

THE BENEFITS AND COSTS OF EMPLOYEE SUGGESTIONS UNDER GAINSHARING

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Using data for the years 1985–92 from a discontinued suggestion program at a manufacturing plant in the United States, this study examines the benefits and costs of suggestions under gainsharing. The implemented suggestions are found to have improved labor productivity and reduced grievances and disciplinary actions, but more robust evidence suggests that they also incurred transaction costs and implementation costs. The author speculates that substantial transaction and implementation costs may be a factor responsible for the typically modest outcomes and generally short longevity of employee involvement programs and high-performance work practices.

Employee suggestions had become less effective when we decided to discontinue the suggestion system in 1992. At that time, lots of the suggestions were not for productivity improvement but for employee comforts that dealt with grievances or safety and health issues. When we took into account the hours and effort spent discussing the suggestions in the screening and production team meetings, the suggestion system was not a cost-efficient system.

—Anonymous Human Relations Manager, August 1999 interview

The company did not truly want workers to get involved in decision-making. The company only wanted to substitute gainsharing bonuses for wage increases. Management looked for a big and quick idea that could save thousands of dollars, and they were tired of little ideas. That is why the company stopped the suggestion system.

—Anonymous Union Officer, June 1994 interview

When labor and management contemplate implementing an employee involvement (EI) system, the tangible ben-

efits and costs of the system are center-stage considerations. Previous literature on this subject has, however, typically em-

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The data and computer programs used to generate the results presented in this paper are available on request from the author at the College of Business Administration, Korea University, Anam-Dong 5-Ga, Sungbuk-Gu, Seoul, Korea (E-mail: dokim@korea.ac.kr, dokim64@hotmail.com).

phasized the positive side of EI by discussing how EI enhances democracy (for example, Collins 1998), increases productivity (Doucouliagos 1995), and improves job satisfaction or loyalty to the organization (Lawler et al. 1998), while generally downplaying its negative side. Only a few empirical studies have examined the costs involved in EI (for example, Batt 1999; Macy and Mirvis 1982). Even the three most extensive reviews of EI (Cotton 1993; Heller et al. 1998; Locke and Schweiger 1979) mentioned the negative side or the costs of EI only briefly and with little detail or empirical evidence (Cotton 1993:238; Heller et al. 1998:155–57; Locke and Schweiger 1979:325–26).

A candid analysis of the cost side of EI, which can reflect the harsh reality of life in competitive organizations (Heller et al. 1998:3), is needed to reach a more balanced view of EI. That project is central to the present paper. Using a longitudinal data set, I examine the fortunes of a gainsharing plan at a manufacturing plant, with a particular focus on the employee suggestion system that was integral to the plan. I investigate both the benefits and costs of the suggestion system—cognitive benefits, affective benefits, and involvement costs—and explore the implications of the findings for the construction and maintenance of effective EI programs.

Background

Despite the alleged beneficial effects of EI, the performance and diffusion of EI programs generally fall short of expectations. The available evidence suggests that EI programs spread unevenly: while a majority of employers have experimented with innovations, only a small percentage have adopted a full system of these practices or have applied them to a majority of their employees (Appelbaum and Batt 1994; Ichniowski et al. 1996; Osterman 1994, 2000). In particular, much lower adoption rates are observed among Brownfield sites than among Greenfield sites, although many EI programs seem to have survived the waves of restructuring in the 1990s (Osterman 2000).

Despite the possibility of significant underreporting of failed cases, EI programs have been found, on average, to result in only modest positive effects on organizational outcomes (Cotton 1993). Although higher levels of performance have been reported in some industries or firms, the positive evidence from published studies is largely confined to a subset of manufacturing industries (Godard and Delaney 2000). Furthermore, many employee participation programs (Drago 1988; Eaton 1994), quality circles (Lawler and Mohrman 1985), and gainsharing programs (Kim 1999) have been abandoned after only a few years.

Previous literature reviews have concluded that gainsharing, a topic in the present study, exerts stronger positive effects on organizational performance than do other forms of EI such as quality circles, quality-of-work-life programs, and works councils (Cotton 1993; Eaton and Voos 1992). Some observers, however, have the impression that the gains from even gainsharing plans frequently fall short of expectations. They have cited case studies of successful plans reporting net productivity increases or bonuses that amounted to less than 3% (for example, Cooper et al. 1992).

There are several explanations for the limited adoption of EI and the rather unsatisfactory outcomes of EI. First, difficulties in changing management practices and traditional top-down organizational cultures discourage the adoption of EI and impair its performance after implementation. Second, in order to adopt an effective EI system, organizations need to change an entire system of work practices, which entails not only switching to an entirely new set of production and distribution procedures, but also making a great investment in new technologies. These costs, which considerably exceed those involved in adopting an EI program, inhibit the adoption of a complete system, and when an incomplete system is consequently adopted, its performance is likely to be suboptimal.

Third, the history of labor-management conflict and mistrust hampers the adoption and functioning of EI programs. In

some cases, employee teams are viewed as management tricks to cut jobs, and gainsharing is regarded as a tool to cut base wages. The level of mistrust becomes greater when an employer seeks employees' cooperation and partnership in one unionized facility while engaging in union avoidance practices at other sites.

Fourth, supervisors and other workers might not fare as well under EI and other new practices as under the existing system. Thus, senior workers who are fearful of job insecurity and front-line supervisors whose role can be dramatically altered under the new arrangements may not cooperate in the adoption and functioning of EI programs (Ichniowski et al. 1996).

Finally, a study by Cappelli and Neumark (2001) suggested that higher wages associated with EI may be responsible for the limited adoption of EI and its meager effects on organizational outcomes. Using longitudinal data sets of a national probability sample of establishments, the authors found evidence that high-performance work practices (HPWPs) had a positive impact on labor costs per employee (a cost to employers), but statistically weak evidence that they had a positive impact on productivity (measured by sales per employee) or on overall labor efficiency (measured by the output per dollar spent on labor). Thus, the authors found that HPWPs raise labor costs, but the net effect on overall profitability was unclear. The findings implied that the higher labor costs associated with HPWPs and their meager impact on organizational performance may explain the limited adoption and high failure rates of HPWPs.

It is noteworthy that most of the earlier arguments considered environmental and situational factors (for example, a traditional top-down culture, a need to change an entire system of work practices, labor-management distrust, and employee opposition) as the main obstacles to the adoption and effective functioning of EI programs and HPWPs (Godard and Delaney 2000; Ichniowski et al. 1996), and rarely focused on fundamental problems in the paradigm itself, such as the costs involved

in the implementation process. The present study argues that the costs of EI itself may be responsible for the suboptimal outcomes of EI. I predict that (1) EI has both positive effects (for example, improved efficiency and employment relations) and negative effects (for example, the costs involved in the implementation process) on organizational outcomes; and (2) the perceived net effects of EI eventually determine the managerial decision regarding whether or not to continue a program.

Employee suggestions are the most fundamental element in EI because most EI programs (such as labor-management committees, quality circles, self-managing teams, and employees' strategic participation) and HPWPs are designed to use employees' untapped knowledge, ideas, and creativity in a more effective and efficient way. Indeed, a formal employee suggestion system is often an integral part of such EI programs and HPWPs. If the present study should find that substantial costs are associated with employee suggestions, an implication would be that EI programs and HPWPs are very likely to suffer from the same problem.

