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Edited by Casey Ichniowski, David I. Levine, Craig Olson and George Strauss

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## CHAPTER 1

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# What Works at Work: Overview and Assessment

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The past two decades have witnessed considerable experimentation and research on new work practices and human resource policies. Why have businesses adopted them? What has been their effect on performance?

This study has two primary goals. The first is to review features of the research methods employed in studies on workplace innovations. This review of methodological issues serves as a framework for evaluating existing studies and to encourage new research on workplace innovations to incorporate the most persuasive research designs possible. The second goal is to review the findings from a broad set of studies that employ different research designs. Because different research designs have their own particular strengths and limitations, we highlight those results that emerge consistently from different studies. Much more than a typical volume introduction, this chapter presents a critical review of the strengths, weaknesses, and results of research on what works at work.

### The Nature of Workplace Innovations

The term “innovative work practices” has no settled meaning. For many scholars and practitioners it refers to employee involvement efforts such as work teams (e.g., Katz, Kochan, and Gobeille, 1983). For others, it means employee participation in the financial well-being of a company such as profit-sharing, employee stock ownership, or pay-for-performance. Still others have in mind flexible and broadly defined job

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assignments, employment security policies, or improved communication and dispute resolution mechanisms. Often, managers and workers refer to a special workplace “culture” that is not easily captured by the measurement of a single work practice.

What these diverse work practices have in common is that they depart from the traditional work systems and labor–management relationships that evolved in the United States out of the “New Deal system of industrial relations” (Kochan, Katz, and McKersie, 1986). The traditional system is characterized by tightly defined jobs with associated rates of pay, clear lines of demarcation separating the duties and rights of workers and supervisors, decision-making powers retained by management, and the channeling of communications and conflicts through formal chains of command and grievance procedures. Current workplace innovations seek greater flexibility in work organization, cooperation between labor and management, and worker participation in the decisions and financial well-being of a company. In this chapter, we use the term “workplace innovations” or “new work practices” to refer generally to all these kinds of non-traditional work practices that have become increasingly common among U.S. businesses in recent years (Ichniowski, Delaney, and Lewin, 1989; Osterman, 1994; Lawler, Mohrman, and Ledford, 1995).

### *Theoretical Explanations*

Elaborate theories have been developed to explain why new high-skill, high-involvement workplaces may be more effective (for a review see Levine, 1995). These can be divided into theories that focus on the effort and motivation of workers and work groups and suggest that individuals work harder, and theories that focus on changes in the structure of organizations that improve efficiency.

High-involvement workplaces may lead workers to work harder if the work is less onerous. Workers may enjoy work more when the characteristics of the job make work interesting and ensure that the work provides feedback and rewards. They are also less likely to resent a job if they help design it.

Innovative work practices may also lead workers to work more efficiently. Workers often have information that higher management lacks, especially as to how to make their jobs more efficient. Further, greater participation permits a variety of views to be aired, and many such views lead workers to redesign their jobs so that they can better coordinate their efforts. Indeed, Berg, Appelbaum, Bailey, and Kalleberg (Chapter 3, this volume) conclude that in the apparel plants they studied “working

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smarter” is more important than any changes that make work more interesting or enjoyable. Work groups may encourage both working harder and working smarter if their norms change from discouraging high performance – for example, by punishing “rate busters” – to rewarding high performance. These changes, in turn, are more likely if the group is rewarded for its collective success, perhaps with bonuses or gainsharing.

Innovative work practices can also produce structural changes that improve performance independent of their effects on motivation. Cross-training and flexible job assignment can reduce the costs of absenteeism; decentralizing decision-making to self-directed teams can reduce the number of supervisors and middle managers required while improving communication; training in problem-solving, statistical process control, and computer skills can increase the benefits of new information technologies; worker and union involvement in decision-making can reduce grievances and other sources of conflict and thereby improve operating efficiencies. These kinds of organizational changes that are often associated with employee involvement processes make it difficult to isolate any single causal mechanism that produces their effects on economic performance.

Thus, theories of new work practices imply that these new arrangements can cause workers to work harder and share more ideas. Further, they can make organizational structures more efficient regardless of any effects they may have on worker motivation. In either case, companies that adopt these practices should enjoy higher productivity and quality (as in Berg et al., Chapter 3, and Kelley, Chapter 4, this volume), leading to lower costs and higher product demand, all else equal. But any savings may be offset by the expenses of employee involvement programs, such as the costs of extra meetings and of related human resource policies. Cost reductions and stronger demand, holding other things constant, should lead to higher sales and earnings (Dunlop and Weil, Chapter 2, this volume) and ultimately better performance on financial measures such as cash flow and return on investment. Ultimately, these financial improvements should be reflected in the value of the enterprise’s stock (Huselid and Becker, Chapter 5, this volume).

