awards for those articles and books, and she has won awards for her teaching as well. Within her home university, she has served both on the labor side and on the management side. In the latter role, she was head of the Department of Industrial Management. In the former, Professor Shaw served as Chair of the Faculty Senate, which is the closest body in the university world to a labor organization. She earned her Ph.D. in economics from Harvard University in 1981, and since then has been teaching at Carnegie Mellon University in the Department of Economics. With that, I will turn over the microphone to Professor Kathryn Shaw. At the conclusion of her remarks, I will introduce our second speaker.

II. INNOVATIVE HUMAN RESOURCE PRACTICES AND WORKPLACE EFFICIENCY

KATHRYN L. SHAW*

As advocates and arbitrators, you play key roles in both shaping and administering labor policy. For that reason alone, I am delighted to have this opportunity to speak to you about some of the issues that have been on my mind for years. To a small extent, they are on the minds of the Council of Economic Advisers as well. The three of us who are members of the Council of Economic Advisers advise the president about economic policy. I am the "micro" adviser. That means that I cover labor issues, basic employment policy, and a broad range of issues from welfare and Social Security to prescription drugs. We advise the president through working groups that formulate policy and through papers that we write. For example, we've written recent papers on gender pay equity and information technology, we're in the middle of writing on Hispanic pay equity, and we've written others on family-related issues.

This summer we're developing a paper on what we'll call the "new economy." Specifically, we're focusing on the roles that information technology and organizational change will play in this new economy. As you turn to the macro dimension of the economy, everything looks very good. Overall, we're at record low unemployment rates not seen in decades. Some subgroups of the population, including women and Hispanics, are at record low rates as well.

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Similarly, our productivity growth rate right now is very high. We are approaching 3 percent trend productivity growth, which means that we are becoming wealthier at a more rapid rate. It means that many people are doing very well and feeling a lot better about it.

The search for workplace efficiency has been driving part of this economy, and it plays a big part in all of our lives. I'm going to discuss the search for efficiency gains in terms of innovative human resource policies and practices, information technology, and capital investments. Then, to a much lesser extent, I'll cover reductions in force and reorganization.

The focus of my research in these areas can be reduced to a few important questions: (1) Do innovative human resource practices improve employee performance? (2) What is the optimal set of practices? (3) How does information technology interact with these practices?

Between 1995 and 1997, a group of us studied integrated steel mills. As we began this research, we wanted to learn what the steel industry was all about from a human resource management perspective. We learned initially that managers in the industry often had two things to say about innovative human resource practices. First, they felt that new human resource management practices were going to be absolutely essential for the steel industry to improve its competitiveness. Second, in contrast, we found an equally prevalent view that teams, information sharing, and "all that participation stuff" have been a "dismal failure." These opinions were advanced by two steel mill area managers who felt that they had more than enough experience to make such assessments. Opinions are just that, but what about the data? Do productivity data support the claim that progressive or participatory human resource practices increase performance?

In the steel industry today, everyone takes an engineering perspective of sorts. There is great capital and information technology investment, because engineers walk up to the managers who run the company and cite high returns on capital investment as justification for investing.

But what about investments in people and human resource practices? Firms and business schools wanted to know whether a return on investing in people and practices could be quantified. And so that's what we set out to do. We made multiple plant visits, selected one type of production process, then identified the mills that used it. The sample consisted of integrated mills that make flat rolled steel. We wanted to conduct interviews to get a qualitative

sense for the mills. Most important, though, we wanted to gather data that might help us quantify the returns generated by human resource investments.

We did our work in integrated mills owned by about 21 different companies. The mills were dispersed throughout the United States. We primarily collected monthly productivity and yield data to try to find out whether they were affected by human resource practices. We obtained about 2,000 observations on line-specific productivity at 45 mills over about a five-year interval in the mid-1990s. We visited Japan as well and were able to obtain comparable data.