Using longitudinal data spanning a seven-year period from a manufacturing plant, in the present study I investigate the impact of employee suggestions on various organizational outcomes. The study has two additional theoretical implications. First, as arguments for EI have come to focus more on efficiency and performance than on industrial democracy or workplace humanization (Heller et al. 1998), numerous studies have investigated the net impact on individual and organizational outcomes of various forms of EI, such as self-managing teams (for example, Beekun 1989), quality circles (Adam 1990), gainsharing (Kim 1996, 1999), quality-of-work-life programs (Katz et al. 1985), and works councils (Kleiner and Lee 1997). Despite the abundance of empirical studies on various EI programs, research on employee suggestion systems has been relatively scarce. I found few such studies in the literature on gainsharing. Those studies, which indi-

cate that employee suggestion systems comprise an element of gainsharing in plans such as Scanlon, Rucker, Improshare, and customized plans, can be classified into two groups: studies describing basic features, committee structures, and operating mechanisms of suggestion systems in general (Graham-Moore and Ross 1990, 1995) or of those at specific research sites (Bowie-McCoy et al. 1993; Schuster 1984); and studies analyzing individual employees' suggestion behaviors—how the volume and types of suggestions change over time (Arthur and Aiman-Smith 2001) and why individuals differ in their willingness to become involved in the suggestion-making process (Hatcher et al. 1989). I found no studies directly measuring the impact of suggestions on organizational outcomes, however. For example, Katz et al. (1985), examining a data set from 25 plants, found that the percentage of hourly employees who submitted suggestions during the year was positively related to product quality. This earlier study, however, did not measure the impact of the suggestions themselves on plant performance. Thus, the present study is one of the few attempts to investigate the effects of suggestions themselves on organizational outcomes.

Second, this study represents a “conservative” test of the effects of employee suggestions. Whereas many studies of EI effectiveness have focused on successful cases (for example, Arthur and Jelf 1999; Buch and Spangler 1990; Masternak 1997; Naff and Pomerleau 1988; Poza and Markus 1980; Schuster 1984), studies focusing explicitly on failed cases, such as the work of Meyer and Stott (1985) and Miller and Schuster (1995), are rare. The present study deals with a failed case in which an employee suggestion system was discontinued due to results that were disappointing to management. A finding that suggestions had positive effects in this case would constitute strong evidence for the effectiveness of suggestion systems in general. In addition, this study's exploratory investigation of why the suggestion system was discontinued could point to the underlying reasons for many EI programs' failure.

Hypotheses

Three hypotheses were formulated in the present study: two concerning the benefits of suggestions and one concerning their costs.

Benefits of Suggestions

Locke and Schweiger (1979) argued that the benefits resulting from EI fall into two major categories: cognitive benefits, which are positive outcomes pertaining directly to productivity; and affective benefits, which include increased morale, increased job satisfaction, and reduced grievances, disciplinary actions, turnover, and absenteeism. This conceptual scheme was adopted by subsequent empirical studies, which generally found evidence of both cognitive and affective benefits of EI (Miller and Monge 1986; Steel and Lloyd 1988).

One group of scholars has argued that the ultimate benefit of EI comes from the use of employees' hidden knowledge and know-how (Frost et al. 1974; Locke and Schweiger 1979). Miller and Monge (1986:730) called this line of reasoning a “cognitive model of participative effects.” This cognitive model assumes that the main function of EI is to provide employees with opportunities to use hidden knowledge and know-how, and EI works because it enhances the flow and use of important information, knowledge, and know-how in organizations. The model proposes that workers typically have deeper workplace knowledge than managers do, and that they make decisions based on a better and more complete pool of information. In addition, the model indicates that employee suggestions lead to more upward communication, better use of information, better understanding of jobs and decisions by employees, and more creative and innovative ideas. According to the cognitive model, improvement in productivity is a direct consequence of the use of employees' capabilities, whereas employee satisfaction is merely a by-product of EI in important organizational decisions. Locke and Schweiger (1979) hypothesized that productivity improvement will be stronger where workers have

information and knowledge about decisions to be made.

Some proponents of EI (for example, Likert 1967; McGregor 1960) have tended to focus on motivation, assuming that greater morale or commitment is responsible for improved productivity. However, Locke and Schweiger (1979) persuasively argued that the cognitive factors produced by involvement may be more influential than motivational effects. They did not predict increases in workers' productivity and satisfaction simply from their working in participative work climates or for nondirective (participative) leaders, but made the case that increases in productivity and satisfaction are attributable to specific inputs from subordinates on issues in which they are interested and about which they are knowledgeable. The first hypothesis of the present study, relying on a logical extension of the cognitive model of participation articulated by Locke and Schweiger (1979), is that the cognitive functions of employee suggestions are mainly responsible for improvement in labor productivity.

Of course, suggestions do not always improve organizational performance, because an organization may adopt harmful ideas based on incorrect decision-making. It is expected, however, that beneficial suggestions are more likely to be chosen than are harmful suggestions, on average, because organizations in most cases have a multi-step screening mechanism (in the present case, production and screening teams) to select beneficial suggestions and reject harmful ones. Thus, the present study hypothesizes that implemented suggestions will increase labor productivity. Since it takes a substantial amount of time for suggestions to be fully implemented and for employees to become acquainted with changes in the production process, the effects of suggestion implementation will be realized after a time lag.

Hypothesis 1. There will be a positive relationship between the number of implemented suggestions and labor productivity.

Followers of the human relations school

(for example, Likert 1967; McGregor 1960) have suggested that EI is effective primarily because it satisfies workers' needs and motivates them through increased satisfaction and morale. That is, EI will lead to greater fulfillment of higher-order needs (such as self-esteem, respect, and autonomy), and this in turn will increase employee morale and satisfaction.

Human relations scholars argue that participation has motivational effects, promoting, for example, greater trust, a greater feeling of control, more ego involvement and identification with the organization, less resistance to change, and more acceptance of and commitment to decisions and changes. Miller and Monge (1986:730) called this line of reasoning an "affective model of participative effects."

The affective participation model articulated by Miller and Monge (1986) implies an indirect linkage between EI and productivity. Specifically, the model is composed of two parts: (1) participation fulfills higher-order needs, and fulfilled needs lead to satisfaction; (2) satisfaction strengthens motivation, and increased motivation improves workers' productivity in the workplace (Miller and Monge 1986:731). Although the first part of the model (the participation-satisfaction link) is widely accepted, the second part (the satisfaction-productivity link) has not been well received. Indeed, previous literature on the direction of causality between satisfaction and productivity has been ambivalent. Some have argued that satisfaction is an outcome, not a predictor, of productivity (Petty et al. 1984), whereas others have asserted that there is no direct relationship between satisfaction and productivity, and that a third variable (the receipt of rewards) influences both (Porter and Lawler 1968). Thus, the hypothesis of the present study was formulated based on only the first part of the affective participation model (the participation-satisfaction link).

It is expected that if employees' ideas and input are recognized, accepted, and finally implemented, their higher-order needs will be fulfilled and they will experience increased satisfaction and morale.

Specifically, this enhanced motivation and satisfaction are expected to manifest themselves in the form of reductions in grievances and deviant behaviors. Indeed, previous studies identified improved employment relations as the main affective benefit of EI (Arthur and Jelf 1999; Locke and Schweiger 1979; Miller and Monge 1986; Schuster 1984; Steel and Lloyd 1988).¹ Again, the affective benefits will be realized after a time lag, because it takes time for the consequences of implemented suggestions to be realized by employees, and then for enhanced motivation and effort to lead to changes in behavior.

Hypothesis 2. Implemented suggestions will be negatively related to the occurrence of grievances and disciplinary actions.

Costs of Suggestions

Any type of change program incurs costs. For example, it is often pointed out that the implementation and operation of gainsharing requires substantial financial and human resources, including bookkeeping and clerical support, meeting and administrative time, and outside consultant fees. In some organizations, these direct and indirect costs can be so large as to discourage use of a gainsharing plan (Lawler 1981:151).

