HOW COMMON IS WORKPLACE TRANSFORMATION AND WHO ADOPTS IT?

PAUL OSTERMAN*

The author, using data on 694 U.S. manufacturing establishments from a 1992 survey, examines the incidence of innovative work practices (teams, job rotation, quality circles, and Total Quality Management) and investigates what variables, including human resource practices, are associated with the adoption of these practices. He finds that about 33% of private sector establishments with 50 or more employees made substantial use of flexible work organization in 1992. Some factors associated with an establishment's adoption of these practices are being in an internationally competitive product market, having a technology that requires high levels of skill, following a "high road" strategy that emphasizes variety, service, and quality rather than low cost, and using such human resource practices as high levels of training and innovative pay systems.

A new conventional wisdom has emerged concerning work organization in the United States. This view holds that gains in productivity depend on adopting new models of work organization, models that entail internal labor market (ILM) innovations such as broad job definitions and the use of teams, employee problem-solving groups, and quality circles. Scholars have used a variety of labels to describe these systems—among them, "transformed" systems, "salaried" systems, "flexible specialization," "high commitment" organization, and "high performance work organization." Influential national reports such as Made in America (Dertouzos, Lester, and Solow 1989) and the Cuomo Commission Report (1988) have emphasized the importance of spreading flexible work organization throughout the economy. Many American firms have begun this transformation, while others have either chosen not to make the shift or have been unable to do so. A common policy prescription is for the state, local, and federal governments to intervene with training or incentives to adopt new work systems.

Running through this academic and policy discussion have been two major unresolved questions. First, how many firms are engaged in reorganizing work? And second, what differentiates firms that undertake these efforts from those that do not?

With respect to the first question, one widely cited national estimate comes from the Commission on the Skills of the

*The author, Professor of Human Resources and Management at the Sloan School of Management, M.I.T., thanks Peter Cappelli, Thomas Kochan, Frank Levy, and Michael Massagli for comments on an earlier draft of this paper. This research was supported by a grant from the Spencer Foundation.

The survey employed in this paper will be made publicly available beginning September 1995.

0019-7809/94/4702 $01.00

173
American Workforce, which claimed that 5% of employers are so-called High Performance Work Organizations (1990). The Commission, however, has never described clearly the source of this estimate. A national survey of Fortune 1000 firms by Lawler, Mohrman, and Ledford (1992) examined quality programs, and a survey by Delaney, Lewin, and Ichniowski (1989) examined ILM rules more generally; below, I compare the results of those efforts with findings of this paper. For specific industries, Vanian (1991) provided estimates for Japanese electronics plants in California, Florida and Kenny (1991) studied auto parts suppliers in the Midwest, and Kelley (1989) and Keele (1991) examined manufacturing sites using machine tools.

On the second question, systematic studies of the determinants of adoption are extremely sparse. That is, there is little or no research that takes work organization as the dependent variable and tests hypotheses found in the literature. Adequate data have not hitherto been available to take the discussion very much beyond anecdotal evidence.

In this paper I present a survey conducted in 1992 to provide a description of ILM practices across a representative range of American industries. Some important advantages of this survey over previously available data sources are its coverage of a wide range of American employers (all private sector establishments with 50 or more employees), the fact that it was conducted at the establishment level rather than the corporate headquarters level, and its very high response rate (65.5%). My analysis addresses both questions mentioned above, providing evidence on the distribution of new forms of work organization among American workplaces nationwide, and explaining the pattern of diffusion of these new forms of organization by estimating models that contain variables representing a number of competing hypotheses.

The Survey

The survey upon which this paper is based contains 875 observations on American establishments and was conducted in 1992. An establishment is defined as a business address and is distinct from a company. For example, each assembly plant of General Motors is an establishment, as is the corner gas station. The great advantage of surveying establishments, as opposed to firms, is that the respondent in an establishment (of whom more will be said below) is likely to know the facts. I wanted to avoid the risks inherent in surveys that rely on reports of corporate human resource personnel about practices in branch plants on the other side of the county.

The sampling universe was the Dun and Bradstreet establishment file, which purports to be a list of all establishments in the nation. In a comparison of this file with alternative sampling frames (the unemployment insurance files, the telephone white pages, direct enumeration, and Chamber of Commerce membership listings), Kalleberg, Marsden, Aldrich, and Cassell (1990) found that for a local area the Dun and Bradstreet file and the unemployment insurance files yield representative samples and are generally the best available sources. For creating a national sample, the Dun and Bradstreet file is the only practical choice.

