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# Policy levers for high performance production systems

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US firms seek to maximise profit, and economists have assumed that, in a competitive system, this is sufficient to drive inefficient producers out of the market and to guarantee that only those that have efficiently allocated labour and other resources survive. As a result, most economists have treated the firm as a 'black box' whose inner workings could be ignored, confining their interest at the micro-economic level to the production function relationship between inputs and output, and advocating that the rôle of government intervention be largely limited to assuring the existence of competitive market conditions. It was on this basis that the Reagan and Bush administrations looked to deregulation to promote productivity growth and the competitiveness of US firms.

But the assumption that profit-maximising firms are inevitably efficient may not hold. The competitive advantage achieved by foreign firms whose management methods and work organisation differ markedly from that in US companies, and the enormous performance gains in both efficiency and quality reported by domestic producers that have fundamentally reorganised the production process, suggest that a more efficient organisation of the factors of production may, in fact, be possible. In contrast to the neoclassical assumption that the most efficient use of technology is both available to firms and easily achieved, a more dynamic theory of the firm suggests that efficiency is affected by management structures, organisational systems, and company strategies (Chandler, 1990, 1992; Teece, 1993). These, in turn, are shaped by the institutional framework within which the firm operates. Most important are the financial system, which affects the firm's ability to invest in new technology and in intangibles such as work reorganisation and training, and labour market institutions, which govern skill acquisition and the terms on which labour can be hired (Porter, 1992; Wever and Allen, 1992). The realisation of new and more efficient production systems may, therefore, be slower and more difficult than envisioned in the neoclassical theory of the firm; the discipline of the market may not be sufficient to guarantee their timely adoption. In the US, the pace of organisational change has been relatively slow. Several factors account for this. First, given current skills of frontline workers in the US and current levels of expenditure on civilian research and development, *static* allocative efficiency considerations may dictate that firms economise on the use of scarce resources, such as highly skilled frontline workers and sophisticated process technologies. While this may yield least-cost outcomes for individual firms in the short run, in the long run

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US firms will lose out to foreign competitors who develop a dynamic competitive advantage through higher levels of investment in worker skills and in the development of manufacturing process technology. Second, the institutional framework of the US was developed to support the old, mass production system which produced standardised products that competed on the basis of price. Now that the basis of competitive advantage in the advanced industrial economies has changed, US economic development is constrained by the very institutions that previously assured its competitive success. Third, the incentive structure in US firms rewards what Stephen Smith (1991) has termed 'managerial opportunism': managers are rewarded, for example, for appropriating the ideas of their subordinates; or for improving the bottom line in the short run, and then moving on to other positions before the long-run implications of the strategies they have adopted make themselves felt. The result is that managers may be reluctant to implement change.[1] Fourth, the erosion of the concept of 'ownership' of publicly-held corporations and the rise of the market for corporate control have made maximisation of current stock price the chief goal of publicly-held firms in the US. This has impaired their ability to make financial commitments to other stakeholders or to make investments that pay off over the long run (Porter, 1992). Finally, most workplace innovations consist of practices borrowed piecemeal from one or another alternative to mass production. Managers themselves are often uncertain as to what is required in a transformed production system in order to achieve continuous improvements in quality and efficiency.

This analysis leads to two conclusions: First, if profit maximising firms are not now efficient, transforming the organisation of production can lead to performance gains in productivity and quality. Second, adopting a dynamic view of industrial development suggests that there is a role for government policy in building a new institutional framework that defines and supports high performance work organisation.

We discuss these issues at greater length in this paper. Section 1 examines the challenge to US firms. Section 2 identifies and characterises two coherent high performance production models that have only recently emerged in the US. Unfortunately, only a minority of companies have adopted high performance work systems. Section 4 examines why organisational change is not more widespread by analysing the obstacles to change and the dilemmas facing firms, unions, managers, and frontline workers. Finally, section 5 examines the impediments to the diffusion of high performance work systems posed by the current institutional framework of the US. This analysis suggests an important role for public policy in developing a new framework that can support transformed, high performance work systems. A more hospitable institutional setting may enable nascent or newly emerging high performance systems to survive the challenges posed by poor macroeconomic performance. The section concludes with a discussion of some of the more important policy levers that government can use to promote the development and diffusion of these systems.

[1]As Smith (1991) argues, this provides the economic rationale for legally mandated codetermination.

## 1. The challenge to US firms

For the last two decades, US companies have faced sharply rising competition in world and domestic markets. American complacency with the traditional organisation of production has been challenged by the loss of market share and jobs in industries ranging from autos and apparel to aerospace and computer chips. Among the reasons why the old ways of doing things are no longer adequate, two, in particular, stand out. First, firms in newly industrialising countries that pay wages a fraction of US wages are now able to compete successfully in price-conscious markets for standardised products. Second, the increased capacity for customisation and diversity inherent in microprocessor-based process technologies has reduced the cost advantages of mass production and increased competition in quality-conscious markets.

US firms have responded to intensified competition by initiating a wide range of cost-cutting and performance-enhancing strategies, sometimes attempting to undertake both simultaneously. Cost-cutting strategies usually combine a more flexible use of technology with the downsizing of employment and the replacement of full-time permanent employees with contingent work arrangements—an approach sometimes referred to as 'flexible mass production'. But downsizing and other cost-cutting measures are often not successful (American Management Association, 1992; Wyatt, 1991). Such changes may make mass production systems somewhat more flexible, but work organisation remains essentially unchanged and firms continue to compete solely on the basis of price. However, competitiveness in markets that expect quality, variety, service, and timeliness to be delivered in a cost effective manner requires a fundamental transformation of the production system. These are the markets in which most US firms compete (GrantThornton, 1991).

Many US firms have responded to these challenges by adopting performance enhancing strategies and experimenting with new work organisation, management methods, human resource practices, and industrial relations practices. Unions and workers have also been responsive to the need for change. Today, more than 85 national unions are involved in employee participation (Bluestone and Bluestone, 1992).

This is not the first attempt at workplace reform in the US. Self-conscious efforts to improve work systems—to reduce alienation, increase commitment, and make better use of workers' intelligence and skills—have occurred with discouraging regularity since Elton Mayo's experiments at Western Electric's Hawthorne plant in the 1920s (Bailey, 1992). Two features distinguish the current period of work reorganisation from previous attempts: the extent of experimentation with innovative practices is more widely dispersed than in earlier periods, affecting more than 80% of large American firms (Lawler, Mohrman and Ledford, 1992); and a growing minority of companies have made the commitment to substantially transform their production systems into high performance work organisations.

The recent emergence of high performance work systems in the US is cause for guarded optimism about the ability of US firms to produce in the US and compete successfully in world markets. These best practice American companies have

distilled and selectively adopted features of production models developed abroad, but they have combined them with distinctly American practices—including American applications of the principles of organisational psychology and American experiences with collective bargaining.