Performance measures vary widely, from those close to the workplace such as worker stress (Berg et al.), to intermediate outcomes such as machine time per piece in the machining industry (Kelley), to outcomes quite distant from the workplace such as stock market value (Huselid and Becker). For public policy, knowing the effects of innovative work practices on workers and productivity may suffice. For private-sector decision-makers, such as investors and managers, financial and stock

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market returns are the arbiters of success. Because these latter groups have far greater influence on management practices than do union leaders or policy-makers, we need to know how work practices affect the bottom line. Unfortunately, as discussed later in this chapter, a number of factors imply that even fairly successful workplace innovations may have effects on financial performance that are difficult to detect.

Recent research further suggests that high-involvement work practices are more effective when “bundled” with supporting management practices (Milgrom and Roberts, 1990, 1993; Holmstrom and Milgrom, 1994). Workers cannot make good decisions without sufficient information and training, and they are unlikely to make suggestions if they feel this will cost them their jobs or reduce their pay (Levine, 1995, ch. 3). Dunlop and Weil, and Pill and MacDuffie (Chapter 6, this volume), shed light on theories of “internal fit,” that is, how bundles of work practices support, or fail to support, each other.

The external context also matters. For example, bundles of work practices that support a highly flexible work process may be effective in a product market with rapidly changing demands, but have fewer advantages in a stable market. Dunlop and Weil find evidence that the organization’s environment in the apparel industry has affected who adopts innovative work practices and how effective they are. More generally, they argue that new work practices must be analyzed within the context of the organization’s overall strategy and market environment, not as an isolated human resource policy initiative.

#### *Types of Workplace Research*

It may be useful to place the research reported here in broader perspective. Empirical research began with laboratory experiments. These identified the theoretical principles that might underlie effective work practices such as participation and goal setting. Unfortunately, what works in a short-term laboratory experiment (often with college students) may not work in the real world. Early field experiments in workplaces were more realistic, but usually were confined to single departments, lacked controls, and lasted for short periods of time (e.g., French and Coch, 1948; Whyte et al., 1955).

The late 1960s and 1970s saw experiments in which various forms of employee involvement were introduced into entire plants. The effects of these workplace changes on various outcomes such as attitudes, production, accidents, and turnover were carefully monitored, both qualitatively and quantitatively and over considerable periods of time (e.g., Marrow, Bowers, and Seashore, 1967; Goodman, 1979). These studies raised most

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of the issues of current concern, such as resistance to workplace innovation by both unions and management, and the importance of having appropriate training and compensation practices. The past few years have seen a wave of innovative case studies, many based on Japanese transplants (Fucini and Fucini, 1990; Graham, 1995; Adler, Goldoftas, and Levine, 1997). These case studies provide insight and suggest hypotheses, but it is difficult to know how well they generalize.

Recently, workplace research has expanded to include surveys (often rather small ones) of firms, lines of businesses, and establishments. By contrast with case studies, surveys cover more than one establishment and their purpose is more often to test theories than to generate them. These surveys can be grouped under three headings.

First are the major government-sponsored British (Millward, Stevens, Smart, and Hawes, 1992) and Australian (Callus, Morehead, Culley, and Buchanan, 1991) surveys of workplace practices, which involve stratified random samples of large and middle-sized workplaces. With high response rates (87% in the Australian case), these provide a wealth of data about the incidence of various practices, but tell us little about their impacts. The closest U.S. equivalents of these studies are a survey conducted by the Government Accounting Office (GAO) with two follow-ups by a University of Southern California group (Lawler et al., 1995), a line-of-business survey by Columbia University researchers (Delaney, Lewin, and Ichniowski, 1988), a study by Osterman (1994), and the two waves of data analyzed by Huselid and Becker. Most of these U.S. studies are based on firms or lines of businesses, permitting analysis of financial performance. At the same time, most of the companies implement a mixture of work practices among their multiple workplaces, making it difficult to determine the particular impact of practices that may be employed in only some of the workplaces. In addition, rather low response rates lead to concerns about these studies' generalizability. (Osterman, 1994, surveys establishments, gaining greater precision in measurement while foregoing most measures of overall organizational performance.)