Considerable thought went into the selection of respondents. Although in many cases a human resources person might be appropriate, automatic selection of people in this position was avoided. Years of open-ended interviews suggested to me that too often HRM staff, even at the establishment level, are not in touch with work organization. Therefore, the introductory letter said:

In order to get the best possible answers we need the cooperation of the most senior person at your location in charge of production of goods and services. For example, in manufacturing this might be the plant manager. In a non-manufacturing setting it might be the head of the office or the manager responsible for operations.

The survey research firm worked with the survey inappropriately, the final sample size used in this paper is 694.

Table 1. The Distribution of CORE Occupations*

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional/Technical</td>
<td>14.9%</td>
</tr>
<tr>
<td>Sales</td>
<td>19.0</td>
</tr>
<tr>
<td>Clerical</td>
<td>6.0</td>
</tr>
<tr>
<td>Service</td>
<td>18.3</td>
</tr>
<tr>
<td>Blue-Collar</td>
<td>42.3</td>
</tr>
</tbody>
</table>

*46.0% of the respondents worked in a human resources function and 54.0% were line managers. I entered a dummy variable for HRM staff in the equations reported below, and this variable was insignificant, indicating that the answers did not systematically vary with the respondent’s position. Recall that the sampling unit is the establishment, not the firm.

According to the Dun and Bradstreet file, establishments with 50 or more employees represent only 10% of all establishments. According to the May 1988 Current Population Survey, however, they represent 51% of all employees.

The survey was conducted by the University of Massachusetts Center for Survey Research. The Delaney, Lewin, and Ichniowski survey, which contained a very detailed and rich set of questions about a wide range of work practices, had a response rate of 6.5%. Lawler, Mohrman, and Ledford had a response rate of 32%. The Dun and Bradstreet survey was limited to the 1,000 largest firms, and it was answered by a respondent in corporate headquarters with regard to practices for all employees in the entire company.

It is possible to estimate response bias by using variables in the Dun and Bradstreet file. I estimated a logit model in which the dependent variable was the probability of response and the independent variables were size, a dummy equal to one if the establishment was manufacturing, a dummy equal to one if the establishment was a headquarters of a multi-branch firm, and a dummy equal to one if the establishment was part of a larger enterprise. The manufacturing dummy and the headquarters dummy were insignificant. Transforming the coefficient at the mean value of the variables indicated that the probability of response increased by 5 percentage points if the respondent was in manufacturing. A similar calculation revealed that the probability of response decreased by 8 percentage points if the establishment was a headquarters. Even among non-manufacturing headquarters establishments, however, the response rate in the survey was 59.1%. The weights used in this paper are adjusted to reflect non-response.

The distribution of CORE jobs by industry follows the pattern one would expect. For example, in manufacturing, firms blue-collar jobs were designated as the core job in 86.9% of the cases. In Finance, Insurance, and Real Estate the distribution of CORE jobs was 7.3% professional, 54.1% sales, 20.4% clerical, 18.0% service, and 0% blue-collar.

The sample was limited to establishments with 50 or more employees in non-agricultural industries. Non-profit organizations were eliminated. The sample was size-stratified in order to create adequate samples within size categories, and appropriate weights are used to create a representative sample of establishments. Each contact was preceded by an introductory letter and a worksheet, and the interviews were conducted by telephone. The response rate was 65.5%.

A final point regarding the survey procedure concerns the unit of analysis within the establishment. Many variables were collected for the entire establishment. Detailed information on work organization, however, was obtained only for core employees. The reason for that restriction is that no single answer regarding, say, job training is likely to be applicable to all occupational groups within an establishment, since employers have distinctive ILM systems for different families of jobs (Osterman 1987). Because it was not practical to collect ILM data on all job families, the notion of a core job was developed. The core job was defined as the largest group of non-supervisory, non-managerial workers at this location who are directly involved in making the product or in providing the service at your location. We want you to think of the various groups directly involved in making the product or providing the service and then focus on the largest group. For example, these might be assembly-line workers at a factory or computer programmers in a software company, or sales or service representatives in an insurance company.

Table I shows the distribution of the core job by broad occupational categories. The core jobs were coded as two-digit occupations. This table represents a further collapsing of these categories. It is apparent, and indeed a strength of the survey, that there is considerable variation. It will be important in the analysis that follows to control for occupation.
Flexible Work Organization

In order to describe and analyze the distribution of more flexible work systems, we must define and operationalize the idea. The problem is that there is no single accepted definition. Although it seems fair to say that the many scholars who have written on the topic have the same broad set of practices in mind, different authors place primary emphasis on somewhat different sets of dimensions of those practices.