Our review of the evidence (Appelbaum and Batt, 1993) points to the emergence of two distinct and coherent models of high performance work systems in the US—an American version of lean production, and an American version of team production. There is considerable overlap between them because they rely on similar applications of information technology and similar quality tools and techniques to improve performance. The models differ, however, in the extent to which frontline workers have responsibility for continuous improvement and in the extent to which workers or their representatives participate in joint decision-making processes away from the shopfloor or work site, at the plant and corporate levels. While both lean and team production systems can exist in either union or nonunion settings,[1] the fully developed American team production model, with workers represented on high-level corporate committees that plan and implement strategic goals, is more likely to be found in unionised firms. We analyse these models in the next section.

## 2. American models of high performance work organisation

In moving from mass production to higher performing work systems, firms have borrowed ideas from the American past and from around the globe (Appelbaum and Batt, 1993). While the Japanese system of lean production has received the most attention, it is not the only source of work innovation. Some strategies, like total quality management (TQM) via statistical control processes, originated in the US in the 1920s at Bell Labs, and were a central feature of war production in American companies during World War II before being adopted by the Japanese (Walton, 1986, p. 8; Eidt, 1992). The American Human Resource (HR) model, developed from the 1950s on by firms such as IBM, Proctor and Gamble, Cummins Engine, Texas Instrument, and Hewlett Packard, continues to influence work reorganisation efforts. Following this model, managers draw on the principles of organisational psychology to improve worker motivation and management–employee communication. Pay for performance grows out of this tradition. Gain-sharing, a form of group-based sharing of productivity gains, originated in the steel industry with the United Steel Workers in the 1940s (Lesieur, 1958).

In their search for better production methods, US firms have isolated and experimented with the distinctive features of work systems developed in other national contexts. The current widespread interest in self-managed teams draws on the sociotechnical systems (STS) approach which emerged in Britain and Norway in the 1950s and later gained attention in the US (Trist, 1981; Zagar and Rosow,

[1]For example, several divisions of Hewlett Packard, a nonunion firm, have adopted the American team production model; while the unionised AT & T Transmissions Systems Unit, which won the Baldrige Award, has adopted the American lean production system.

1982).[1] The Swedish version—exemplified by Volvo's Uddevalla plant, among others—emphasises low-volume, customized production using autonomous teams of skilled craft workers. From Japanese lean production, American firms have copied quality circles, design for engineering, and just-in-time (JIT) inventory systems. Italian and German industrial districts have offered examples of networks of firms that collaborate to enhance product innovation and provide flexibility—a model of 'flexible specialisation' for responding to rapidly changing product demand. State governments have supported the development of such small firm networks as a vehicle for regional economic development (Bosworth, 1992; Batt and Osterman, 1993; Harrison, 1993); and there is growing interest in expanding this model to larger companies on a more national scale (Nagel and Dove, 1991).

More recently, researchers and policy makers have focused attention on the German system of diversified quality production: on the critical role of a publicly-funded training system jointly administered by the government, unions, and firms (Osterman, 1988; Berg, 1993); on the centrality of works councils in representing employee voice in day-to-day operations-level decisions and the representation of unions in the strategic decision-making of enterprises (Freeman, 1991; Rogers and Wootton, 1992; Wever, Berg and Kochan, 1993), and on the role of the German financial system in promoting investment in training and R & D (Porter, 1992; Wever and Allen, 1992).

A common result is that American firms gather a 'menu' of practices and tools to choose from. The advantage of this 'eclectic' approach is its potential for creating new types of human resource practices, for allowing more variety within the organisation, and for adapting production methods to the particular requirements of a product line or to the specific interests of workers and managers. The danger, however, is that firms may adopt fragments of production systems that, taken out of context, do not produce the kind of continuous improvements in performance that they do in their original settings—as occurred with quality circles in the early 1980s (Drago, 1988; Lawler and Mohrman, 1987; Kochan, Katz and Mower, 1984) and may be happening with some applications of total quality management (TQM) (Gilbert, 1992; Boyett, Kearney and Conn, 1992; Mathews, 1992; McLagan, 1991). These failures feed worker cynicism with workplace change and fuel management fadism.

Recently, two distinct and coherent types of high performance work systems have emerged in the US. Both draw on quality engineering and management concepts, and both use incentives developed in the American HR model to improve performance. As a result, the demarcation between the two models tends to be fuzzy, and there can be considerable overlap in the practices employed in each. The

[1]By self-managed teams we mean groups of workers who have substantial discretion over the work process, make changes in production methods as needed, and take on many of the tasks traditionally carried out by frontline supervisors such as allocating and co-ordinating work between different employees and scheduling work. Clearly there is a range of variation in the optimal degree of autonomy that groups have, and this is likely to depend on the nature of the work as well as the preferences of the particular group of employees. In the extreme, such teams are truly autonomous and have no supervisors, as in the Volvo plant at Uddevalla, Sweden, where the ratio of managers to employees is approximately 1:60 (Hancke, 1993). In most US cases, the ratio is considerably larger, supervisors act as 'coaches' and teams are more accurately described as 'semi-autonomous'. In this report, we use the term self-directed or self-managed to include this range of variation in the autonomy of groups.

approaches differ, however, in the extent to which they locate the source of continuous improvement in frontline workers and, consequently, in their utilisation of human resource practices such as worker participation in decision-making; extensive training of nonmanagerial employees; and employment security that provides employees with the opportunity, capability, and motivation to contribute to upgrading quality and efficiency. They differ as well in the extent to which employee participation extends beyond the immediate work process and involves workers or their representatives in a broad range of operational and business decisions.

One model is an American version of lean production, perhaps best characterised by the influential Baldrige award criteria that emphasise top management-driven quality systems.[1] The second is a more decentralised system that we refer to here as 'American team production'. It combines the principles of Swedish sociotechnical systems (STS) and, often, self-managed work with those of quality engineering. Performance improvements in both cases appear impressive (Appelbaum and Batt, 1993). These findings contradict the view held by many, and expressed most emphatically in *The Machine That Changed The World* (Womack, Jones and Roos, 1990), that the Japanese model of lean production is superior to all other production models and should be applied in every industry.[2]

The distinction between these two models centres largely on differences in human resource and industrial relations policies rather than on differences in product markets, technology or organisational strategies. The American team production approach relies heavily on decentralised decision-making through collaborative team work and on joint labour-management structures that allow workers to be represented in decision-making at every level of the company—operational, tactical, and strategic. The American version of lean production is more centralised in its approach—tending to implement or mandate a set of human resource policies such as training in quality or problem-solving skills across the entire organisation. This approach emphasises some elements of total quality management (TQM) more than others. It focuses, for example, on process management or re-engineering of work flows, data collection and performance measurement, and a centralised approach and 'alignment of vision' between the goals of the company and those of the employees. Although quality theorists such as Deming discuss the importance of employee involvement, American firms using this approach do not rely on innovations from frontline workers in the way envisioned by the more decentralised American team production approach. Employee involvement, for example, usually takes the form of a selected subset of workers participating in problem-solving committees directed by first line supervisors or other managers.