Each study in this volume has some measure of *incidence* (how frequently a given practice is employed). When incidence studies are repeated, it becomes possible to study the *adoption* and cessation of work practices. For example, Pil and MacDuffie examine the adoption of work practices in the world automobile assembly industry. Adoption studies also provide a weak test of effectiveness; presumably, work practices that managers adopt are those they expect to be successful. Studies of longevity often find that the half-life of many innovations is short, suggesting that their effectiveness is often less than managers had expected

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(Drago, 1988; Eaton, 1994). Similarly, Dunlop and Weil found that when innovative work practices in the apparel industry were introduced before related changes in customer relations, the innovations did not last long.

A second set of surveys include matched sets of workplaces in more than one country (e.g., IDE, 1983; Lincoln and Kalleberg, 1990). These studies examine how work practices correlate with employees' attitudes. But they are often based on samples of convenience, leading to concerns about how well the results represent the true incidence of work practices in the economy. In addition, the fact that the establishments covered produce many kinds of products and services precludes common hard measures of outcomes such as productivity.

Three of the studies reported in this volume (those of Kelley, of Dunlop and Weil, and of Berg et al.) represent a third line of research, which focuses on the effects of workplace practice on organizational performance in specific industries. This focus makes it possible to make more precise measurements of performance, work practices, and control variables. In addition, within-industry studies automatically control for factors that differ among industries. This approach also enriches the quantitative analyses with the authors' detailed knowledge of each industry's history, technology, industrial relations, and product market.

**Methodological Issues**

What kind of studies would provide the greatest confidence about the direction and magnitude of the performance effects of innovative work practices? Case studies may provide rich insights, but one can never be sure if case study results generalize to other settings. While case studies can be very useful for suggesting hypotheses, one must ultimately study larger samples to test those hypotheses. To go beyond case study descriptions, an ideal study would have high internal validity, meaning that explanations (other than the ones being investigated) for an observed correlation between performance and work practices could be ruled out. The ideal study would also have high external validity – that is, its results could be generalized to infer the likely impacts of new work practices were they introduced outside the sample studied.

The ideal design for ensuring high internal validity is an experimental design with the random assignment of innovative work practices. In such a design the best estimate of the effect of high-involvement work practices is provided by the following regression (where Innovative Work Practices is a dummy variable equal to 1 if an organization has innovative work practices):

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Organizational Performance<sub>*i*</sub> $= a + b$  Innovative Work Practices<sub>*i*</sub> + Residual<sub>*i*</sub>

The goal of random assignment is to ensure that on average the treatment and control groups do not differ in terms of other organizational characteristics affecting performance such as management or worker quality. Thus, with random assignment, the mean difference in performance between the two groups (parameter  $b$  in the equation) will on average reflect only the impacts of the innovative work practices in question.

The external validity of an experiment depends on how closely the research sites resemble the workplaces we might like to understand. If an experiment is based on college students formed into teams that work together for a single hour, we may be skeptical about whether the findings would apply to long-term employees of real businesses. Thus, we would have greater confidence in the external validity of a design that involved the random assignment of a high-performance intervention to half of a sample of workplaces in a single industry or single firm and left the other half unaffected.

No large-scale studies have used this design and it may be impossible to achieve. Our purpose is not to discourage research in the area, but to lay out this ideal type and use it as a framework for evaluating the research. How close have existing studies come to a true experiment, and what are the directions for future research in this area?

*Omitted Variables*

The key benefit of an experiment with random assignment is that the innovative work practices are uncorrelated with other worker and organizational characteristics that affect performance. The non-experimental studies described in this volume and elsewhere lack random assignment. Some studies attempt to control for omitted variables by studying a single industry or technology. Others attempt to control for omitted variables by measuring and statistically controlling for variables that affect performance and are correlated with whether or not organizations introduce innovative workplace practices.

For example, organizations that adopt innovative work practices may have “higher-quality” workers. Similarly, those with “higher-quality” management teams may both introduce new workplace practices and pursue more imaginative marketing, finance, and R & D strategies. So to what extent is improved performance due to work practices alone? Self-

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selection, which occurs when organizations that introduce workplace innovations are more likely to enjoy other good practices as well, implies that the estimated effect of innovative workplace practices will be greater than the true effect.

The opposite form of self-selection processes predicts that less successful organizations are the more likely to innovate. Firms may adopt workplace innovations only because they are in trouble. By contrast, a highly successful organization may develop “competency traps” and be unwilling to depart significantly from existing policies, which the organization believes are responsible for its success (March, 1988). So, when troubled companies are most likely to experiment with new practices, even successful programs may appear to be failures. That is, these forms of self-selection cause the non-experimental estimates to be biased downward relative to the true effect.

If the omitted variables are relatively stable over the study period, then by using longitudinal data to examine whether changes in work practices predict changes in performance, one can control for omitted factors such as workforce or management quality (Huselid and Becker). At the same time, these gains may be offset by greater measurement error of innovative work practices. If the omitted variables are not stable, the only remedy is to identify them from theory, measure them, and attempt to control for them statistically in the analysis.