Empirical studies that actually examine the costs incurred in the EI context, however, have been rare. I can identify only two. Macy and Mirvis (1982), relying on a case study of a QWL program in a manufac-

turing and assembly plant, conducted a cost-benefit analysis. They concluded that although there were substantial program costs, the benefits of the QWL program (valued at a total of \$566,482, including savings from reduced accidents and illnesses, reduced grievances, reduced project rejects, and reduced manufacturing costs, as well as gains from increased productivity) outweighed the costs (valued at a total of \$455,405, including consulting fees and time spent by employees in meetings, interviews, and training) in dollar terms. Batt (1999) recently tested the "transaction cost" (1999:541) issue of whether time spent in training or problem-solving meetings will decrease productivity, and found that time spent in SMT (self-managing team) meetings had a negative and statistically significant relationship to the natural log of monthly sales, but not to work quality. In sum, previous empirical studies, although scant, have confirmed the existence of transaction costs in EI programs.

The present study addresses two types of costs of employee suggestions: transaction costs and implementation costs. Economists were the first to develop the idea of EI costs.² Transaction cost theorists argue, based on economic reasoning, that an increase in the number of decision-makers incurs costs associated with communication among decision-makers and time spent in making and carrying out decisions. Central decision-making is viewed as being more advantageous than decentralized decision-making, especially in large organizations, because of the volume of information required as the number of decision-makers expands. Organizations that seek to re-

¹There is another reason to expect a negative relationship between the number of implemented suggestions and the number of grievances. In a unionized organization operating an employee suggestion system, potential grievances can be handled through the suggestion system as well as through a formal employee grievance system. Specifically, employee suggestions can substitute for grievances by providing employees with the opportunity to express their dissatisfaction with desired solutions in a formalized way. Due to this substitution effect, the number of implemented suggestions is expected to reduce the number of grievances in subsequent periods.

²Three economic frameworks attempt to explain why EI would be resisted: the transaction cost, agency cost, and free-rider frameworks (Heller et al. 1998:155-56). Agency costs and free-rider problems in the EI context have been discussed in previous literature (Levin and Tyson 1990; Kim and Voos 1997). The present study relies mainly on the transaction cost framework because it provides more relevant hypotheses regarding employee suggestions and is better suited to the present research setting.

duce hierarchy and establish consultative participatory structures will incur greater transaction costs than traditional nonparticipatory firms (Williamson 1975, 1980).³

A corollary of transaction cost theory is that decision-making based on employee suggestions incurs more transaction costs than does central decision-making. Indeed, managers at the research site of the present study who complained that substantial meeting and communication time was spent processing, discussing, and implementing employee suggestions echoed this argument. In the present study, transaction costs included time spent by the production and screening team members discussing how to implement suggestions and communicating changes in work processes to affected employees.

More direct costs to organizations in administering suggestions are implementation costs, which are the costs of putting suggestions into practice. Included are the costs of (1) purchasing, assembling, or producing new machinery on a larger scale or of better quality, and (2) repairing broken or malfunctioning devices, machinery, or equipment using materials and components. Such costs are more tangible than transaction costs. In the case studied here, the implementation costs (purchasing equipment, producing new machines, buying materials, and so on) averaged approximately \$200 and ranged from \$50 to \$30,000 per suggestion.

In sum, it is hypothesized that employee suggestions will increase operating costs by incurring transaction and implementation costs. Because it takes a substantial amount of time to process employee suggestions, the involvement costs will be incurred in subsequent periods, too.

Hypothesis 3. The implementation of suggestions will incur transaction costs and implementation costs.

Methods

Research Site

I analyze data for a seven-year period from a plant in the United States that operated a type of gainsharing plan. The plant manufactured commercial doors, which were custom-made to architectural specifications and were sold to domestic customers. The production employees were unionized. The history of labor relations at the plant was relatively peaceful—there had been only one labor dispute, occurring in 1990,⁴ during the previous two decades. The number of grievances averaged approximately 12 per year, and arbitration occurred about once per year during the term of the gainsharing program. There had been no changes in top management (including the president and vice president of operations) since the beginning of the program.

From the beginning of the suggestion program in 1985, employment was stable. The plant had about 220 employees in 1985 and maintained the same employment level until 1992, with 155 production workers, 45 non-production employees, and 20 temporary employees. Except for retirement replacements, very little hiring had been done in recent years. No major layoff had taken place in the previous 20 years, and no expansion in employment was anticipated in the near future.

³Another important aspect of transaction cost theory is its unique perspective on the employment relationship. Transaction cost theorists assume that organizations establish structures to minimize the costs of their transactions with employees when the employees' potential for opportunistic behavior is high. Where organization-specific skills are critical to the organization, turnover can be costly, and organizations adopt internal governance structures to stabilize employment by minimizing negotiation costs (Williamson 1975). The present paper does not address this aspect (the employment and the negotiation process) of transaction theory, but focuses only on the communication and decision-making aspect of the theory.

⁴There was a lockout in April 1990 resulting from a bargaining impasse. The lockout lasted only one day, after which both parties reached an agreement.

Table 1. The Trend of Suggestion Submission and Implementation.

<i>Years</i>	<i>A. Total Number of Submitted Suggestions</i>	<i>B. Total Number of Implemented Suggestions</i>	<i>C. Implementation Ratio (%) (B/A)</i>
1985 ^a	105	84	80.0
1986	310	223	71.9
1987	196	129	65.8
1988	172	143	83.1
1989	148	125	84.5
1990	116	105	90.5
1991	138	124	89.9
1992 ^b	38	25	65.8
Total	1,223	958	78.3

^aThe employee suggestion system began in July 1985.

^bThe employee suggestion system was discontinued in June 1992.

A gainsharing program including a suggestion component was initiated in 1984 by the plant's management. A task force team composed of managers, employees, and union leaders designed the program with the help of an outside consultant. The basic design of the gainsharing plan consisted of a bonus plan and an employee suggestion system. The bonus program was characterized as a Scanlon Plan with a multicost ratio. The ratio of labor, material, and overhead costs to the value of production was used to calculate the amount of the bonus by measuring deviations from a base ratio. The base ratio was calculated using plant performance from January 1, 1980, through December 31, 1984, and was computed as 80.0%.⁵ During each four-week period, the amount of the bonus was calculated. Forty-five percent of the gains were paid to the company and 55% were paid to all the employees, including production, clerical, sales, and managerial employees. The employee suggestion system functioned with (1) ten production teams that gathered, evaluated, and implemented suggestions from the members of each team, and (2) an overall screening team that evaluated and implemented sug-

gestions that were beyond the authority of the production teams.

The performance of the gainsharing program gradually improved from 1985 until 1990. The program recorded the largest employee bonuses (11.37% of total payroll costs) in 1989 and the largest sales (over \$22 million) in 1990. After its peak in 1989 and 1990, however, the performance of the gainsharing program showed a deteriorating trend. The amount of the bonuses decreased from 1990 onward, and there were no employee bonuses in 1992. As Table 1 indicates, the employee suggestion records also showed a declining pattern. After reaching a peak in 1986, when 310 suggestions were submitted, employee suggestion activities continuously declined, falling to 196 in 1987, 148 in 1989, and 116 in 1990. The suggestion component was discontinued in May 1992, and since then, the company has been operating a gainsharing program without an employee suggestion component. I focus on the effects of the employee suggestion system during the period July 1985–May 1992. Thus, this study analyzes the outcomes of a “failed” employee suggestion system.

The data were obtained both through on-site interviews and through examination of documents and archival records. The initial interviews with the human resource manager and union leaders pro-

⁵Later, in July 1988, it was amended to 82.5%.

Table 2. Descriptive Statistics and Correlations among Variables.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8
1. Labor Productivity ^a	416,740.50	33,122.38								
2. Indirect Labor Costs (\$)	99,078.89	8,915.82	.23*							
3. Implementation Costs (\$)	20,492.43	2,923.29	.14	.56**						
4. Grievances	.94	1.05	.18	.17	.08					
5. Disciplinary Actions	2.91	2.92	.06	.27*	-.002	.33**				
6. Implemented Suggestions	10.57	4.95	.31**	.49**	.41**	.12	.14			
7. Previous Bonus Ratio (%)	2.83	4.91	.09	-.38**	-.26*	-.01	-.23*	-.07		
8. Plant Sales Value (\$)	1,213,300.00	106,342.56	.36**	-.30**	-.19	-.01	-.11	-.17	.32**	
9. Industry Shipment Value (in Mil. \$)	11,623.45	681.36	.37**	.33**	.29**	.11	.11	.17	-.14	.16

^aThis number was multiplied by 1,000,000 for convenience of calculation.