A number of researchers have noted a dilemma in balancing decentralised decision-making and self-directed work teams on the one hand, and total quality

[1]Since 1988, the National Institute of Standards and Technology (NIST) of the Department of Commerce and the American Society for Quality Control (ASQC) have administered the Malcolm Baldrige National Quality Award. It is modelled after Japan's Deming Award for quality. Since then, many states, industry associations, and publications have begun similar though less comprehensive quality awards so that even more firms have become involved in or influenced by 'the quality movement'.

[2]'Lean production', write Womack, Jones and Roos, 'is a superior way for humans to make things. . . . It follows that the whole world should adopt lean production, and as quickly as possible' (p. 225).

management on the other: the bottom-up logic of the self-directed team approach and the top-down logic of TQM appear to be contradictory, because total quality principles do not challenge management to decentralise decision-making to the extent implied by the self-directed team production model (see Lawler, Mohrman and Ledford in their recent survey of management practices, 1992, pp. 101–103; also Klein, 1991). Total quality is too easily adapted to the existing hierarchy without fundamental change in human resource and industrial relations practices. Companies are likely to resolve this contradiction by adopting one approach or the other, but not both. The risk of the decentralised approach is substantial variation in performance and insufficient co-ordination across the organisation; that of the centralised approach is inadequate employee involvement and autonomy so that continuous improvements in performance do not materialise (on the latter point see Beaumont, Hunter and Phayre, 1993).

Where unions with the appropriate organisational capacity and leadership have become involved in decision-making, they appear to provide an organisational asset not available in nonunion settings. In the decentralised systems, joint union–management structures may serve to improve co-ordination and diffusion of high performance work systems, to ensure consistency across work units, and to persuade or pressure resistant employees or managers to participate in ways that top management is unable to do through internal firm channels. It is of primary interest to the union, for example, to make sure that working conditions are equitable for all members—to spread innovations made by employees in one department or factory to all. In some of our interviews, managers indicated that unions have indeed played this role. In more centralised management systems, unions can provide a counter-weight to ensure that human resource policies receive attention and financial resources comparable to that expended on technical process improvements.

Performance improvements for firms—as measured by such indicators as decreases in waste or defect rates, reductions in customer complaints, improvements in time to get new designs to market, and increases in market share—resulting from these two approaches appear to be similar. However, the outcomes for employees in the two systems are likely to be different. Production based on team or collaborative work provides greater opportunity for employees to exercise discretion and involves all workers in the process, not a minority who are selected to leave the production floor to participate in problem-solving. That selection pro-cess in itself often creates conflict and resentment between those selected and those left behind to 'do the work'. To be effective, however, this work organisation requires not only supporting human resource and training practices, but industrial relations policies as well. Unions provide due process protections under law that assure employees they will not be penalised for speaking out; and provide mechanisms for addressing conflict in the workplace. Finally, collective bargaining backed by labour law remains the single most effective means for employees to ensure that they receive their fair share of performance gains (Freeman and Medoff, 1984).

### 3. American lean production

The Malcolm Baldrige Award outlines a new American model of lean production and is designed to shape managerial behaviour and improve firm performance. It

encourages firms to focus on quality and customer service and to re-engineer their internal work systems backwards, beginning from the customer's perspective and requirements. Modelled after the Deming Award in Japan, it promotes an American-style lean production in the US, but without Japanese-style human resource and industrial relations institutions.

The American version of lean production differs from the Japanese most notably with respect to human resource and industrial relations policies. A recent study comparing American Baldrige and Japanese Deming award winners, for example, found that the Deming winners have considerably higher levels of 'mass participation' of workers in continuous improvement efforts (Gomez, 1993). Whereas the Baldrige winners tend to use temporary or *ad hoc* cross-functional teams to solve particular problems, Deming winners use quality circles made up of permanent work groups so that all employees, rather than a selected sub-set, are involved in participative efforts. Employee suggestion systems are also of a different character: in the Japanese plants, 'suggestions' are really improvements that the employee implements and then documents. In the US companies, the 'suggestions' are recommendations submitted to managers or engineers who may or may not act on them. The numbers of 'suggestions' per employee are also radically higher at the Japanese plants, implying that employees make improvements as a normal part of the work day. In addition, in the Japanese plants as well as at NUMMI, the well-known Japanese transplant, employment security provides the basis for employee participation in continuous improvement. In both settings, there is a no-layoff policy and employees have protection against unjust dismissal through collective bargaining agreements.

### *3.1. The Baldrige criteria and total quality management (TQM)*

It is important to understand the Baldrige Award because it has already affected the behaviour of thousands of managers across the US. In the first five rounds since its inception in 1988, approximately 500 applicants have entered the competition. However, many more companies have been influenced by the Baldrige competition than the numbers of applicants indicate. In 1992, for example, 240,000 companies requested copies of the award criteria and application (Miller, 1992, p. 1). Moreover, the Award has spurred networking and benchmarking among firms by requiring winners to respond to requests for information. Baldrige winners have given hundreds of lectures and conferences to managers from other firms interested in replicating successful techniques (Main, 1991).

Baldrige examiners judge companies by criteria which fall into seven categories and twenty-eight sub-categories.[1] The point value of each category signals to managers which areas are considered most critical to developing a high quality, high performance system. The Baldrige criteria adopt a version of total quality management that emphasises the strategic role of top management and quality management

[1]The seven categories are customer focus and satisfaction (300 points), leadership (90 points), information and analysis (80 points), strategic quality planning (60 points), management of process quality (140 points), quality and operational results (180 points) and human resource development and management (150 points).

systems in improving competitiveness.[1] Consistent with the TQM adage that 85% of problems reside with management and 15% with employees, 85% of the Baldrige points reward improvements in management methods and processes. These include 30% for customer service (including marketing, product development, time until a new product or model is ready for market); 23% for top management leadership, strategy, and management of information systems; and 32% for process management and operational results. By comparison, only 15% of the points reward improvements in human resource practices.