The difficulty of developing an unambiguous definition is exacerbated by the fact that firms that we might well agree are examples of flexible work organization nonetheless exhibit somewhat different practices. For example, one model is the self-directed work teams implemented in sites such as Cornings and Cummins Engine and in white-collar settings such as Hanover Insurance. On the other hand, the General Motors NUMMI plant has created teams and has numerous opportunities for employee involvement in quality, the actual work tasks are rigidly prescribed (Adler 1992, Brown, Reich, and Stern 1991). It is also the case that some elements of flexible work organization, such as employee involvement and problem solving, have been incorporated—albeit with a different vocabulary—in the newly emergent movement.

My strategy will be to develop various measures of establishment practice. I will not insist that any single particular practice is necessary for an establishment to be classified as "flexible"; instead, I will look for a mix of several practices. Second, other aspects of ILM rules—wages, employment security, and so forth—will be treated as supporting HRM practices that are, in my hypothesis, necessary for the successful implementation of flexible work organization. The correlation between these supporting rules and flexible work organization will be examined below.

It is also important to note that although many of the examples and the language describing flexible work systems are drawn from manufacturing, the concept itself is widely applicable. The survey included the complete range of American industries, and they will be included in the analysis. At various points, however, I will distinguish between manufacturing and non-manufacturing.

Work Organization

In this section I examine the distribution and penetration of the work organization practices. The range of actual practices suggests that no single measure or question is likely to be appropriate in all firms. Therefore, the survey asked about four practices (all with respect to the core job family): self-directed work teams, job rotation, employee problem-solving groups (or quality circles), and Total Quality Management. Respondents were asked whether each practice was employed in the establishment and, if the answer was yes, what percentage of core employees was involved. The precise definitions given for each practice are shown in Appendix A.

Table 2 shows the distribution of each practice for two levels of penetration: whether the practice is used at all, and whether at least 50% of core employees are involved.

It is clear that if the relevant criterion is whether a given practice is used among any core employees, we must conclude that the elements of flexible work are quite widespread. For example, over half of the establishments use teams, and 33.5% employ TQM. The picture changes, however, when we look only at flexible work organization practices in which at least 50% of the employees are involved: the occurrence of each practice then falls by roughly 15 percentage points. Even so, the distribution of self-directed work teams is surprisingly widespread. There is clearly much higher use of this practice than of the others.

In the manufacturing blue-collar sample, as in the total sample, there appears to be substantial diffusion of flexible work practices if we examine the use of those practices at any level, and a substantial drop-off in diffusion if we look only at instances in which at least 50% of core workers participate. Self-directed teams appear less widespread in manufacturing than elsewhere in the economy, but the other practices are more common in manufacturing.

These data lead to the natural question of whether the practices form groups from which emerge identifiable patterns that might be thought of as the new systems discussed in the literature. Table 3 shows how the practices cluster together when the 50% participation threshold is used. (Note, however, that no conclusions are changed when other thresholds are imposed.) It appears that there is no single major dominant cluster of practices. Each of the possible combinations is represented, and in most of the cases the distribution of clusters seems rather even.

Fortune 1000 firms in their sample have quality circles and that 47% have self-managed work teams. In both cases the modal degree of penetration is below 20% for those firms that have the practice (Lawler, Mohrman, and Ledford 1992:20–22).

This conclusion changes a bit when one looks for what might be termed an "anchoring practice." Among non-manufacturing establishments in which the core employees were not blue-collar, 71.7% of those establishments that engaged in at least one practice had self-managed teams. Even here, however, nearly 30% engaged in some combination of practices that did not involve teams. By contrast, there is no evidence of an anchoring practice among blue-collar core employees in manufacturing. Job rotation comes closest: among those establishments that engaged in at least one flexible work practice, 56.3% used job rotation and 45.2% teams.

---

As several people have pointed out, the survey did not directly observe the actual work practices. Respondents may tend to exaggerate, in the direction of socially acceptable responses, their actual practices. As already noted, however, considerable care was taken to work with the most knowledgeable available respondent. Furthermore, as the statistical results below demonstrate, the responses are not simply noise; they are correlated in sensible ways with explanatory variables. Nonetheless, as is true in all surveys of this kind, the point estimates of the practices should be treated with caution.

The results of Lawler, Mohrman, and Ledford are broadly consistent with mine. They find that 66% of the
had some combination that did not involve job rotation.\textsuperscript{10}

A final question, which is virtually imposed by the popular discussion, is whether it is possible to provide a summary figure regarding the use of High Performance Work Systems. The numerous definitions in the scholarly literature might lead one to suspect that this is a difficult question to answer, and nothing in these data suggest otherwise. As already noted, there is no dominant pattern.