*Statistically significant at the .05 level; **at the .01 level (two-tailed tests).

vided the contextual background for the study, and subsequent interviews with other managers and union members helped me to ascertain the intentions and goals of top management in implementing the suggestion system; management's changing positions toward the suggestion system during its life span; and rank-and-file employees' reactions and commitment to, and attitudes toward, the suggestion system. Various comments from managers and union leaders are selectively cited throughout this paper. The hypotheses were tested using numerical data gathered during subsequent visits to the research site.

Measurement and Analysis

Numerical data were collected at four-week intervals, for a total of 89 observations from July 1985 to May 1992. Table 2 shows the descriptive statistics and correlations. Labor productivity was calculated by dividing the number of doors produced by hours of direct labor. Indirect labor costs were used as a proxy for transaction costs, and defined as the dollar value spent to fund employee activities other than direct (production) labor—meeting, communicating, experimenting, fixing, installing, and training. Implementation costs were defined as the dollar value spent to purchase tools, devices, equipment, machinery, and related materials. This variable did not include

costs not closely related to suggestion implementation, such as those for building maintenance, telephones, office supplies, and vehicles. Data on labor productivity and costs were collected by examining bonus calculation sheets. Data regarding grievances (formal grievances filed by employees) and disciplinary actions (written warnings, suspensions, and discharges resulting from employees' deviant behaviors such as being absent without notice, being verbally abusive, sabotaging equipment, and wasting resources) were obtained from company archival records. In constructing a composite measure of disciplinary actions, I assigned scores of 1, 3, and 10, respectively, to written warnings, disciplinary suspensions, and discharges, and computed the overall measure of disciplinary actions by summing the three scores.⁶

Three control variables (industry shipment value, plant sales value, and previous bonus ratio) were included in the labor

⁶In determining the relative weights of the three disciplinary actions, I consulted with the human resource manager and the union leaders at the plant. Of the various combinations of relative weights I presented to them—1–2–3 (1 for written warnings, 2 for disciplinary suspensions, and 3 for discharges), 1–3–5, 1–3–10, and 1–5–10—they agreed that the combination 1–3–10 most accurately reflected the relative weights among the three disciplinary actions.

productivity and cost equations. As outcome variables might be influenced by business conditions, both industry- and organization-level business conditions were included. Industry shipment value was defined as the dollar value of shipment in the construction supplies industry (U.S. Census Bureau 2001). Plant sales value, taken from the bonus calculation sheet in each bonus period, was also included. The previous bonus ratio, the ratio of total employee bonuses to their payroll costs in the immediately preceding bonus period, was included as a control variable. The previous bonus ratio was expected to influence the dependent variables through the monetary motivation effect, which can be inferred from the reinforcement model (Mawhinney and Gowen 1990) and the behavior-outcome instrumentality linkage of the expectancy model (Porter and Lawler 1968). The previous bonus ratio was taken from the bonus calculation sheet. In the grievance and disciplinary action equations, the previous bonus ratio was included as a control variable. Constant dollars adjusted by consumer price indices (U.S. Department of Labor 2001) were used for reporting all dollar values in this study.

A problem with using time-series data in ordinary least squares (OLS) analysis is that OLS analysis requires the error terms to be independent, while each observation in time-series data tends to be statistically dependent on previous observations. Consequently, I used an ARIMA time-series procedure (Box and Jenkins 1976) to model the error (or noise structure) in the regression equation (SAS Institute 1993). Specifically, I examined the autocorrelation and partial autocorrelation residual plots to determine the existence of nonstationarity, seasonality, autocorrelation, and moving average processes in the time-series data that would violate the assumptions of the OLS regression analysis (Ostrom 1990). I then used the information from this identification step to model the noise structure and to estimate statistically efficient and unbiased maximum likelihood regression coefficients. To test the long-term effects of the implemented suggestions, I lagged

the implemented suggestions by one to ten bonus periods (that is, up to 40 weeks after implementation).

Results

The results of the ARIMA analyses are shown in Tables 3–5.⁷ Table 3 shows the effects of suggestions on labor productivity and costs. The results indicate that the number of implemented suggestions was positively related to labor productivity. Suggestions in the lag 2, lag 4, and lag 5 equations had positive and statistically significant coefficients. Thus, the results support Hypothesis 1 (the implementation of suggestions improves organizational efficiency).

Table 4 shows the effects of suggestions on employment relations outcomes. The results indicate that implemented suggestions were generally negatively related to the numbers of grievances and disciplinary actions. In the grievance equation, suggestions had statistically significant and negative coefficients in the lag 2, lag 4, lag 6, lag 8, and lag 10 equations, although the lag 9 equation showed an unexpected positive relationship (significant at the .10 level) between the number of suggestions and the number of grievances. Despite the unexpected sign in the lag 9 equation,⁸ the

⁷To examine the multicollinearity issue, I calculated the Variance Inflation Factor (VIF), which measures how much the variance of the estimated regression coefficients is inflated compared to its value when the independent variables are not linearly related. A VIF value in excess of 10 is often taken as an indication of multicollinearity (Neter et al. 1989:408–9). The VIF in the relevant equations in this study ranged from 1.022 to 1.207. Thus, I believe that there was no serious multicollinearity problem in this analysis.

⁸The unexpected negative effects of suggestions on grievances in the lag 9 equation can be explained in the following manner. Since employees generally prefer stability to suggested changes, they feel uneasiness and difficulty in modifying existing procedures through suggestions and in adjusting to the modified working arrangements. According to this line of reasoning, the increased organizational instability generated by suggestions and by the changes incident

dominant pattern seems to have been a negative association between suggestions and grievances. In the disciplinary action equation, suggestions had statistically significant and negative coefficients in the lag 1, lag 9, and lag 10 equations.⁹ Thus, the results generally support Hypothesis 2 (the implementation of suggestions improves employment relations outcomes by reducing grievances and disciplinary actions).

The results provide evidence for the existence of transaction and implementation costs of EI. As shown in Table 3, the implemented suggestions in the lag 2, lag 4, lag 5, lag 7, and lag 8 equations had positive and statistically significant relationships to indirect labor costs. In the implementation-cost equations, suggestions in the lag 1, lag 2, lag 4, and lag 7 equations had positive and statistically significant coefficients. The overall results clearly support Hypothesis 3 (suggestions incur transaction costs and implementation costs).¹⁰

Regarding the results for the control variables, as shown in Tables 3–4, the industry shipment value had statistically significant and positive relationships to labor productivity, indirect labor costs, and implementation costs in all equations, which strongly suggests that market conditions influenced production costs and the number of products. The plant sales value had

a positive relationship to labor productivity in all equations, whereas its relationships to indirect labor and implementation costs were generally inconsistent. As shown in Table 3, the previous bonus ratio variable had a positive relationship to labor productivity in all equations, and occasionally showed statistically significant coefficients (for example, in the lag 4 and lag 5 equations). These results imply that the previous bonus ratio influences labor productivity through the monetary motivation effect. On the other hand, I found no statistically significant relationships between the previous bonus ratio variable and grievances or disciplinary actions (see Table 4).

Capital Equipment Improvements as an Alternative Explanation

Is it possible that events other than the independent variables in the study were primarily responsible for the observed movements of the dependent variables? One question that might be raised is whether equipment changes increased labor productivity and decreased costs during the period when the suggestion system was in place (1985–92).