If the same diffusion process applies across industries and firms, even the average estimate of the performance effect of innovative work practices across a number of industry studies will be biased. Alternatively, if in some industries high-performing firms implement innovative work practices and in other industries low-performing firms are early implementors, the average effect from the studies may not be seriously biased. This observation has two implications for future research. First, in order to better understand the effect of innovative work practices on performance using non-experimental studies, we need more studies like those of Pil and MacDuffie and of Dunlop and Weil that examine the diffusion of innovative work practices and that try to identify the links between past performance and the decision to pursue an innovative work practice strategy. Ideally, this would include both quantitative studies of diffusion and rich case studies that, for example, might contrast an early innovator in an industry and follow this up with a study of a later innovator.

Studying the diffusion process also involves studying the survival of innovative work practices. When firms abandon innovative work practices, does this indicate poor fit with other firm policies (e.g., Dunlop and Weil), poor implementation, or a poorly chosen bundle of work prac-

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tices? In the absence of experimental control, it is critical that we study the implementation process to improve our understanding of the correlation between innovative work practices and the many variables that affect organizational performance.

### *Response Bias*

Even if an appropriate sample is selected, if survey respondents and non-respondents differ in important ways, the results may be biased. Such response bias can induce a correlation between performance and variables affecting performance that are unobserved by the researcher (the residual in our equation) even where there is no correlation in the population.

Researchers usually rely on data from establishments or firms that voluntarily agree to be observed or agree to complete a phone or mail survey. The need for cooperation introduces the possibility that firms that enjoy above-average success with their workplace innovations are more likely to participate than those less successful. The latter may prefer to remain silent. Thus, the study may overstate program gains.

Longitudinal studies require ongoing organizational participation, something that many organizations are unwilling to provide. Huselid and Becker's study is based on 218 firms (out of about 3,500) that gave usable responses in both waves of their study. This modest response rate is typical of studies of this type, but is clearly a cause for concern. Those who conduct longitudinal studies must not only worry about whether the respondents in the initial wave are a random sample of the population, but also be concerned that attrition between waves may be related to performance. This is almost certain to be a problem, because failing firms by definition do not respond to the second wave.

The best solution is a large random sample with a very high response rate. To date, U.S. researchers have not been able to combine these desirable features. (British longitudinal surveys, by contrast, have response rates of more than 80% [Millward and Stevens, 1986].) Ultimately we need a better understanding of why organizations agree to respond to workplace practice surveys, and the ability to track the history of non-responding organizations as well as respondents.

### *The Unit of Observation*

In the ideal field experiment, innovative work practices are applied to all workers in one randomly selected group of organizations and not to another. Then the performance of workplaces that received the inter-

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vention is compared with that of workplaces which did not. An experimentalist would not include in the measure of performance for the treatment group the performance of workplaces that were not subject to the treatment. If not all the workers in the treatment group actually worked in workplaces with innovative practices, the estimated effect of the new work practices would only be less than the true effect. This bias suggests that estimates based on corporate-level performance measures (Huselid and Becker) are likely to be lower-bound estimates of the effect of innovative work practices.

To see the problem, consider the example of a well-run employee involvement program that raises productivity by 10% in those workplaces in which the program is introduced; however, as is the case with most companies studied in this volume, only 20% or so of the employees are involved. Assume further that the kinds of measurement error discussed in the next subsection reduce the estimated impact by one-half, as is likely with such difficult-to-measure constructs as employee involvement. Thus, it would seem, employee involvement increases productivity by only 1%. If some of this productivity gain is split between workers and shareholders, the impact of these innovations on profits and stock market value will be less than 1%.

It is important to study the effects of innovative work practices on financial performance because investors and managers focus on these measures. However, our example shows that the lack of a sizable effect on financial outcomes is likely when a fairly effective innovation affects only a small group of workers while performance is measured over a broader sample of workers. In particular, we should be reluctant to accept the null hypothesis that the work practices have no effect when the unit of observation for the performance measure differs substantially from the treatment unit.

*Measurement Issues*

In an experiment, the researcher has a well-defined treatment and typically performs a manipulation check to ensure that the implementation of the treatment was effective. Also, because the experimental researcher controls who does and does not receive the treatment, there is typically no measurement error caused by incorrectly measuring whether a subject was in either the treatment or the control group. Non-experimental researchers evaluating innovative work practices lack the luxury of experimental application of the intervention, leading to a number of sources of measurement error.

Many of the constructs central to innovative work practices are based