If we are pushed to state a definition, it might be reasonable to characterize an organization as "transformed" if there are at least two practices in place with 50% or more of core employees involved in each. By this definition, 36.8% of the entire sample, 43.0% of non-manufacturing establishments, and 35.9% of manufacturing establishments are of the new breed.\textsuperscript{11} These estimates are considerably higher than those commonly cited, and although the definition is admittedly arbitrary, it is likely that the truth is much closer to these figures than to those found in popular accounts (recall also that only core jobs are being considered here).

\textbf{Explaning the Distribution of Work Practices}

The next step is to try to understand why some establishments have adopted these various work practices while others have not. I will estimate three models that use alternative dependent variables as measures of the establishments' overall profile with regard to flexible work systems. Details on the estimation methods are provided below.

The independent variables are intended to test many of the explanations that have appeared in the literature concerning variation in the adoption of flexible work practices across establishments. These explanations can be categorized as follows.

\textit{Markets and strategy.} It seems reasonable to suppose that the nature of an establishment's competitors and of its market will influence the choice of work systems. The relationships, however, are not necessarily simple and straightforward. Consider first competitive pressure. Normally, one might expect that an establishment selling in a market with many competitors will face more pressure to adopt the most productive possible work system, and this tendency may indeed lead to elements of flexible work organization. Offsetting this tendency, however, is the consideration that new work systems represent considerable investment, and firms that face very competitive markets may be unwilling to undertake these long-run investments. The variable measuring the competitiveness of product markets is called COMPETIT.\textsuperscript{12}

In addition to the degree of competition in the market, it is also important to consider the identity of the competitors. Much of the pressure to adopt new production systems has come from the example of foreign competitors, and this pressure probably is felt most strongly by enterprises that compete in international markets. In addition to this market argument, it seems reasonable to expect that establishments operating in international markets are more likely to be exposed to new ideas and practices than are those operating only in domestic markets.\textsuperscript{13} The variable INTERNAT is a dummy variable equal to "1" if the establishment sells in international markets.

A second aspect of an establishment's market concerns its competitive strategy. It is commonly posited that employers face the choice of either competing on the basis of cost or competing on the basis of quality, variety, larger values of the price (Piot and Sabel 1984; Cuomo Commission 1988; Kochan and Osterman 1991). In popular discussion, the former is referred to as the "low road" and the latter as the "high road." On the assumption that the latter implies more generous employment conditions (such as wages) and new work systems.

The survey contained a set of questions intended to distinguish between these strategies. I assigned 100 points to the goal of competing on cost and then asked the respondents to indicate how many points three other competitive strategies—quality, variety, and service—would receive for their establishment in comparison. For example, if the respondent considered competing on quality twice as important as the establishment as competing on cost, he or she would assign 200 points to competing on quality.

I employ the first principal component of the three variables, and this component is termed Strategy. Large values of this variable imply greater use of the "high road" strategy.\textsuperscript{14}

\textit{Technology.} An important aspect of technology is its complexity. It is reasonable to expect that the gains from the introduction of flexible work systems, and hence the likelihood that such systems will be introduced, are greater under more rather than less complex technologies. The extent of complexity is measured by Tobin's \textit{q}, which equals \textit{1} if the production process requires high levels of skill and \textit{0} otherwise.\textsuperscript{15}

\textit{Values.} It is well known from anecdotal evidence that firms that appear to observers to be similar with respect to markets, technology, and other structural characteristics nonetheless differ considerably in human resource practices.\textsuperscript{16} One possible explanation for such differences is differing values from firm to firm. For example, firms may differ in the extent to which the enterprise is seen as a community or as a "family." Many observers believe that Japanese employers have more of a community or stakeholder view of their enterprise than do American employers, and this difference helps explain various differences between work practices in the two countries (Dore 1973; Lincoln and Kalberg 1990). Kochan, Katz, and McKersie (1986) cite management values as an important determinant of HRM practices.

About 50% of the survey instrument consisted of a long series of questions about benefits, particularly work-family benefits, and about enterprise values regarding these benefits. This portion of the questionnaire was administered before the work organization questions. As mentioned, the respondents' answers to values questions were not influenced by the work organization section. The key values question in the benefits section was, 'In general, what is your establishment's philosophy about how appropriate it is to help increase the well being of employees with respect to their personal or family situations?' Establishments that responded (on a five-point scale) that it was "very" or "extremely" appropriate were assigned a "1" on the dummy variable VALUE.\textsuperscript{17}

\textsuperscript{10} Again, Lawler, Mohrman, and Ledford find roughly similar patterns. For example, 66% of firms in their sample viewed TQM and various forms of employee involvement as distinct programs that are not managed (Lawler, Mohrman, and Ledford 1995:104).