In the customer service category, the emphasis is on improved methods for incorporating customer feedback into marketing and product development, particularly through methods such as customer surveys and focus groups. Closer attention to customer demand is required by rapid advances in technologies and the proliferation of differentiated products that make it more difficult for companies to anticipate the demand for their products. Customer surveys provide constant feedback, while customer focus groups help create customer loyalty. A key objective measure of quality and customer service is cycle time (both quality and speed are often byproducts of the same source—for example, the integration of engineering and manufacturing). To achieve this, the Baldrige model draws on other elements of the TQM approach to improve internal management and production processes: top management provides leadership, develops a strategic plan, ensures quality engineering processes; gets feedback through data collection performance measurement, and management information systems; and measures operational results.

The remaining 15% of the formula rewards improvements in human resource development and management: overall human resource management counts 2%; employee involvement, 4%; education and training, 4%; employee performance and recognition, 2·5%; and employee well-being and morale, 2·5%. The Baldrige award provides no special incentive for the involvement and empowerment of frontline workers *per se*, but rather suggests that companies involve different categories of employees according to company goals or occupational responsibilities.[2]

The important omissions are notable. There is no mention of those measures that employees consider central to their well-being: employment security, wage growth, promotions, due process guarantees, conflict resolution procedures, or employee voice. The Award criteria mention the role of unions only once, in a footnote concerning human resource planning (US Department of Commerce, 1992; Baldrige Award Criteria, 1992, p. 17; comment is repeated in the introduction, p. 4).

[1]In reality, there are many different versions of TQM, some emphasising the link to customers and robust product design, some the importance of strong managerial role and leadership (Juran and Gyrna, 1988), some the cost of nonconformance (Crosby, 1979), and some the importance of employee involvement (Deming, 1984).

[2]In a footnote to the section on employee involvement and empowerment of frontline workers, the Baldrige criteria state: 'Different involvement goals and indicators may be set for different categories of employees, depending on company needs and on the types of responsibilities of each employee category'.

The Baldrige Award criteria, therefore, provide a model of lean production that improves firm performance by combining total quality marketing and problem-solving techniques with more traditional hierarchical organisation and with employment policies such as careful selection of new employees, training, and performance evaluation drawn from the American Human Resource model.

While industrial relations issues and human resource practices are sleighted in the Baldrige Award *criteria*, most Baldrige *winners*[1] pay careful attention to some human resource policies. They tend to be more selective in hiring practices, invest more substantially in training in quality, group process, and job skills, and are more likely than are conventionally managed companies to tie compensation to performance. Despite the low weight assigned to worker participation in the Award *criteria*, the Award *winners* tend to make use of quality circles, problem-solving teams or cross-functional teams.[2] These team structures mobilise the information and knowledge that hourly workers have in order to make process improvements, and are an important form of employee involvement; but they are different from production teams or collaborative work groups, and they do not involve employee participation in management. They are parallel structures that coexist with the 'normal bureaucratic organisation and hierarchical authority, but leave these arrangements untouched' (Hill, 1991, p. 549).

There is a diversity in management practices among the Baldrige winners (Gomez, 1993), but Baldrige winners share certain characteristics. Most discovered the total quality teachings of Deming, Crosby, and others earlier than other American firms and experimented for several years with refining those principles to fit the peculiar characteristics of their own industries and organisational cultures. Many were spurred by a profit crisis or decline in product market share that led top executives to make a single-minded commitment to quality and customer service and to make radical changes in production processes to achieve those ends. IBM Rochester and Marlow Industries are typical in this respect. Case studies of several Baldrige winners (Gomez, 1993) confirm the top-down implementation of TQM; the increased empowerment of managers through greater sharing of company information and involvement in quality councils and strategic planning committees; the training of workers in team-building, problem-solving, and quality tools; the involvement of workers in a variety of parallel structures, such as quality improvement or problem-solving teams; and the greater openness and responsiveness to customers and suppliers.

### *3.2. American team production*

The American team production model begins with sociotechnical job design and the use of collaborative work groups and, frequently, self-directed teams but

[1]Information on the Baldrige winners here and below comes from case studies conducted by the bureau administering the Baldrige Award in the US Department of Commerce, by the US Department of Labor, by the American Productivity and Quality Center, and by Gomez (1993).

[2]Solectron Corporation has taken a 'team-focused' approach to employee involvement, and has trained most workers in problem-solving methods and statistical process control. Motorola uses problem-solving teams throughout the company to establish quality goals. The Wallace Company uses teams and has empowered 'associates' to make decisions not exceeding $1000 without consulting a supervisor. Zytec Corporation uses cross-functional design teams and several departments are self-managed.

incorporates an eclectic set of ideas from other sources: just-in-time inventories from the Japanese, total quality and statistical process control from Deming via Japan, incentive and compensation structures developed in the American HR model, and a uniquely American form of labour–management partnership growing out of the American experience with collective bargaining and joint Quality of Worklife (QWL) activities. It incorporates a real redistribution of power and authority in the workplace. Among the cases we examined, this model is most fully articulated at the Xerox facilities in Webster, New York, at GM's Saturn plant in Spring Hill, Tennessee, and at some of Corning's plants—the new or 'greenfield' catalytic converter plant in Blacksburg, West Virginia and the converted or 'brownfield' specialty cellular ceramics (SCC) plant in Corning, New York.[1] Other companies, such as Ford, have adopted important elements of this model with notable results (Banas, 1988; Smith, 1986; Sheridan, 1990; Templin, 1992). More recently, service sector firms such as BellSouth and AT & T have begun experimenting with this approach.[2]

In the following sections, we outline the main features of this model, which include a sociotechnical organisation of work; employee participation in human resource issues such as selection of work unit participants, training, and compensation systems; industrial relations built around joint labour–management decision-making structures; and total quality principles and techniques such as quality process improvement, just-in-time inventory systems, and statistical process control.

### *3.3. Sociotechnical work systems and self-directed teams*

Continuous improvement in a sociotechnical work system is expected to come from two sources: giving employees autonomy in decision-making and opportunities for refining the production process, and treating work as a system designed to fit with the technical system rather than a set of individual jobs. The assumption is that, because of their intimate knowledge of the work process, workers rather than managers or engineers are best equipped to organise work with a given technology. Employees are more likely to come up with process innovations if they can look across a work system rather than at a narrow job—hence the importance of working in teams rather than individually (Simmons and Mares, 1983). Once teams of workers design a work process they can, if given the discretion and incentives, become the source of continuous improvement. The high performance plants at

[1]For the following analysis of these cases, we draw on a combination of case materials and interviews with participants. For Xerox, we rely largely on March 1993 interviews with Xerox manager Nick Argona and ACTWU union representative Tony Constanza, co-managers of the 'Joint Process Architecture' that initiated organisational changes at Xerox; also interviews with Peter Lazes, consultant on the transformation process at Xerox in the 1980s. For Saturn, we rely on September 1992 interviews with Dick Tracey, former GM and Saturn manager, currently at the Industrial Technology Institute; also LeFauve and Hax, 1992; Fraser, 1992; and Rubinstein, Bennett and Kochan, 1993. Information on Corning comes from our on-site visit and interviews in October 1992.