The interviews with managers and union officers provide some assurance that such effects were not large. The interviewees indicated that changes in production equipment were made at a moderate pace, that the plant was still labor-intensive, and that its operation largely depended on the skills of carpenters until the mid-1990s. It was not until 1997 that the radical step of introducing computerized equipment and automation projects was begun.

I performed an additional statistical analysis to examine this issue more thoroughly. Because management started to modernize production machinery in 1991 independent of employee suggestions, it is interesting to investigate whether the statistically significant association between implementation costs and suggestions is still in evidence even when the analysis is restricted to the period 1985–89, before management began making major equipment purchases. The ARIMA regression

to those suggestions creates more ambiguity and uncertainty for employees than does maintenance of the status quo. The generation and implementation of suggestions is believed to result in confusion, uncertainty, hardship, and low satisfaction from the employees' standpoint, which in turn leads to an occasional increase in grievances.

⁹Since the relative weighting of the three disciplinary actions can be considered somewhat arbitrary, I used other measures of disciplinary actions as dependent variables, too. Regressions with other combinations of the relative weights of the three disciplinary actions—1–2–3 (1 for written warnings, 2 for disciplinary suspensions, and 3 for discharges), 1–3–5, 1–5–10, and 1–1–1—as dependent variables yielded results reasonably similar to those reported in Table 4.

¹⁰ARIMA analyses were also conducted using \ln (indirect labor costs) and \ln (implementation costs) as the dependent variables. The results were found to be basically the same.

Table 3. The Effects of Suggestions on Productivity and Costs.
(ARIMA Procedure; 89 Observations; Standard Errors in Parentheses)^a

Variable	Labor Productivity	Indirect Labor Costs	Implementation Costs
<i>Lag 1 Equation</i>			
Implemented Suggestion Lag 1	[ARIMA 0,0,1] 231.84(678.41)	[ARIMA 0,0,1] 143.93(140.75)	[ARIMA 2,0,1] 260.11(56.08)***
Previous Bonus Ratio	99.86(795.50)	-179.79(168.90)	-76.97(58.82)*
Plant Sales Value	.10(.03)***	-.02(.007)***	-.003(.003)
Industry Shipment Value	15.41(5.72)***	4.06(1.52)***	.86(.44)**
AR(1)			-.87(.18)***
AR(2)			.10(.12)
MA(1)	-.25(.12)**	-.60(.08)***	
Log Likelihood	-1025.31	-892.15	-806.41
<i>Lag 2 Equation</i>			
Implemented Suggestion Lag 2	[ARIMA 0,0,1] 1345.66(762.70)**	[ARIMA 0,0,2] 499.12(142.43)***	[ARIMA 1,0,1] 170.87(64.16)***
Previous Bonus Ratio	140.79(728.92)	-163.88(164.70)	-112.18(63.67)**
Plant Sales Value	.12(.04)***	.007(.008)	-.0002(.003)
Industry Shipment Value	13.69(5.78)**	3.48(1.60)**	.95(.49)**
AR(1)			-.45(.26)*
MA(1)	-.28(.11)***	-.69(.11)***	-.72(.20)***
MA(2)		-.20(.11)**	
Log Likelihood	-1012.16	-876.00	-801.89
<i>Lag 3 Equation</i>			
Implemented Suggestion Lag 3	[ARIMA 0,0,1] -211.53(704.11)	[ARIMA 0,0,1] -132.99(138.22)	[ARIMA 0,0,1] -6.03(63.88)
Previous Bonus Ratio	116.51(747.52)	-185.96(170.04)	-103.60(69.47)*
Plant Sales Value	.10(.03)***	-.02(.007)***	-.004(.003)
Industry Shipment Value	16.23(5.66)***	4.21(1.56)***	1.33(.54)***
MA(1)	-.25(.11)**	-.66(.08)***	-.33(.10)***
Log Likelihood	-1001.45	-872.35	-795.53
<i>Lag 4 Equation</i>			
Implemented Suggestion Lag 4	[ARIMA 0,0,2] 1908.14(628.23)***	[ARIMA 0,0,1] 264.90(135.39)**	[ARIMA 0,0,1] 93.22(63.08)*
Previous Bonus Ratio	813.70(627.23)*	-127.32(161.54)	-90.89(68.08)*
Plant Sales Value	.12(.03)***	-.02(.007)***	-.003(.003)
Industry Shipment Value	13.53(6.10)**	3.89(1.54)***	1.23(.55)**
MA(1)	-.20(.11)**	-.68(.08)***	-.36(.10)***
MA(2)	-.35(.11)***		
Log Likelihood	-982.19	-859.76	-785.34
<i>Lag 5 Equation</i>			
Implemented Suggestion Lag 5	[ARIMA 2,0,0] 1127.87(663.41)**	[ARIMA 0,0,2] 196.36(145.25)*	[ARIMA 0,0,1] -31.34(63.22)
Previous Bonus Ratio	569.77(664.50)*	-202.20(175.05)	-101.23(69.08)*
Plant Sales Value	.12(.03)***	.02(.008)***	-.004(.003)
Industry Shipment Value	15.92(6.95)**	4.38(1.63)**	1.36(.55)***
AR(1)	-.22(.12)**		
AR(2)	-.22(.12)**		
MA(1)		-.62(.12)***	-.34(.11)***
MA(2)		-.15(.11)*	
Log Likelihood	-973.35	-850.89	-777.57
<i>Lag 6 Equation</i>			
Implemented Suggestion Lag 6	[ARIMA 2,0,0] -436.07(691.19)	[ARIMA 0,0,1] 122.98(138.27)	[ARIMA 0,0,1] 69.20(62.92)
Previous Bonus Ratio	572.04(695.29)	-161.34(167.89)	-98.84(67.10)*
Plant Sales Value	.12(.03)***	-.03(.007)***	-.003(.003)
Industry Shipment Value	14.81(7.64)**	4.36(1.59)***	1.38(.54)***
AR(1)	.31(.11)***		
AR(2)	.18(.12)*		
MA(1)		-.67(.08)***	-.33(.11)***
Log Likelihood	-963.03	-841.75	-766.25
<i>Lag 7 Equation</i>			
Implemented Suggestion Lag 7	[ARIMA 1,0,0] 196.85(671.70)	[ARIMA 1,0,1] 258.95(152.30)**	[ARIMA 2,0,2] 234.89(48.31)***
Previous Bonus Ratio	370.52(703.66)	-63.66(158.94)	-78.60(50.60)*

Continued

Table 3. Continued.