We attempted to create definitions of groups of practices that we called "systems" and identified four such systems that seemed to be in place on the shop floor. The first one is what we call the "high-performance system." Think of the Japanese system in the early 1980s, before certain elements of it transferred here. It is a participatory system that houses many innovative human resource practices. The system is characterized by extensive information sharing, extensive skills training, implicit or explicit employment security, teamwork mechanisms, extensive employee participation, job flexibility, and some form of multi-attribute incentive pay. Steel lines that had all of those practices in one form or another are termed "high performance."

The second type of system we called "high teamwork." This system didn't include all of the aforementioned practices but emphasized teamwork. The third system we called "high communications," because it embodied improvements in communication structure but didn't really go to the next step of high participation. Finally, "traditional" meant any system that had no innovative practices. Traditional systems provide very little communication between workers and management at the local plant level. They do not consider participation a job responsibility.

Using the traditional system as the base, we found that adding employee participation and communication improved the uptime (i.e., the time the line is up and running) by an estimated 2 percentage points. If you add high participation and teams, it improves relative to the base by 3.5 percentage points. So, for example, a production line operating 90 percent of the time could advance to being up and running 93.5 percent of the time.

No mill or production facility ever runs 100 percent of the time, but they try to approach that level through adopting various innovative human resource practices. The "high-performance"

systems we studied in the United States are completely comparable to the mills we visited in Japan. They experienced the largest gains, bringing them up into the range of about 97 percent to 98 percent uptime.

In this study we attempted to control for technological differences. The Japanese lines were not more sophisticated technologically than our best lines in the United States, but we tried to control for differing technologies and then estimate the effects of human resource practices and policies on performance. We found some quantitative differences, which, as always, are subject to interpretation. In trying to determine why innovative human resource practices are effective, at each site we talked to area managers, local union representatives, and to some extent the production workers who were doing work on the line. We concluded that innovative human resource practices really prepare workers for taking on-the-job actions and thus controlling production lines more effectively.

We found illustrations of how practices seem to enhance workplace efficiency. For example, some firms communicated to production line employees the nature of the competitive environment in which their products are manufactured and marketed. Still others provided opportunities for employee action, allowing them to make decisions relevant to their day-to-day work and providing incentives for doing so. I use the word *incentives* here, because in part we talk about incentive pay. In a steel mill, it could mean quality tons off the line. But incentives can and do have a much broader impact. The "pay" associated with them is not all monetary. There are also intrinsic rewards that stem from enlightened human resource practices—the feeling of recognition and the satisfaction of a job well done.

A high-performance human resource environment usually provides both monetary and nonmonetary incentives. They co-exist comfortably. What is the optimal set of practices? To address that question, we constructed a "payoff matrix" with the extent of teamwork on one axis and the extent of the use of incentive pay on the other. The matrix illustrates various combinations of teamwork and incentives, to demonstrate how they pay off respectively. For example, one might have very low incentive pay and very low teamwork and therefore reap no payoff from either. Alternatively, there could be high levels of teamwork with little associated intrinsic or extrinsic incentives, and thus the payoff from the teamwork is likely to be very low. Thus, we believe some combination of teamwork *and* incentives is necessary to enhance workplace efficiency.

Ideally, firms that implement innovative human resource practices should experience a payoff from doing so. But the introduction of only one of these practices is unlikely to generate even a minor payoff. Thus, a slow, sequential introduction of practices can be very discouraging. The firm experiences very little payoff from each practice as it is introduced, because there are no corresponding practices to enhance value.

After observing the mills in our sample, we concluded that the high-performance human resource systems work because multiple human resource practices build trust, while individual practices do not.

I'm an economist. I am rigorously trained in econometrics and other esoteric academic research techniques. Yet here I am talking about trust. All of you folks are comfortable with that. It took me a while to get comfortable. But let me give you an example of what convinced me as we did our plant visits. When you walk into a mill and see employees starting production shifts, you see them participating in problem-solving teams. These are off-line team meetings designed to improve efficiency. At the off-line team meeting, you eat the doughnut and drink the coffee, but you don't do anything meaningful unless you trust that there's going to be some reward associated with your activity. The reward could be implicit (e.g., greater job satisfaction in the long run) or it could be explicit. It could be the feeling that you've contributed to greater efficiency on the line, you're going to be able to negotiate more generous contracts over the long run, and you're going to see some economic gains from this. But you have to trust managers to reward you later. To an economist, these are sophisticated models with reputation effects, but the bottom line is that trust is the key. That's what I'm going to emphasize for the next portion of my comments.