\textsuperscript{11} The Commission on the Skills of the American Workforce used the criterion of whether firms hired on the basis of a skill as opposed to behavior or ability to "get along." They assumed that firms that sought hard skills used them and hence were high performance organizations. The distinction between hard skills and behavioral skills is not conceptually clear, nor is the assumption that one can go from knowing about hiring rules to understanding work organization. Leaving aside these problems, however, the current survey can also provide estimates along these lines. In an open-ended question, I asked establishments what were their first and second most important hiring criteria for core jobs. I coded their responses into various categories. If high-performance firms are defined as those listing hard skills as their first most important hiring criterion, 36.3% of establishments in the sample were high-performance; if only those establishments that listed hard skills as both their first and second most important criteria are counted, only 15.4% were high-performance.

\textsuperscript{12} The respondent was asked whether there were many firms, a few firms, or no firms selling products or services that competed with the establishment. The variable is coded "1" if there are many competing firms and "0" if there are no competing firms or a few competing firms.

\textsuperscript{13} For example, in the automobile industry quality circles were included in contract language as early as 1973, but were implemented on a wide scale only after pressure from Japanese competitors became intense (Katz 1985).

\textsuperscript{14} The eigenvalue for the first component was 1.806 and the proportion of variance accounted for by this component was 63.2%.

\textsuperscript{15} Respondents were asked to characterize the skill level of the core jobs on a 1-to-5 scale; suriv is coded "1" if the reply was "very skilled" or "extremely skilled."

\textsuperscript{16} In the computer industry, Data General and Digital Equipment Corporation are two firms that have taken very different approaches over the years. In the steel industry, USX and National or Inland are examples.

\textsuperscript{17} The distribution of responses on the five-point scale was 1.7% "not appropriate," 9.4% "a little appro-
**Firm environment.** An increasingly common argument is that some companies fail to transform their work organization because such transformations are long-term investments with considerable up-front costs and uncertainty. Many firms, so it is alleged, face pressures from investors to emphasize short-term profits at the expense of such long-term investments (Porter 1992; Jacobs 1991). The variable horizon measures the extent to which the establishment feels such pressure. 18

There are several other environmental features that may influence the adoption of new work systems. Establishments that are part of larger organizations (a branch plant, for example) may receive greater resources, information, and technical assistance in adopting flexible work organization than do independent establishments. In addition, they may be more likely to adopt flexible work systems due to isomorphic processes of coercion and mimicry (DiMaggio and Powell 1983; Pfeffer and Cohen 1984; Baron, Jennings, Devereau, and Dobbin 1988). A dummy variable larger takes on the value of "1" if the establishment is part of a larger organization.

Size is likely to be related to adoption of flexible work practices, but the direction of the effect is ambiguous. On the one hand, smaller establishments have fewer resources to devote to human resource innovations. The literature on training, for example, demonstrates clearly that small firms train less than do large ones (Bishop, n.d.). On the other hand, the literature on corporate reorganization and decentralization (as well as the policy discussion of networks) suggests that smaller establishments, which are not weighed down by the heavy hand of corporate bureaucracy, are more agile and more likely to adopt new production techniques than are large establishments. In order to test for possible non-linear effects of size, we use a step function, that is, a series of size dummy variables. The omitted category is 100–499 employees. The organizational sociology literature suggests that the age of an establishment (for which the variable age is entered) should inversely influence its rate of adoption of innovations, because organizational forms tend to be "frozen" at birth (Stinchcomb 1965). Finally, whether a union is present seems important, although the expected direction of the effect is not clear. There is considerable anecdotal evidence of unions opposing the kinds of work rule changes that are implied by transformed systems, but there are also instances in which unions have been cooperative and helpful in the process (Katz 1985; Cappelli and Sherer 1989). The net effect is an empirical question. The variable union measures whether employees at the establishment are covered by a union.

The models also include dummy variables for the core occupations and for industry. 18

**Estimation.** An important difficulty is that there is no single obvious way to estimate a model explaining adoption of flexible work practices. One natural strategy is to combine the practices and ask about an establishment's overall rating. This is particularly tempting since, as noted, about a third of the establishments have none of the designated flexible work practices. I will take three approaches to an overall characterization of the establishment. First, I will estimate a logit model in which the dependent variable equals one if an establishment engages in at least one of the practices at the 50% level of penetration and zero otherwise. The advantage of this variable is that it is straightforward and readily interpretable; the disadvantage is that it is a bit arbitrary, since an establishment with 49% penetration is given a zero. A second approach is to use principal components analysis to construct a composite variable from the percentage of penetration of each of the four practices. I therefore create an index that is the first principal component of the four penetration variables, and this is treated as a dependent variable. 18 The third approach is to estimate an ordered probit model in which the dependent variable ranges from zero to four, with each point on the scale representing an additional work practice at the 50% penetration level.