[2]The unions that have developed partnership relationships with these firms are the Amalgamated Clothing and Textile Workers Union (ACTWU) at Xerox, the United Auto Workers (UAW) at Saturn, and the American Flint Glass Workers Union (AFGWU) at Corning. Other unions that have recently negotiated such relationships include the Steel Workers (USWA), the Communication Workers (CWA) and the International Brotherhood of Electrical Workers (IBEW).

Xerox, Corning, and Saturn all take a sociotechnical systems (STS) approach to technology and work organisation.

At Xerox as early as 1978 some managers began looking at human resource issues from the point of view of sociotechnical job redesign, did benchmarking with firms in Norway, and drew on the knowledge of outside consultants trained at Tavistock, the British institute known for its elaboration of STS principles. About the same time, Xerox officials used their corporate relationship with Fuji-Xerox of Japan, which won the Deming prize in 1980, to establish internal benchmarks for manufacturing cost, quality, and design time. By 1982, a union–management team visited Japanese companies to observe their manufacturing methods and human resource practices. Similar processes occurred at Saturn and Corning from the mid-1980s on. At Saturn, workers and the union participated in every phase of the design and construction of the plant. A committee of managers and workers known as the Group of 99 participated in fact-finding missions and visited benchmark companies all over the world to develop a new production system (LeFauve and Hax, 1992).

In these three cases, the basic production unit is a team or collaborative work group; the composition and degree of autonomy vary within and across the sites. The key concept is that frontline employees participate in shaping their areas of responsibility based on the product, technology, and preferences of those involved. Work teams at the Corning and Saturn plants have substantial autonomy, not only over work-related decisions but also human resource issues. Work groups at Xerox show more variation in composition and discretion.

At the Corning SCC plant, teams work autonomously without shift supervisors, cross-train, rotate across semi-skilled jobs, and communicate directly with engineers and support staff to solve production line problems or co-ordinate production deadlines and deliveries. They regularly receive business information about the plant's competitive position. At Saturn, the basic work unit is a six to 15 member team that is self-managed and has the responsibility and authority to address work flow, quality, and human resource issues. Teams elect their own leaders, who remain working members of the unit. Interrelated teams form modules, which are then integrated into three business units. Each business unit has a joint labour-management 'Decision Ring' or committee to address plant-level operational issues. There are also Decision Rings at the module level. Other joint structures are the Manufacturing Action Council which covers the manufacturing and assembly complex and the Strategic Action Council which does long-range planning at the corporate level.[1]

At the Xerox Webster plant the basic work unit is the Business Area Work Group (BAWG), a group of 35 to 60 people that includes all employees—production, maintenance, managers, engineers, union representatives—responsible for producing a specific output (Lazes *et al.*, 1991). These small business teams make their

[1]Work units at Saturn 'are self-directed and empowered with the authority, responsibility, and resources necessary to meet their day to day assignments and goals including producing to budget, quality, housekeeping, safety and health, maintenance, material and inventory control, training, job assignments, repairs, scrap control, vacation approvals, absenteeism, supplies, record keeping, personnel selection and hiring, work planning, and work scheduling' (Rubinstein, Bennett, and Kochan, 1993).

own decisions about how to get the work done, as long as production quotas, schedules, and quality standards are met. The BAWGs use a variety of participatory practices and tools—including problem-solving and quality teams; just-in-time application projects; production design teams; task forces for new product development; and study teams to tackle longer-term problems (Lazes *et al.*, 1991; Lazes and Constanza, 1984). The BAWGs also have the authority to establish self-managed work teams. These are voluntary, and are established if a work group and managers agree. As a result, the degree of worker self-management varies. Autonomous work groups, semi-autonomous work groups, and work groups with supervisors co-exist in the same facility.[1]

The organisational structure at both Corning and Saturn is flat. Xerox retained its traditional structure throughout the 1980s, but created a leaner organisation by increasing the training and responsibilities of frontline employees and decreasing reliance on engineering and support staff. More recently, it began a restructuring effort that levels its hierarchy and reduces production job classifications (e.g. machining from 25 to five broad bands).

*3.4. Human resource policies: hiring, compensation, training*

The participation of workers in setting HR policies provides workers with incentives to improve the work process. At the Corning SCC plant, the self-managed teams developed disciplinary rules governing behaviour on the job. Workers help select new entrants to the team and explain team production to new applicants. Job applicants who are not interested in self-managed work tend to self-select out of the hiring process, improving the fit between incumbent and new team members. Corning teams also undertook job analyses to develop a new set of job classifications and a three-tiered skill hierarchy which is the basis for a pay-for-skills compensation system negotiated by the union and management. Additionally, the SCC employees (both managers and workers) receive 5–7% of their wages through a gainsharing plan (linked to achieving plant-level performance goals) and a profit-sharing plan (linked to corporate performance).

Teams at Saturn do their own hiring and are responsible for developing and administering policies regarding absenteeism and replacement of absent workers. Wages at Saturn are set at 80% of the industry wage, paid as an annual salary rather than an hourly wage, with workers receiving an additional 20% if performance goals are met, and with the possibility of up to another 20% if goals are exceeded.

At Xerox, workers are generally not involved in the hiring process. An exception is that trades people participate in interviewing new workers who may be joining them on the mod squads to be sure the person is qualified. The union and management have jointly developed a training programme and have negotiated a gainsharing plan that allows workers to share the rewards of performance gains. Gainsharing is based on workers meeting quality, cost, scheduling, safety, and attendance goals.

[1]An example of autonomous work groups at Xerox are the 'Mod squads'—autonomous groups of electricians, painters, and carpenters that have cut costs by 30% by eliminating layers of employees as the teams took over advising, engineering, drafting of blueprints, and supplier relationships.

Training budgets at all three work sites are extensive. In the set-up phase at Corning, training costs ran as high as 23% of payroll. Now that the new organisation is functioning smoothly, the plant manager budgets 15% of worker time for training. Initial training of workers at Saturn is extensive, despite the fact that the workforce consists entirely of experienced auto industry workers. Following this, workers at Saturn devise individual training goals, and are expected to spend 5% of their time (92 hours annually) in training activities. Training has always been extensive at Xerox, which has a highly developed internal training capability. The company puts all production workers through a qualification course, and has a four-year apprenticeship programme for the skilled trades. Training for frontline workers in problem-solving techniques, quality practices, and team-building skills have been an integral part of the strategic shift to joint partnership and of the establishment of problem-solving teams. Xerox spent $9 million for trainers in 1985, and employee time spent in training in a three-year period had a value of $70 million (Marshall and Tucker, 1992, p. 97).

