.3
   - Cost benefit analysis-.9

10. Would you, or someone else in your firm, be available to discuss your firm's human resource management procedures in greater detail? Yes 33.3 No 53.0

Name/title of respondent______________________________

Phone number______________________________

Thank you for completing the questionnaire. Please return the questionnaire in the envelope provided. Your time and assistance in this research project are appreciated.
Appendix B: Interview Questions

Interview Questions
For Firms Without Human Resource Planning Programs

1. Demographic Information
   a. number of employees
   b. industry
   c. title/position of interviewee
   d. subsidiary of a larger firm

2. How would you define the concept human resource planning?

3. Misconceptions Regarding Cost Effectiveness of Planning
   What causes you to believe that human resource planning would (not) be cost effective for your firm?

4. Benefits of Human Resource Planning (If not covered above) If any, what do you think the benefits would be of having a human resource planning program? (avoid shortages and surpluses, reduce labor costs, provide information for corporate strategy making)

5. Costs of Human Resource Planning (If not covered above) If any, what do you think the costs would be of having a human resource planning program? (data collection and analysis, planners time)

6. For Those Who Indicated Would be Cost Effective
   Given that you believe human resource planning would be cost effective for your firm, why don't you have a human resource planning program?

7. Restrictions on the Flow of Information
   How do you find out about human resource planning techniques and developments?

8. Not Clear Who Would be in Charge
   If your firm were to institute a human resource planning program, how would the firm determine what department would be in charge of the program?
9. Internal Political Considerations
   Are there groups within your firm that are, or that
   would be likely to be, opposed to the implementation of
   a human resource planning program?
   a. Describe these groups?
   b. Why do you think they are, or might be, opposed to
      human resource planning?
   c. What form does, might, this opposition take?

10. Misconceptions Regarding the State of the Art
   a. To the best of your knowledge, what information can a
      state of the art human resource planning program
      reliably produce?
      (internal supply, requirements, cost estimates)
   b. In what ways can this information be utilized?
      (avoiding surpluses & shortages, reducing human
      resource costs, selecting corporate strategies)

11. Limitations of the State of the Art
    Are there any capabilities that human resource planning
    programs do not now have, that if they did, would
    increase your interest in the implementation of a human
    resource planning program? What are these capabilities?

12. Why Don't More Firms Have Human Resource Planning
    Programs
    Give the background thesis of the dissertation, namely
    while there has been much written about human resource
    planning there is little done.
    Why do you think more firms are not engaged in human
    resource planning?
Interview Questions
For Firms With Human Resource Planning Programs

1. Demographic Information
   number of employees
   industry
   how long had planning program
   title/position of interviewee
   subsidiary of a larger firm

2. Description of Their Human Resource Planning Program
   a. Describe your human resource planning program?
   b. Have you performed any tests of the reliability of your prediction techniques? Tell me about them
   c. (For Kindas) Have you considered including the prediction of both requirements and internal supply by skill specific occupations?
   d. (For those who checked data) How does your firm determine the impact on human resources of strategic options under consideration

3. Misconceptions Regarding Cost Effectiveness of Planning
   What causes you to believe that your human resource planning program is (not) cost effective for your firm?
   a. (For not cost effective) Given that you believe your human resource planning program is not cost effective, why do you keep it?

4. Benefits of Human Resource Planning (If not covered above)
   What are the benefits to your firm of human resource planning? (avoid shortages and surpluses, reduce labor costs provide provide information for corporate strategy making)

5. Costs of Human Resource Planning (If not covered above)
   What are the costs to your firm of having a human resource planning program? (data collection and analysis, planners time)

6. Restrictions on the Flow of Information
   How do you find out about human resource planning techniques and developments?

7. Not Clear Who Would be in Charge
   How did your firm determine what department would be in charge of its human resource planning program?
8. Misconceptions Regarding the State of the Art
   a. What information can a state of the art human
      resource planning program reliable produce?
      (internal supply, requirements, cost estimates)
   b. In what ways can this information be utilized?
      (avoiding surpluses & shortages, reducing human
      resource costs, selecting corporate strategies)

9. Limitations of the State of the Art
   What limitations of human resource planning capabilities
   have caused problems for your firm?

10. Internal Political Considerations
    Are there groups within your firm who were opposed to the
    implementation of a human resource planning program?
    a. Describe these groups
    b. Why do you think they were opposed?
    c. What form did the opposition take?
    Are there groups within your firm that are presently
    opposed to your human resource planning program?
    d. Describe these groups
    e. Why do you think they are opposed?
    f. What form does the opposition take?

Why Don't More Firms Have Human Resource Planning Programs
Give the background thesis of the dissertation, namely
while there has been much written about human resource
planning there is little done.

Why do you think more firms are not engaged in human
resource planning?
Appendix C: Two Digit SIC Codes

20 - Food and kindred products
22 - Textile mill products
23 - Apparel and other finished products made from fabrics and similar materials
24 - Lumber and wood products, except furniture
25 - Furniture and fixtures
26 - Paper and allied products
27 - Printing publishing and allied products
28 - Chemicals and allied products
29 - Petroleum refining and related industries
30 - Rubber and miscellaneous plastic products
31 - Leather and leather products
32 - Stone, clay, glass, and concrete products
33 - Primary metal industries
34 - Fabricated metal products, except machinery and transportation equipment
35 - Machinery, except electrical
36 - Electrical and electronic machinery, equipment and supplies
37 - Transportation equipment
38 - Measuring, analyzing, and controlling instruments; photographic, medical and optical goods, watches and clocks
39 - Miscellaneous manufacturing industries
48 - Communication
49 - Electric and gas utilities
60 - Banking
63 - Insurance
### Appendix D: Number Of Responding Firms
By Firm Size And City Size

<table>
<thead>
<tr>
<th>Number of Employees</th>
<th>Under 5,000</th>
<th>5,000 to 10,000</th>
<th>10,000 to 50,000</th>
<th>50,000 to 100,000</th>
<th>100,000 and Over</th>
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<td>500 to 1,000</td>
<td>15</td>
<td>13</td>
<td>49</td>
<td>18</td>
<td>78</td>
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<td>1,000 to 1,500</td>
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<td>4</td>
<td>14</td>
<td>6</td>
<td>22</td>
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<td>4</td>
<td>30</td>
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<td>0</td>
<td>9</td>
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<td>5,000 and Over</td>
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<td>0</td>
<td>1</td>
<td>3</td>
<td>4</td>
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BIBLIOGRAPHY


Young, Andrew and Almond, G. "Predicting Distributions of Staff." Computer Journal 3 (1961): 246-250.