Taken together, these three dependent variables seem to represent the range of ways in which one might form an overall characterization of an establishment. One model (the logit) asks whether any practice is used at all at the 50% level, another (the ordered probit) asks how many practices are used at the 50% level, and the third (the principal components) treats penetration as a continuous variable and creates an index of the four practices. Using all three models permits an assessment of how robust the findings are across specifications. 21

Means for the variables are shown in Table 4, and results of the estimation are presented in Table 5. The first column of Table 5 contains coefficients for the logit model concerning whether the establishment engages in any practices at the 50% level of penetration; the coefficients in the second column are for the principal components model; and the coefficients in the third column are for the ordered probit. The logit coefficients have been transformed so that they have a direct interpretation. 21

21In unreported regressions (using Tobit models) I also estimated models in which the dependent variables were the penetration percentage of each practice. The results of these equations are available upon request. The results are generally comparable to, but slightly weaker than, those reported here. In particular, the strategy variable and the variable measuring whether the establishment is part of a larger organization were significant in the equations for teams and job rotation but not in the quality circles or TQM equations.

22In order to interpret logit coefficients as the marginal change in a probability given a one unit change in the independent variable, they need to be transformed.
issues of work organization. Evidently, independent of any productivity gains to be had from flexible work organization, establishments that believe that they have responsibility for employee welfare are more likely to adopt innovative work practices.

It is also striking that enterprises that sell in international markets are more likely to adopt work reform. This result is independent of the overall level of competition in the market. One possible interpretation of this pattern is that establishments that are exposed to international markets learn more quickly than others about alternative work practices.

The third variable that produces consistently strong results is skill level. As the skill levels required by an enterprise's technology increase, so does the use of the various work organization innovations.

These models also support the view that establishments that follow the "high road" are more likely to adopt flexible work practices. In addition, being part of a larger enterprise, that is, being a branch plant or office, also increases the likelihood of adoption of elements of flexible work organization. Finally, smaller enterprises seem more likely to use innovative work practices.

In none of the equations is there evidence in support of the time horizon argument, nor do the age or union status of an establishment appear to be very important. A related Human Resource Policies

There is a widespread view that work organization changes need to be accompanied by supporting HRM practices. This view follows from an idea found in the internal labor markets literature that groups of rules fit together logically and that it is therefore not possible to randomly adopt particular practices (Osterman 1987). The prescriptive literature has taken a similar perspective (National Research Council 1986). Although it seems unlikely that we will find perfect real world adherence to these ideas (for example, some establishments that adopt flexible work organization without adopting all of the other HRM rules that the literature predicts), it is important both for theory and practice to learn whether there are indeed the kinds of interrelationships among personnel rules that are predicted. I first describe the kinds of supporting rules theory leads us to expect and then examine whether the survey data show an association between these practices and flexible work organization.

In order to achieve the flexibility inherent in systems such as team production, employees must be willing to change jobs more often and to rely less on rigid procedures governing who does what. In this survey, deployment rules were measured by asking two questions, one concerning the importance of employee versus merit in promotions and one concerning the importance of insider preference versus outside hiring in filling vacancies.

Compensation is also a central HRM variable. The anecdotal evidence suggests that many firms that have moved toward more flexible work organization have accompanied the shifts in systems with comparable changes in ILM rules governing wages. These firms presumably subscribe to the theory that when employees are given more power to determine outcomes, they should have a financial stake in enterprise success. There has been an explosion of innovations in pay systems, and the survey focused on three of the most popular: the respondent was asked whether or not the establishment had in place profit-sharing or bonuses; gain-sharing; and pay for skill. Separate questions were asked about each practice.

A second issue concerning wages is whether the establishment paid its employees a wage premium (or what might be termed an efficiency wage). New work systems typically require more commitment, effort, and discretion from employees, and these qualities are just the ones that are alleged in the efficiency wage literature to be produced by wage premiums. In addition, to the extent that the firm wishes to be selective in hiring and establish a pool or waiting line of higher-quality employees, it will also pay a wage premium.

The implementation of flexible work systems would seem to require higher levels of skills than are typically required of employees in traditional production systems. One would therefore expect that investments in training would be higher in transformed work systems. Three training variables are used: one measuring the percentage of core employees who receive formal off-the-job training, one measuring the percentage of core employees who receive cross-training (training in skills other than those used directly in their current job), and one measuring the value placed on skill enhancement relative to other HRM goals. (The last variable is described in more detail below.)