Variable	Labor Productivity	Indirect Labor Costs	Implementation Costs
<i>Lag 7 Equation (continued)</i>			
Plant Sales Value	.13(.03)***	.001(.008)	-.007(.003)***
Industry Shipment Value	14.06(6.62)**	3.71(2.39)*	1.11(.17)***
AR(1)	.40(.11)***	.84(.09)***	1.65(.13)***
AR(2)			-.80(.12)***
MA(1)		.37(.16)**	1.54(.31)***
MA(2)			-.55(.21)***
Log Likelihood	-948.43	-828.30	-750.23
<i>Lag 8 Equation</i>			
	[ARIMA 1,0,0]	[ARIMA 1,0,1]	[ARIMA 0,0,1]
Implemented Suggestion Lag 8	43.25(648.58)	211.38(159.88)*	53.69(65.83)
Previous Bonus Ratio	257.47(695.37)	-49.41(166.16)	-88.40(69.50)
Plant Sales Value	.12(.03)***	-.005(.008)	-.004(.003)
Industry Shipment Value	13.24(7.52)**	4.20(2.35)**	1.45(.54)***
AR(1)	.53(.11)***	.77(.11)***	
MA(1)		.22(.17)*	-.32(.11)***
Log Likelihood	-933.25	-819.40	-748.62
<i>Lag 9 Equation</i>			
	[ARIMA 1,0,0]	[ARIMA 0,0,1]	[ARIMA 2,0,2]
Implemented Suggestion Lag 9	71.53(611.19)	43.81(149.67)	32.61(58.70)
Previous Bonus Ratio	560.21(638.64)	-140.93(175.07)	-97.32(60.53)*
Plant Sales Value	.12(.03)***	-.02(.008)***	-.003(.003)
Industry Shipment Value	14.49(6.57)**	4.44(1.60)***	1.28(.48)***
AR(1)	.47(.11)***		-1.45(.12)***
AR(2)			-.52(.12)***
MA(1)		-.63(.09)***	-1.91(.26)***
MA(2)			-.98(.27)***
Log Likelihood	-916.20	-812.19	-730.56
<i>Lag 10 Equation</i>			
	[ARIMA 1,0,0]	[ARIMA 0,0,1]	[ARIMA 2,0,1]
Implemented Suggestion Lag 10	-356.64(603.12)	-7.67(145.64)	2.89(65.80)
Previous Bonus Ratio	453.70(640.31)	-165.91(175.36)	-66.30(66.17)
Plant Sales Value	.12(.03)***	-.03(.008)***	-.004(.003)*
Industry Shipment Value	15.22(6.43)**	4.58(1.58)***	1.51(.54)***
AR(1)	.47(.11)***		-.74(.14)***
AR(2)			.25(.12)**
MA(1)		-.65(.09)***	-.99(.14)***
Log Likelihood	-904.22	-801.71	-727.91

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level (one-tailed tests).

*Constant values omitted in each equation.

results that used data for this period only, although not reported here, were very similar to those shown in Table 3. I believe, therefore, that equipment changes are not very likely to have influenced the results in a substantial and systematic way.¹¹

¹¹I also conducted regression analyses adding a dummy variable to indicate the year 1990. Since the highest sales figures and largest bonuses were evident in 1990, and 1990 was the year in which there was a bargaining impasse and lockout, I was interested in seeing whether employment relations outcomes (such as grievances and disciplinary actions) were affected by the inclusion of the 1990 dummy variable, and

Why Was the Suggestion System Discontinued?

At this point, one may raise an obvious question: how was the decision to discon-

whether its addition altered the existing statistical relationships between suggestions and employment relations outcomes. The ARIMA results, which are available upon request, showed that although the 1990 dummy variable had occasional negative and statistically significant relationships to grievances and disciplinary actions, its addition did not importantly alter the existing negative and statistically significant relationships between suggestions and the latter two variables.

Table 4. The Effects of Suggestions on Grievances and Disciplinary Actions.
(ARIMA Procedure; 89 Observations; Standard Errors in Parentheses)^a

Variable	Grievances	Disciplinary Actions
<i>Lag 1 Equation</i>	[ARIMA 1,0,0]	[ARIMA 1,0,0]
Implemented Suggestion Lag 1	.02(.02)	-.074(.057)*
Previous Bonus Ratio	.01(.03)	-.06(.06)
AR(1)	.61(.09)***	.53(.09)***
Log Likelihood	-127.98	-200.41
<i>Lag 2 Equation</i>	[ARIMA 1,0,2]	[ARIMA 1,0,0]
Implemented Suggestion Lag 2	-.009(.005)**	-.06(.06)
Previous Bonus Ratio	.006(.007)	-.06(.06)
AR(1)	-.04(.20)	.51(.09)***
MA(1)	-1.54(.17)***	
MA(2)	-.58(.17)***	
Log Likelihood	-96.02	-198.88
<i>Lag 3 Equation</i>	[ARIMA 1,0,0]	[ARIMA 1,0,0]
Implemented Suggestion Lag 3	.006(.03)	.05(.07)
Previous Bonus Ratio	.01(.03)	-.05(.07)
AR(1)	.61(.09)***	.51(.10)***
Log Likelihood	-126.48	-197.15
<i>Lag 4 Equation</i>	[ARIMA 1,0,2]	[ARIMA 1,0,0]
Implemented Suggestion Lag 4	-.01(.005)**	-.03(.06)
Previous Bonus Ratio	.006(.007)	-.06(.07)
AR(1)	-.08(.20)	.52(.10)***
MA(1)	-1.59(.16)***	
MA(2)	-.62(.16)***	
Log Likelihood	-94.29	-195.26
<i>Lag 5 Equation</i>	[ARIMA 1,0,0]	[ARIMA 1,0,0]
Implemented Suggestion Lag 5	-.002(.03)	-.02(.06)
Previous Bonus Ratio	.01(.03)	-.06(.07)
AR(1)	.62(.09)***	.51(.10)***
Log Likelihood	-123.97	-193.52
<i>Lag 6 Equation</i>	[ARIMA 1,0,2]	[ARIMA 1,0,0]
Implemented Suggestion Lag 6	-.011(.004)***	-.03(.06)
Previous Bonus Ratio	.007(.006)	-.06(.07)

Continued

tinue the suggestion system in May 1992 related to the performance trend of the system in terms of the benefits and costs of employee suggestions? One possible explanation, which was implied in the interviews with the human resource manager and union officers, is that management viewed the benefits of employee suggestions as growing smaller than the involvement costs (the transaction and implementation costs). Before investigating this issue empirically, let me first describe the developments in the employee suggestion system, as revealed through the interviews and archival records.

Although the gainsharing program recorded substantial employee bonuses in 1989 (11.37% of total payroll costs), the company believed that this successful outcome was mainly due to favorable business conditions in the late 1980s and the change in the base ratio for calculating bonuses in 1988, rather than to employee ideas, effort, and commitment to the gainsharing program. In fact, the company became decreasingly satisfied with the quality of employee suggestions. When the company initiated gainsharing in 1985, management expected that suggestions from employees would save substantial production costs and improve productivity. Over time, however,

Table 4. Continued.

Variable	Grievances	Disciplinary Actions
<i>Lag 6 Equation (continued)</i>	[ARIMA 1,0,0]	[ARIMA 0,0,1]
AR(1)	-.10(.19)	.52(.10)***
MA(1)	-1.64(.15)***	
MA(2)	-.66(.15)***	
Log Likelihood	-91.81	-191.68
<i>Lag 7 Equation</i>	[ARIMA 1,0,0]	[ARIMA 0,0,1]
Implemented Suggestion Lag 7	-.02(.03)	.02(.04)
Previous Bonus Ratio	.01(.03)	-.02(.05)
AR(1)	.62(.09)***	
MA(1)		-.81(.07)***
Log Likelihood	-121.34	-180.90
<i>Lag 8 Equation</i>	[ARIMA 1,0,2]	[ARIMA 0,0,1]
Implemented Suggestion Lag 8	-.009(.005)**	.04(.04)
Previous Bonus Ratio	.005(.006)	-.02(.05)
AR(1)	-.03(.19)	
MA(1)	-1.63(.15)***	-.83(.07)***
MA(2)	-.65(.15)***	
Log Likelihood	-87.89	-178.78
<i>Lag 9 Equation</i>	[ARIMA 1,0,1]	[ARIMA 1,0,0]
Implemented Suggestion Lag 9	.01(.01)*	-.11(.06)**
Previous Bonus Ratio	.008(.011)	-.06(.07)
AR(1)	.38(.11)***	.53(.10)***
MA(1)	-1.00(1.17)	
Log Likelihood	-89.32	-184.49
<i>Lag 10 Equation</i>	[ARIMA 2,0,1]	[ARIMA 1,0,0]
Implemented Suggestion Lag 10	-.009(.006)*	-.09(.06)*
Previous Bonus Ratio	.005(.009)	-.06(.07)
AR(1)	.52(.12)***	.51(.10)***
AR(2)	-.27(.11)**	
MA(1)	-.98(.17)***	
Log Likelihood	-85.61	-183.27

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level (one-tailed tests).