Throughout our study, we recorded some interesting quotes from the participants. Many were related to the concept of trust. One, which reflects a new twist on an old sentiment, is this:

> At the end of the slow period, we forced all the workers who hadn't already scheduled their vacations to take the week off. That was a mistake. It destroyed the cooperative spirit that had been developing or building around here. It's taken a long time to rebuild that spirit. It would have been better to have the workers do more maintenance or training.

It reminds me of how I train my kids. I tell them, "If you tell one little lie, then when can I trust you?" And that's the difficulty in making labor-management relations work. It's easy to slip into that one little lie, that one cost-effectiveness issue, but if you are trying

to build a structure of trust, then you must engage in a broad range of communication to get past that mistake.

Now let's talk about working smarter. When we visited these mills, both managers and employees said that production workers—the operators on the line—bring incredible talent and skill to the mix. And it's a type of skill that the engineers sitting in some cubicle in some other part of the mills simply don't have. We saw this quote and its equivalent repeatedly from managers: "We found out their ideas were often better than ours." That sentiment speaks volumes about the efficiencies that employees in an enlightened human resource environment can provide. As I said, maintaining trust is not easy. You must believe that there's a payoff. I believe from my research that there's an economic payoff to human resource practices that provide employees with information about the organizations that employ them, and that give them the opportunity to influence their operations.

Let's talk now about pay for performance. I visited some high-tech medical technology firms over the past couple of days, and everyone had stock options. The rest of us don't have stock options, for the most part, but we may enjoy some other kind of bonus system. The question is: Are these bonuses very valuable? There are many disadvantages to using specific incentives. For one, you get what you pay for, and a current example is education. Testing students and making teachers accountable for the results motivates teachers to teach to the test. That can happen anywhere, in any industry. An outcome too narrowly defined can diminish the effectiveness of broad intrinsic rewards—like the joy of teaching, for example. Although the high-tech medical technology firms I visited can't possibly pay what the "dot coms" pay, their employees stay because they feel they're building a product (heart valves) that saves lives. Organizations should avoid defining incentives so narrowly that they prevent employees from experiencing the intrinsic rewards that commitment can offer.

Few performance measures can encompass the full range of desired work outcomes. One reason we talk about testing with teachers is because it's so hard to measure everything else teachers do. But there are big advantages to pay for performance systems. Employees want to know what's in it for them if they contribute. In California, we see stock options gravitating toward the production worker level. They want to share in the rewards the company enjoys on account of their efforts. So they ask, "What's in it for me?" People respond to incentives. If you offer multidimensional incen-

tives in which pay depends on multiple performance indicators, then you're less likely to have that single dimension problem we discussed regarding teachers.

Let's now turn our attention to information technology (IT). I'm currently visiting medical technology and other firms to understand what's behind the national productivity gains and figure out what's really going on. You can't find a steel mill today that isn't computerized. Information technology is the name of the game. Production workers sit at computerized pulpits, monitoring screens and entering data with keyboards. They input command information based on electronic feedback from gauges on the line. And as you observe these mills, you can't help but conclude that these IT practices are performance enhancing. These new mills, being run through computer control, are producing a higher quality of steel than they did with the manual labor systems of the past.

But it's very hard to quantify the IT contribution. I believe that many of the recent productivity gains we're seeing in the economy stem from a return to IT. But I want to emphasize that human resource practices and IT are complementary. Consider that steel pulpit. The production worker is getting lots of information, not only about the production line, but about all kinds of elements of the production process, from order entry to shipment, and even to profitability. With so much information in the hands of production workers, it's important to allow them to optimize its usefulness. Giving them decisionmaking authority for selected production issues is one approach. It qualifies as an innovative human resource practice—indeed, one that is complementary to the information technology.