*3.5. Industrial relations*

A distinctly American form of 'partnership' between plant management and the union has emerged at Xerox, Saturn and Corning, with an emphasis on developing a 'shared business vision' and joint union–management committees at each level of the organisation. Shopfloor participation, while important, is viewed as insufficient to gain the full involvement of the workforce in the organisation. Production and problem-solving teams are most effective at refining a given production process and improving 'conformance' quality—that is, improving conformance to specifications and reducing defects. To go beyond these incremental changes requires joint processes and 'architectures' that involve workers or their representatives in broader operational and strategic issues. Company officials credit worker and union representation on joint policy committees with improving the planning process and the quality of decisions. In addition to providing a vehicle for tapping knowledge, sharing information, and obtaining a buy-in on decisions from both sides, the joint committees are an important expression of mutual respect. At Saturn, the partnership between the union and the corporation encompasses strategic planning at the corporate level through the Strategic Action Council which meets weekly to deal with relations with dealers, suppliers, and stockholders and to address long-range business issues. In addition, union and management partnerships are responsible for tactical planning, and operational planning and performance in most areas of plant operation through Decision Rings, Problem Resolution Circles, and partnering by the union and management in middle management positions (LeFauve and Hax, 1992). Business Unit Leaders (plant managers) are partnered with elected union Executive Board members. This partnering of a union member with a manager in hundreds of staff and line positions may be the most innovative aspect of Saturn's governance system (Rubinstein, Bennett and Kochan, 1993).

At Xerox's Webster complex, major elements of the ACTWU/Xerox joint process structure include the executive and policy committee that meets semi-annually to set overall strategic goals, the joint planning committee which meets quarterly as a

steering committee to determine how the overall strategy should be deployed, and the plant advisory committees which meet monthly to decide how to implement the strategy. In addition to management and union representatives, the advisory committee also includes shopfloor workers.

The structure of these joint committees—approximately equal numbers of representatives coming from management and the union—as well as the negotiating process are an extension of, rather than an alternative to, collective bargaining. They grow out of the American experience with bargaining at the plant and local level. The collective bargaining process is expanded as joint decision-making creates implicit contracts that are often made explicit in memos and company documents. Negotiating, itself, has become an ongoing process.

Employment security is central to the kind of flexibility inherent in these labour contracts. This commitment makes economic sense for firms when they have invested heavily in training workers and where multi-skilling allows for more flexible internal deployment. Workers at Xerox's Webster plants have had employment security since the 1983 contract, though they may be transferred to different BAWGs and even different plants in the Webster complex as necessary. The Saturn contract guarantees workers employment security, providing that there will be no layoffs except in the case of a catastrophic event.

*3.6. Quality*

Quality is a central focus of organisational transformation at all three companies. Xerox won the Baldrige Award in 1989 and Corning was a finalist. Quality tools and techniques extend far beyond the control of variance. Corning began introducing Total Quality concepts in 1982, making statistical process control (SPC) available to plant managers to use as they determined. The Corning plant incorporates SPC responsibilities into the jobs of frontline production teams, as does Saturn; and SPC has been an important quality tool at Xerox since 1983. As noted above, problem-solving and work teams are at the heart of the very substantial performance gains reported by all three companies.

Xerox adopted just-in-time production as a key element of its production system in 1988, and 'time-based competitiveness' in 1993 (Argona, 1992). Just-in-time production techniques are also an integral part of the high performance systems put in place in the late 1980s at Saturn and Corning. In addition to tight management of buffers and 'pull' production and scheduling, steps have been taken at all of the companies to minimise set-up time, streamline supplier relationships, distribute the work load within teams or work groups and across the plant more evenly, reduce equipment downtime, and improve the throughput of materials. All three companies have also built customer feedback into the quality control system; and customer satisfaction ('internal' as well as 'external' customers) drives design changes in products and delivery systems.

A critical feature of the quality programmes in all three companies has been the role of the union in creating the kind of 'mass participation' in quality efforts needed to make them successful. At Corning, for example, management initiated a total quality programme in 1982 and put all employees through training, but it did not really take hold until the late 1980s after the company and the union negotiated an

agreement that embodied a shared vision and a partnership structure for the union in business decisions and planning.

At Xerox, the process occurred in reverse: 'Team Xerox', the joint process first ratified in the 1980 collective bargaining agreement, laid the groundwork for the 'Leadership Through Quality' programme introduced by top management in the mid-80s. As with total quality management generally, the training was 'cascaded down' from top management to lower levels of management and employees. When total quality training finally reached the shopfloor and skilled trades, workers found that, while the terminology was different, they had already mastered these skills. The total quality processes introduced at Xerox already had a firm basis for success in the prior training and activities of shopfloor workers. At the prodding of the union, what started as a top-down mandate for change was blended with the employee involvement and joint process commitment already in place. The slogan at Xerox became 'Total Quality Through Employee Involvement'.

## 4. Obstacles to change

### *4.1. Dilemmas facing firms and managers*

*Barriers for firms.* Individual firms face numerous difficulties as they attempt to transform their production systems. These include the high initial training costs and the difficulty of assuring that the firm will capture the returns, the high cost to small firms of training workers at all, the lack of a clearing house for sharing information on innovative practices, and the absence of accounting standards for measuring quality or valuing investments in research or human capital. In addition, there are problems of interfirm co-ordination as well as more commonly recognised externalities or market imperfections. Examples include the recruiting by one firm of workers trained by another or the problems of integrating employees and equipment that belong, say, to the telephone company but are located on a customer's premises into a participative work system.

Finally, there are the problems created by the recent rise of the market for corporate control, which requires a firm's top officers to satisfy the demands of portfolio investors (who favour firms with high dividend payout rates) rather than to use the earnings of the company for investments in difficult-to-measure activities like training or research and development. The proportion of after-tax corporate profits distributed as dividends by US firms, already 45% in the 1960s, rose to 60% in the 1980s, and to 72% in 1990 as profits fell and dividends climbed (Lazonick, 1992, p. 459). Present corporate governance structures in US companies make it difficult for top management to make intra-firm commitments to the development of new production processes or to long-term employment relations and to make inter-firm commitments to stable, collaborative network relationships with suppliers. Yet, many researchers have argued these are essential characteristics of high performance production systems (Brown, Reich and Stern, 1991; Brown, Reich, Stern and Ulman, 1993; Levine, 1992; Levine and Tyson, 1990; Helper, 1991; Helper and Levine, 1992).

We are not suggesting that individual firms can never successfully transform their production systems in the absence of a supportive institutional environment.