^aConstant values omitted in each equation.

management realized that the overall quality of employee suggestions was below expectations and getting worse; only a minority of them were worth implementing.¹²

¹²In the interview, the human resource manager mentioned that despite the disappointment over the quality of submitted suggestions, management intentionally tried to accept and implement as many suggestions as possible in order to motivate employees to continue making suggestions, because management wished to see improvement in the quality of suggestions as the suggestion program matured. Thus, the average implementation ratio of suggestions at this plant reached 73.7% during the operation of the suggestion system. Because in most suggestion pro-

The human resource manager believed that employees' pent-up desire to make suggestions might have resulted in a number of effective suggestions in the initial period, but the workplace problems and issues that employee suggestions could help to tackle might disappear over time, leading to less effective suggestions in later periods. Considering the time spent discussing the suggestions in the screening and production team meetings, the company thought that the employee-suggestion component of

grams the acceptance rate is below 70% (Schuster 1984), a 73.7% acceptance rate is considerably higher than that of typical suggestion programs.

gainsharing was “not a cost-efficient system” for improving firm performance.¹³

Over time, the company gradually reduced its commitment to the employee suggestion system. Instead, it began to make capital investments in new machinery to modernize its production system, and in the summer of 1991 it hired a problem-solving consultant. The company believed that it was more efficient to modernize production machinery or use an outside consultant to reduce production costs than to rely on the “inefficient” EI system.

In May 1992, the company decided to discontinue the gainsharing suggestion program. Since then, the company has been operating a gainsharing program without an employee suggestion component (that is, the program is made up of an employee bonus system only). No screening and production team meetings have been held, and the plant’s accounting department has calculated the bonus amount and distributed it to individual employees without union input. The role of the union officers with regard to the gainsharing program has been limited to asking questions about the details of the bonus calculation.

To examine the issue of whether the performance of the suggestion system changed over time, I conducted ARIMA analyses for three sub-periods. In other words, I investigated whether management may have discontinued the suggestion system because the benefits from suggestions had declined. To do so, I divided all 89 bonus periods into three sub-periods—Periods 1–30 (initial period), Periods 31–60 (middle period), and Periods 61–89 (last period)—and performed an ARIMA analysis for each period.

As Table 5 indicates, the results suggest that the effects of suggestions on labor productivity had declined over time.¹⁴ The

declining influence of implemented suggestions on labor productivity was most evident in the last period (Periods 61–89). For Periods 1–30, although one lagged variable (lag 1) had a negative and statistically significant coefficient in the regression equation, two lagged variables (lag 7 and lag 8) showed a positive and statistically significant relationship to labor productivity. In the regression equation for Periods 31–60, three lagged variables (lag 1, lag 5, and lag 7) showed a positive and statistically significant relationship to labor productivity. In the regression equation for Periods 61–89, however, employee suggestions showed mixed relationships to labor productivity: two lagged variables (lag 1 and lag 3) had positive and statistically significant coefficients, whereas two (lag 2 and lag 6) had negative and statistically significant coefficients.¹⁵ The clear trend from the middle period to the last period was a decline in the impact of suggestions on labor productivity. This diminishing effectiveness of suggestions in improving labor productivity might provide one explanation for the discontinuation of the suggestion system in May 1992.

Management’s disappointment with the quality of suggestions is implied by the trend in the implementation ratio. Along with the decline in the number of submitted suggestions, from 310 in 1986 to 116 in 1990, the implementation ratio (that is, the ratio of the number of implemented suggestions to the number of submitted suggestions) also declined, from 90.5% in 1990 to 65.8% in 1992 (see Table 1). Thus, in the last period, both the number of imple-

implementation costs, grievances, and disciplinary actions as the dependent variables. Unlike in the case of labor productivity, the regression results (not reported here) did not show any systematic trends over time.

¹⁵One possible explanation for the mixed productivity effects of suggestions in the last period is that the obvious and easy-to-implement suggestions—the “pent-up” ideas—were exhausted in the earlier periods, and employees were subsequently left with ideas that were less sure-fire and more difficult to implement.

¹³From the interview with the human resource manager.

¹⁴To investigate whether the affective benefits and involvement costs of employee suggestions changed over time, I conducted ARIMA analyses for the three sub-periods. In these analyses, I used indirect costs,

Table 5. Labor Productivity Effects of Employee Suggestions, by Period.
(ARIMA Procedure; Standard Errors in Parentheses)

<i>Independent Variables</i>	<i>Periods 1–30 (30 Observations)</i>	<i>Periods 31–60 (30 Observations)</i>	<i>Periods 61–89 (29 Observations)</i>
Implemented Suggestion Lag 1a	–1,602.30* (1,213.98)	755.09* (509.48)	2,371.62** (1,216.43)
Implemented Suggestion Lag 2a	–573.32 (1,280.11)	411.67 (1,358.99)	–3,257.98*** (839.59)
Implemented Suggestion Lag 3a	–1,449.08 (1,342.25)	–1,227.11 (1,048.52)	1,650.56* (1,243.96)
Implemented Suggestion Lag 4a	1,000.10 (1,385.27)	986.09 (1,059.59)	794.74 (1,286.38)
Implemented Suggestion Lag 5a	–767.80 (1,793.76)	731.56* (483.04)	1,000.06 (1,292.36)
Implemented Suggestion Lag 6a	59.87 (1,584.96)	89.60 (516.86)	–1,098.62* (809.42)
Implemented Suggestion Lag 7a	1,975.51* (1,349.11)	1,009.99** (532.45)	–1,338.22 (1,257.37)
Implemented Suggestion Lag 8a	2,758.08** (1,072.42)	129.67 (1,060.72)	1,245.28 (1,442.68)
Implemented Suggestion Lag 9a	–488.93 (1,188.21)	–869.73 (860.23)	622.97 (1,415.55)
Implemented Suggestion Lag 10a	— (—)	–476.31 (411.23)	1,209.56 (1,408.05)

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level (one-tailed tests).

^aAll control variables (as in Table 3) were included in each equation.

mented suggestions and the implementation ratio decreased, which is consistent with management's increasing dissatisfaction with the quality of employee suggestions after 1990.

A closely related factor behind the decision to discontinue the employee suggestion system may have been a weak managerial commitment to the concept of EI—that is, from the beginning, the company's management did not seem to be philosophically behind the concept of EI. The initiation of the gainsharing plan by the plant's managers appears to have been based on the purely practical aim of increasing productivity as had another plant owned by the same parent company. The gainsharing success story at the sister plant was widely circulated by a U.S. Department of Labor publication as an exemplary case of union-management cooperation that overcame a serious business crisis in the 1980s. Since

the successful plant was similar to the present site in location (a small town in the same region), industry (wooden products), and size (approximately 200–300 employees in both plants), and was owned by the same parent company, the plant's management believed that they could easily replicate this success. In contrast to the program implemented in the sister plant, however, the gainsharing program in the present plant was not a joint labor-management response to a perceived business crisis and a threat of job loss, but a managerial attempt to imitate the success of the sister plant. Thus, the plant's management did not seriously consider empowering employees by fundamentally changing its top-down managerial culture.

Although both the production teams and the plant-wide screening team contained managerial members and labor representatives, the managerial members tended to

dominate the decision process. The ten production teams and one overall screening team in the plant were each composed of elected employee representatives, union officers, and appointed managers. Although the number of managerial representatives was roughly equal to the number of employee and union representatives, an appointed department manager and a vice president of operations chaired the production and screening team meetings, respectively. In a 1992 interview, union leaders mentioned that in screening and production team meetings, the company's management representative (typically a manager with a strong, aggressive character) had, in effect, blackmailed the union officers, threatening to discontinue the entire gainsharing program unless they accepted management's position. In the union executive membership meeting on July 21, 1992, which I observed myself, several union members said that "the company played a game with employees" regarding the gainsharing program. These examples indicated that "a sense of participation and partnership," which is the fundamental prerequisite for successful EI (Scanlon 1948:74), did not exist in the plant.