Why have I chosen to discuss innovative human resource practices with this group? As I said at the outset, as arbitrators and advocates you shape, maintain, and alter human resource policies and practices. As you do so, remember the complementary relationships among them. Recognize the importance of building and maintaining trust in the workplace. It can generate bottom-line performance effects.

In the steel industry, the adoption of innovative human resource practices has not taken place overnight. It has taken a long time to make such changes, because the parties were invested in old ideas about how people relate to one another. There were old hierarchies very resistant to change. There were low levels of trust between management and labor. It is very difficult in such

circumstances to regain trust and maintain it at a high level. As a result, it often takes building a new plant to recognize the "capital investment" element of innovative human resource practices.

It is very difficult to make incremental adjustments, but this is the more common approach, rather than broad-brush, wholesale changes to entire human resource systems. As you make an incremental adjustment, in your day-to-day work lives, in bargaining, etc., you've constantly got to talk about where you're going, how you're going to get there, and how it's going to make a difference. Otherwise, you feel you're never getting anywhere with those incremental practices.

When I discuss the steel industry, people ask what role the union plays in innovative human resource practices. My first response is to cite the United Steel Workers of America. They have negotiated many contract clauses that provide for joint labor-management participation, decisionmaking, etc. My research has not focused specifically on how unions have affected the transition from traditional to innovative human resource practices. I can tell you, though, that in some of the smaller firms and plants I've visited, the unions have been very supportive of adopting innovative practices. They have added a voice and structure that management lacked, particularly where management was focused on the bottom line and not on investing in people over the long run. That is anecdotal evidence to be sure, but I think it is significant.

In conclusion, I'd like to remind you of the essential role that trust must play in any reorganization affecting the way employees help a firm reach its objectives. Employees' contributions should not be too narrowly defined. Rather, multiple performance dimensions should be identified and rewarded. Innovative human resource practices represent a capital investment that enhances performance. They build critical social and knowledge capital among production workers.

Let me hasten to add that not everyone should adopt innovative practices such as those we've discussed this afternoon. For example, in a simple service or single commodity firm, there may not be a big role for innovation. Innovation is more valuable when you're running a complex process. U.S. firms have been moving commodity production to China, so innovative human resource practices are crucial for enhancing efficiency in the more complex work environments that remain here in this country.

Finally, what about the future? In the 1980s, we experienced technology shock. Everyone wanted to emulate the Japanese. In

the 1990s, we were still adjusting to this technology shock and other attempts to improve workplace efficiency. The adjustment got easier as employees became more and more accustomed to having decisionmaking authority. Productivity is rising. Numerous studies have pointed that out, and economy-wide productivity is flourishing. To ensure that such gains continue and even increase, labor and management must work together. They must jointly embrace innovative human resource practices and information technology, and continue to recognize the strong common interest they have in doing so.

Thank you.

III. INTRODUCTION TO JONATHAN HIATT

ROBERT GORMAN

I am now pleased to introduce Jonathan Hiatt, who is General Counsel to the AFL-CIO under President John Sweeney. Mr. Hiatt will respond to some of the issues raised by Professor Shaw and will share his perspective on additional matters as well.

IV. THE IMPACT OF ARBITRATORS ON WORKPLACE EFFICIENCY

JONATHAN P. HIATT*

Thank you, Professor Gorman. When I was invited to be the respondent to a professor from Carnegie Mellon, I assumed the conference planners were looking for controversy. So it may disappoint some of you that, try as I might, I find it difficult to disagree with most of Professor Shaw's remarks. Therefore, let me just comment briefly on a few of her conclusions, and then turn to two other related aspects of the "relentless search for efficiency in the workplace," in which, I would suggest, this particular audience of arbitrators is implicated.

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*General Counsel, American Federation of Labor and Congress of Industrial Organizations, Washington, D.C. I express great appreciation for research assistance by Andrea Ritchie, law student at Howard University School of Law, and to the law firm of Van Bourg, Weinberg, Roger & Rosenfeld for information pertaining to the Kaiser Hospitals arbitration system.