Many advocates of flexible work systems have argued that firms adopting these systems must be prepared to provide enhanced levels of job security (Levine and Tyson 1990).

Causality may, however, run in the other direction. That is, it may be that only firms that are productive due to their adoption of flexible work organization are able to compete internationally. To determine the direction of causality, data on timing both of work reforms and entry into international markets are necessary. The survey did not collect these data.

Lawler, Mohrman, and Ledford (1992:97-98) present the results of a significant test of simple (that is, unconditional) correlation coefficients between the presence of TQM and some independent variables. They find that size, manufacturing, and the presence of foreign competition are positively correlated with the use of TQM, and unionization is negatively correlated.

The transformation is \( \Delta P = \beta_0 + \beta_1 P + \epsilon \), and this expression is evaluated at the mean probability in the sample.
Kochan and Osterman (1990). The logic is that for employees to be willing to give up work rules that provide them a degree of job security (in the sense of limiting the employer's ability to collapse jobs and hence reduce employment), they must be provided employment guarantees in return. Such job security is seen as an important element of the Japanese and even German systems, and a number of the new auto contracts, such as NUMMI and Saturn, have strong employment pledges. On the other hand, there have been widespread recent layoffs even in firms, such as IBM and DEC, that are thought to exemplify flexible work organization. I employ two questions concerning job security. The first is simply whether the establishment had made any explicit or implicit no-layoff pledge. The second is a part of a series of questions asking the establishment to rank various human resource objectives.

At the same time, a variable, respondents were asked to rank several human resource goals. The technique was to assign 100 points to a baseline objective, in this case controlling wage and benefit costs, and then ask respondents to assign points to each of three additional objectives: increasing employee commitment, increasing employee skill, and reducing employment reductions. The first two goals are expected to be positively associated, and the third (employment reductions) negatively associated, with flexible work systems.

The respondents were also asked about their use of temporary and contingent labor. (A distinction was made between in-house temporary help—employees who are on the establishment's payroll—and outside contractors, who are on the third party's payroll. Parallel questions were asked about each category.) The standard argument concerning temporary and contingent employees is that firms use them in order to buffer their core employees from the vicissitudes of the labor market. Since protection of core employees is more important in transformed work systems than in conventional work settings (both because of the higher skill level of these workers and because greater security is necessary to obtain their cooperation in flexible work), a hypothesis is that there will be a higher fraction of contract and temporary employees in establishments that have adopted flexible work systems. A contrary argument is that use of contingent workers and temporary workers signals lack of commitment to investing in permanent labor force.

One might also expect a high priority on human resource considerations in firms committed to new work systems. I asked respondents how great a weight HRM considerations are given when major decisions are taken by the establishment. The five-point scale answers were recoded to equal one if HRM was said to be "very" or "extremely" important.

Table 6 shows the mean value of these HRM variables for the entire sample and for two subgroups: establishments that engaged in any of the work organization practices at a penetration level of 50% or more, and those that did not. In addition, the table provides significance tests for the differences in the means between the two subgroups. These significance tests are based on regressions in which the dependent variable is the HRM practice in question and the independent variable is a dummy for whether the establishment has 50% or more penetration of at least one practice. The regressions also include controls for industry and core occupation.

This analysis shows that a number of the HRM practices are indeed related to adoption of flexible work practices. There is clear evidence that skills and training are important; indeed, all three of the skill variables (percentage in off-the-job training, percentage who receive cross-training, and commitment to increasing skill) are significant. In addition, two of the four pay practices are significant, although neither gainsharing nor the wage premium variable proves important. A high valuation on attaining a committed work force is significant, a result that is indirectly reinforced by the negative and significant coefficient on the use of contingent employees. Finally, the role of the HRM department also differentiates establishments that use flexible work practices from those that do not.

These results support many of the propositions in the HRM and ILM literatures concerning the practices needed to underwrite flexible work organization. 48 The most surprising exception is the lack of evidence that employment security is important. Also surprising is the finding of no evidence that seniority versus merit rules play a role. Both of these sets of variables can be thought of as capturing various aspects of job ownership.

---

48 Some readers might prefer a technique such as cluster analysis to determine if the HRM practices fall together in recognizable ways. Although clustering is a reasonable alternative, as a first-round approach I find the strategy employed here more robust. Cluster analysis can yield numerous alternative outcomes on the same data depending on choices of metrics or distance measures, and there are no tests for goodness of fit (Nunnally 1978:430). Furthermore, simple examination of means tells us that there is no HRM practice that is uniformly associated with the presence or absence of flexible work organization. Hence, the notion of distinct clusters is not necessarily appropriate.