Clearly, as the evidence in this paper demonstrates, this is not the case. But we would argue that it has proven inordinately expensive and unnecessarily difficult for US companies to make the transformation. As a result, transformed work systems have tended to arise when three conditions are present: a crisis threatens the product line or market share, the company has the resources to gamble on a high risk strategy, and top management is willing to take that risk. Such crisis conditions, however, have often had the opposite effect—causing a company to downsize or outsource production and renege on the commitments it has made to its hourly workers and middle managers on gainsharing or employment security.

*Managerial resistance to change.* Several factors account for managerial inertia and resistance to organisational change in the US. First, the incentive structure in US firms rewards managerial opportunism (Smith, 1991). Unless corporations restructure the reward system, these perverse incentive structures may lead managers to resist change.

Second, sharing power, authority, responsibility, and decision-making is uncharted territory for most US managers, and many are reluctant to cede power to workers on and off the shopfloor. This is particularly true in view of the widespread downsizing and reductions in managerial ranks undertaken by many firms. Companies that wish to reorganise work systems must define new roles for managers that give them responsibilities for co-ordinating across functions, improving quality, or responding more directly to customers or suppliers.

Third, earlier rounds of work reform and employee involvement were intended to improve worker attitudes and avoid unionisation, and only indirectly to affect firm performance. For that reason, training, job enlargement, and other workplace innovations were seen as discretionary actions that could be cut back in times of crisis to reduce costs. It is only since 1980 that some managers have recognised that organisational transformation is part of the firm's competitive strategy, and not a tactical tool for dealing with workers. Disagreement on this point among managers continues to be prevalent, and may account for the failure of successful transformations to diffuse, even within a company.

Finally, most workplace innovations consist of practices borrowed piecemeal from one or another alternative to mass production. Managers themselves are often uncertain as to what is required in order to achieve continuous improvements in quality and efficiency.

*4.2. Union and worker ambivalence toward partnership*

Many unions now recognise the value of participation in management decision-making. As the central conflict between labour and management has shifted from wage bargaining to saving jobs, unions have recognised the need to represent members' interests by taking a proactive rather than reactive stance to corporate decisions that affect the profitability of the company. Long-term management decisions with respect to capital investments, product development, technology, and work organisation determine the viability of a facility. If unions are not involved early on in the decision-making process, they have little opportunity later to shape the course of events. In addition, worker participation at the workplace in

problem-solving teams often results in cost savings and quality improvements that save jobs. A growing number of examples exist of employee committees that have identified sufficient improvements to prevent the out-sourcing of work or to bring new work in-house.

Joint labour–management programmes have been established at approximately half of the unionised establishments (Cooke, 1991), and many of the best known examples of high performance production systems are occurring in unionised plants. Many more unions have had positive experiences working on joint committees focused on specific issues such as training or health and safety (Mitchell, Lewin and Lawler, 1990). Participation by unions in these committees is less problematic than is participation in quality-oriented committees, however, because the subject of joint participation is clearly delineated and unlikely to impinge on collective bargaining issues. Many employees also genuinely like participating in problem-solving or self-directed teams, and other workplace programmes that draw on their ideas (see for example, Adler, 1992; also, the 1992 survey of AT & T employees jointly administered by AT & T and CWA).

The locus of debate within unions, therefore, has largely shifted from whether to participate to *under what conditions* and *how*. These questions continue to pose daunting dilemmas for unions. A union local at a large manufacturing plant that recently won a quality award refused to participate in the quality efforts when invited to do so because management unilaterally set the terms and conditions of participation and retained the right to select the employees who would participate. Under these conditions, participation was not attractive to the union. The question of *how* to participate also poses problems. Participation puts major new demands on the administrative, leadership, and technical capabilities of unions in a period of dramatically reduced organisational and financial resources. Few unions currently have the necessary capabilities to assume 'partnership' responsibilities.

*The concerns of unions and members.* Union members may be called on to make decisions about two different levels of participation: whether to support *worker participation* in management-led committees such as problem-solving teams; and whether the *union* should participate in joint union–management structures. Two interrelated principles guide union decisions on these questions: the welfare of members and the institutional integrity of the union. The two are closely linked because the institutional strength of the union determines how well it can represent the interests of members in the long run. Workers' welfare rests on improvements in working conditions, employment security, and income growth. Decisions by union members to participate depend largely on their ability to negotiate two types of guarantees: that workers will share in the gains from work reorganisation and that the union's security is preserved and its ability to organise new members is unimpeded.

For union members, however, work restructuring and the pruning of middle management have sometimes amounted to increased burdens and speed-up of hourly employees who have been poorly prepared by the company to undertake new responsibilities. In other cases, participation may be used to provide managers with access to workers' tacit knowledge, which may then be used to reorganise work at

foreign subsidiaries or elsewhere, at the cost of the jobs of the original workers (Richardson, 1992).

Self-directed teams provide greater autonomy for workers, but management of workers by their peers introduces the potential for new kinds of conflicts, including the illegitimate use of peer pressure to intensify work or carry out management by stress. Conflict resolution among workers and between workers and managers is more complex under these circumstances. Some of these issues may be resolved through contract language that builds in mechanisms for gainsharing, employment security, and retraining and placement of workers displaced by technology or by process and quality improvements.

For unions, worker involvement in management-led committees raises two concerns that relate to their institutional integrity. First, in nonunion settings, companies have used employee involvement programmes to discourage union organising; the National Labor Relations Board (NLRB) has determined that such committees, with management-appointed members, constitute illegal company unions. Second, in unionised settings, unions are concerned about their ability to uphold collective bargaining principles. Even some unionised companies have attempted to use quality of worklife (QWL) or other committees to undermine or marginalise the union. Quality or process improvement teams in which management selects volunteers to participate pose even larger concerns than QWL committees. These teams focus on ways of changing working conditions and the skill content of jobs (for which the union has negotiated specific wage rates). These are issues of mandatory bargaining under US labour law. Even under the best of circumstances—where management does not intend to undermine the bargaining relationship and the union selects participants—legitimate concerns arise regarding the use of informal labour–management committees in decentralised worksites. These committees engage in ongoing negotiations that may reach agreements that contravene broader contract agreements. Workers representing their own interests at one site may not be aware of the adverse affects of their decision on workers in another unit. The union, however, has the legal responsibility to represent all workers. Unions also are concerned that joint work site committees may allow management to engage in 'whipsawing'—in which locals are made to compete against each other or compelled to match changes made at other sites.