Lacking a philosophical belief in EI, it could be that management was easily influenced by the declining effects of suggestions on labor productivity, and the substantial transaction and implementation costs. During the initial period, when the effects of suggestions on labor productivity were stronger, management might have believed that the benefits of suggestions (the labor productivity effects) overshadowed their costs (the transaction and implementation costs). However, in the last period, when suggestions had mixed effects on labor productivity, management seemed to believe that the costs of suggestions were overwhelming and that it was a rational decision to discontinue the suggestion system.

Alternatively, the employees themselves might have been responsible for the decline in suggestion activities and suggestion effectiveness in the last period. Dur-

ing the initial period (especially during the period 1985–1990), the employees may have discovered that they benefited financially by coming up with suggestions. As Hammer (1988) noted, the bonus payment in gainsharing represents a "promise kept" to workers regarding a fair exchange for the increased effort associated with making and implementing suggestions. Thus, the relatively higher bonus in the initial period motivated them to make more frequent and more effective suggestions. However, the employees may have also learned with time that their submitted suggestions had diminishing returns for them as individuals, since the amount of the bonus began to fall starting in 1990. These diminishing returns could have dampened their enthusiasm for suggestion activities in the last period, resulting in fewer and lower-quality suggestions. Thus, the changing employee suggestion behaviors in the present plant can also be explained by the reinforcement model (Mawhinney and Gowen 1990) and the behavior-outcome instrumentality linkage (Porter and Lawler 1968). In sum, both the declining productivity effects of suggestions in the eyes of management and the diminishing returns of suggestion activities in the eyes of the employees could have played a part in the discontinuation of the suggestion system.

Discussion and Conclusion

The study has yielded four main findings with respect to the suggestion system I examined: (1) the implemented suggestions enhanced labor productivity; (2) the implemented suggestions reduced the occurrence of grievances and disciplinary actions; (3) the implemented suggestions incurred indirect labor and implementation costs; and (4) there was evidence that the effects of the suggestions on labor productivity declined over time, which might be a reason for the demise of the suggestion system.

Two limitations of this study should be mentioned. First, although it would have been desirable to apply some form of cost-benefit analysis directly to the employee

suggestions, such an analysis was not feasible in this study because the benefits and the costs were measured by different means. The fact that management discontinued the suggestion program implies that its costs were believed to exceed its benefits during the last period. A more thorough cost-benefit analysis that takes into account a more comprehensive range of outcome variables (such as product quality, absenteeism, turnover, satisfaction, and organizational commitment) would be a fruitful avenue for future research.

Second, the suggestion system I examined was not a stand-alone program, but a component of a gainsharing plan. Thus, if an idea was implemented and improved organizational performance, generating a bonus, the suggestor shared the bonus with other workers through the group incentive system. The monetary incentive for the suggestor might therefore be small if many workers were covered by the bonus system. It is unclear whether a suggestion system without a group incentive basis would have produced the same outcome. On the other hand, most previous studies analyzing employee suggestions (for example, Arthur and Aiman-Smith 2001; Bowie-McCoy et al. 1993) have been based on suggestion systems combined with group incentive systems. Thus, the results of the present research can still be compared with the results of these past studies.

That said, I believe the results of this study—based as they are on a longitudinal methodology, which is believed to be more convincing than the methodology of cross-sectional studies—provide fairly strong support for the important argument that suggestion systems entail substantial costs as well as benefits. Indeed, the results show that the positive effects of suggestions on transaction and implementation costs are more robust than their effects on labor productivity and grievances. Not only these results, but also some explicit comments by managers at the research site, imply that the transaction and implementation costs can render EI too expensive for some organizations to adopt and maintain. The pattern of findings suggests that the costs asso-

ciated with EI may in fact be one of the major reasons it has not been widely adopted, and that the high organizational costs may explain why many of these programs fail over time. This is the first study, to my knowledge, to substantiate the argument that the costs of EI and HPWPs can importantly influence managerial decision-making in regard to these programs.

Some readers might think that the underlying message of the present study is that suggestions are useful only until the pent-up supply of limited business-related ideas is exhausted. I do not believe, however, that the typical suggestion system is useful only for a short time. Furthermore, it may be premature to conclude that the long-term functioning of suggestion systems can only occur in knowledge-intensive businesses. There are many instances of long-lasting suggestion systems (often combined with gainsharing), such as the programs implemented by DeSoto, Southwest Corp., Bridgestone/Firestone, TRW, and Herman Miller (Graham-Moore and Ross 1990 1995; Kim 1993), and not all of them belong to knowledge-intensive industries. These examples suggest that there must be room for continuous improvement in operation processes in most industries and organizations, and that the key to generating effective and creative suggestions over time is continuous effort to cultivate employee knowledge and creativity, as Locke and Schweiger (1979) stressed.

One possibly important pattern revealed by the regression results is the discontinuous character of labor productivity improvement effected by suggestions. As shown in Tables 3 and 5, the effects of the suggestions on labor productivity over the 10 lags were far from continuous. The coefficients for the suggestions were generally positive and statistically significant in most equations, but sometimes turned out to be negative and statistically significant (especially during Periods 1–30 and Periods 61–89). There are at least two likely reasons for this fluctuation in labor productivity in the process of suggestion implementation. First, successful change requires

three steps: unfreezing the present level, moving to the new level, and refreezing group activity on the new level (Lewin 1947). In particular, unfreezing involves an alteration of the forces acting on the individual such that his or her stable equilibrium is disturbed sufficiently to impart both motivation and a readiness to change (Schein 1973). The instability and the disturbance of the equilibrium result in temporal inefficiency. Second, new knowledge, skills, or attitudes are achieved through a tension- and conflict-filled process that often results in resistance from organizational members (Kolb 1984). Resistance to new ideas and the resultant changes come from various sources: uncertainty about the future, anxiety regarding employees' ability to meet the new job demands, threats to job security, disruption of existing social networks, and so on. Consequently, it takes substantial time and effort to persuade decision-makers and affected employees to accept changes. The time spent communicating, persuading, and educating in regard to the new arrangements resulting from suggestions will render an organization temporarily less efficient. In the present study, during certain stages, the employee suggestions were not productive, which led to a period of instability in the organization. This temporary inefficiency was from time to time expressed in the form of negative effects of suggestions on labor productivity.

The study's results have some plainly practical implications. First, if the costs of EI are as substantial as its benefits, organizations would be well advised to conduct an explicit cost-benefit projection before implementing an EI program, and to design the EI program so as to maximize benefits and minimize unnecessary costs.

In conjunction with previous research (Frost et al. 1974; Locke and Schweiger 1979), the present study suggests that to make a suggestion program successful, one must attempt to maximize the cognitive potentials of employees by fully cultivating and using their knowledge and ideas through employee education and training. A suggestion program, therefore, should be combined with extensive training and education sessions. Both hard skills (for example, competency, knowledge, and ability regarding specific jobs) and soft skills (problem-solving, creative thinking, interpersonal skills, leadership, and so on) need to be acquired by employees through training and education programs before or during the operation of the employee suggestion program. Insufficient training and education programs may indeed have been partly to blame for the unsatisfactory quality of the suggestions yielded by the system examined in this study. One way to prevent a declining trend of suggestion effectiveness over time (which was found in the present study) could be by providing periodic retraining and education sessions covering both the hard and the soft skills of employees during the operation of the suggestion system.

The results also suggest that saving involvement costs is an important task for management. For example, a suggestion program can be designed in such a way as to collect ideas from all employees, but final decision-making (decisions about whether to accept suggestions or not) can be carried out by a small group to economize on transaction costs. To save implementation costs, it may be useful to document the projected implementation costs and payback time, and to make implementation decisions based on these projections.

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