49 These results can be compared to those of Ichniowski (1990), which are based on the survey of Delaney, Lewin, and Ichniowski (1989). Ichniowski did not make the distinction used here between work practices and supporting HRM policies, but rather used cluster analysis to combine a wide range of practices and policies into several groups. The clustering procedure led to the identification of nine groups. These clusters included typical union firms (with, for example, strict seniority and grievance procedures), transformed firms (with flexible job design, high levels of communication between management and workers, and substantial training), and a range of intermediate forms. There was also a substantial number of firms with rules that fell into no discernible pattern. Thirteen percent of the establishments in the sample were the most traditional category, 13% were in the most transformed category, 46% fell between these extremes, and 28% were unclassifiable (Ichniowski 1990:15). Considerable caution is needed in making comparisons between these results and mine, both because of the differences in procedure and because of the very different sampling frames and response rates.
Evidently, contrary to expectations, it is possible to introduce innovations in work practices without reassuring employees that their jobs are not at risk. Some observers explain such results by arguing that workers are constructing their careers via movement among networks of firms rather than by staying put with one employer. On the other hand, in answer to a survey question on whether the expected employment of recent employees was the same as, less than, or greater than in the past, 84% of establishments that had adopted at least one of the four practices at 50% level of use said the stay had lengthened, compared to only 34.9% of establishments with no practice at the 50% level of penetration.

Conclusion

This study has made considerable progress in documenting the extent of the diffusion of flexible work practices and in identifying their correlates. First, about 35% of private sector establishments with 50 or more employees appear to have made substantial use of flexible work organization in 1992. This result is broadly consistent with Lawler, Mohrman, and Ledford's 1992 investigation of quality programs in Fortune 1000 firms. Second, the findings strongly confirm that a number of variables are positively associated with the adoption of flexible work practices: a market with international competition; a high skill technology; worker-oriented values; following a high-road strategy (emphasizing service, quality, and variety of products rather than low cost); and being part of a larger organization. Also robust are the findings that neither the presence of unions nor pressure to turn short-term profits seems to be an important consideration. The results also allow the identification of a set of HRM practices that underwrite adoption of flexible work systems. Chief among these are innovatory schemes, extensive training, and efforts to induce greater commitment on the part of the labor force. By contrast, neither employment security nor policies on seniority versus merit as a basis for promotions seem to be important.

In addition to their interest as previously unavailable descriptions of national practice, these results can be read as supportive of many of the internal labor market theories that have emerged in the past several years concerning work reorganization. On the other hand, the results also contradict some important expectations. There do appear to be systematic differences between establishments that adopted no flexible work practices and those that adopted at least one (as indicated by the results of the logit model). Among firms in the latter category, however, the work practices did not seem to cluster together into a natural formation that one might characterize by any of the popular labels—"high performance work organization," for example, or "transformed" firms. Also quite surprising is the unimportance of some of the HRM practices, particularly employment security, as predictors of the use of flexible work organization.

These anomalies invites some reconsideration of received wisdom, but the implication is far from clear. One possibility is that we are observing aberrations in the process of change, and that after some more practices will be adopted and the clusters expected to find will emerge. There is some support in the survey for this idea, given that 49.1% of the firms, 80.6% of the job rotation practices, 71.1% of TQM programs, and 57.9% of problem-solving groups or quality circles were initiated within five years prior to the survey year of 1992.

Also possible, however, is the considerably more dramatic interpretation that we have been misled by a few well-publicized cases. In the United States there may be many paths for work reform. If that is so, we will want to know much more than we do about the pros and cons of different choices. In addition, the unimportance of employment security may reflect substantial changes in the boundaries of firms and internal labor markets. At a minimum, it seems to me that these data indicate that it is too early to construct "ideal types" of internal labor markets or "transformed" firms. We need instead a considerably more textured understanding of the range of practices and the direction of change.

APPENDIX

Following are the definitions the interviewers used when the respondent requested clarification.

Self-directed work teams: Employees supervise their own work, they make their own decisions about pace and flow and occasionally the best way to get work done.

Job rotation. Self-explanatory example: In some banking firms you spend six months in the real estate division, 6 months in pension plans, etc. Simply rotating jobs.

Problem-solving groups/quality circles: Quality programs where employees are involved in problem-solving.

Total Quality Management. Quality control approach that emphasizes the importance of communications, feedback, and teamwork.

REFERENCES


For example, this point was made by my colleague Charles Sabel in a conversation.