These dilemmas have led some unions to negotiate joint structures and oversight committees at several levels of the organisation. The 1992 contract between AT & T and its unions, CWA and IBEW, which established the 'Workplace of the Future', takes this approach, as do the collective bargaining agreements between Xerox and ACTWU and Saturn and the UAW. This kind of structure, however, requires unions to reorganise internally and to strengthen leadership and administrative capabilities at several levels. It requires large investments by the union in training staff to monitor decentralised agreements and to develop technical expertise to analyse and contribute to new technological and organisational strategies. Moreover, it requires shifting power in decision-making to lower levels of union leaders. Work team leaders, QWL facilitators, and worker representatives on operations and strategic management committees can threaten the authority of elected union leadership if they are not fully integrated into a revamped union

organisational structure. Even where unions have developed joint structures and capabilities, mutual trust depends from the union perspective on management agreeing to remain, at minimum, neutral with respect to union organising at existing nonunion company work sites.

Finally, the involvement of union leaders in operational and strategic management decisions, and the performance of traditional management responsibilities by workers in self-managed teams, raises legal questions. In 1980 the US Supreme Court ruled that employees performing managerial work were not covered under the National Labour Relations Act.[1] How this ruling applies to participatory workplaces remains to be clarified. In nonunion settings, moreover, the question of how workers are to be represented in power sharing activities is a difficult one. The legality of the paternalistic solutions favoured by some companies, especially those that have adopted the American HR approach, has been challenged by the December 1992 ruling of the National Labour Relations Board (NLRB) in the Electromation case.[2] The issue is whether workers' interests are represented in labour–management committees when management selects the workers who will participate.

## 5. The role of public policy

### *5.1. Institutional barriers to change*

In the US context, no 'institutional imperative' shapes organisational transformation. In a sense, the institutional framework in the US can be characterised as permissive—institutions neither require nor support change—which may account for both the diversity we observe as well as the difficulty firms face in making such changes. Moreover, US labour law—in which only wages and working conditions are mandatory subjects of collective bargaining, and business decisions are management prerogatives—hinders the transition to high performance work systems.

The lack of an institutional framework external to firms that shapes opportunities, constrains behaviour, or supports the diffusion of successful innovations within companies shapes the pattern of change. The absence of an infrastructure that supports change means that major organisational transformations are more likely to occur in response to crisis conditions than as a result of the implementation of a vision. The fact that change is usually undertaken as a response to crisis conditions explains in part why reforms tend to be adopted piecemeal—the few best practice cases are exceptions to the rule. Firms that adopt work reforms in crisis conditions are often unable to make commitments to employment security, gainsharing, or other paybacks for workers. Indeed, as they attempt to reform work organisation they may be simultaneously engaged in more direct cost-cutting measures, such as

[1]This decision came in the 1980 NLRB v. Yeshiva University case. While that case applied specifically to academic faculties, it is uncertain whether it applies as well to blue-collar or other hourly workers performing managerial functions.

[2]In December 1992, the NLRB found that the 'action committees' set up by Electromation Inc., a nonunion company in Elkhart, Indiana, to deal with issues ranging from bonuses to the treatment of employee absenteeism violated the 1935 National Labor Relations Act, which bars companies from setting up management-dominated committees. At Electromation, managers determined the purposes and goals of the committees, fixed their size and membership from a list of volunteers, and included a management representative (Victor, 1993).

subcontracting out work and laying off workers, that demoralise employees and undermine trust. Thus, firms may find they do not achieve the anticipated gains from innovations and may jettison them. Many examples also exist of successful experiments disbanded when a stable group of employees who have been working together become redundant or are transferred during downsizing and restructuring.

Furthermore, the lack of an institutional infrastructure to shape developments means that major organisational change is overly dependent on the personalities and commitments of key individuals—the CEO, plant manager, workers in particular units, or local and national union officials. Lacking recognised sources of information, US managers turn to gurus who are expert in one or another management fad, and end up adopting fragments of production systems developed in other institutional contexts. Such changes may be implemented successfully without the support of external institutions; but it takes a leadership dedicated to change and a large commitment of corporate resources to make this happen.

In the absence of institutions that reduce or socialise some of the costs of moving to high performance production systems, it may be unprofitable in the short run for individual firms to undertake the research and training to change to more efficient forms of organisation. The costs associated with organisational change are incurred in advance of the gains from higher quality and/or lower cost in a transformed system. These up-front costs hinder the ability of all but the most convinced or most desperate firms to change.

The decision to pursue a low wage, low skill strategy on the part of some US firms raises further obstacles to success for those firms that wish to implement more innovative approaches in production processes, work organisation, and employee involvement. First, firms attempting to make fundamental changes can be undermined in the short run, before the performance improvements made possible by these changes have materialised, by low wage competitors. Given the very high start-up costs in the US context, firms are especially vulnerable in the initial stages, when they are trying to establish a new production system. Predatory pricing by low wage competitors can threaten the survival of the transformed firms, or at least of the innovations they have adopted. There is some fragmentary, but alarming, evidence to suggest that this is, indeed, happening (Luria, 1992).

Yet another problem is that the lack of legal, bargained, or cultural restrictions on the ability of most US firms to lay off workers makes it difficult for transformed firms, which rely on mutual trust, to honour commitments they have made to employment security during periods of recession. Competitors who have not adopted a high commitment model of work organisation will reduce costs during a recession by laying off workers, putting firms that have promised employment security under pressure to renege.

Finally, unions engaged in a rear guard action to protect jobs and wages at companies pursuing flexible mass production and a low wage path are uncertain about the intentions of firms pursuing alternative forms of work organisation. Unions fear that if they give up traditional means of exercising power—job control, grievance procedures, and the threat of undermining production by 'working to rule'—they will be unable to compel companies to uphold their commitments to worker participation in management or other forms of power sharing. Thus, to the

extent that some firms adopt low wage paths to competitiveness, the obstacles facing firms that attempt high commitment alternatives increase.

*5.2. Public policies for high performance*

To diffuse high performance work systems more broadly requires an interrelated set of public policies that address the issues that firms and workers on their own cannot tackle. Economists generally agree that it is appropriate for government to address externalities and market imperfections. A labour force that possesses a high level of skills reduces training costs and improves the efficiency of all firms. Publicly-supported interfirm consortia that achieve economies of scale in R & D and training similarly spread the costs associated with high performance work systems. The development of officially sanctioned clearing houses to determine and promote best practice in process technologies and associated work organisations reduces uncertainties not only for firms planning to implement them (Cole, 1989), but for financial institutions that would otherwise be reluctant to lend to companies for this purpose. While some of these initiatives require government spending or changes in existing regulations, many require little of the government beyond playing an initial role as 'honest broker' to help the private sector establish these institutions. We have grouped policy options into five areas: policies to improve training institutions, enhance employee participation, increase the commitment of firms to their stakeholders, support interfirm collaboration, and rule out the low wage path.

*Job training.* Building a technically trained workforce requires programmes that are workplace-centred so that training can occur on state-of-the-art technology and be integrated into work reorganisation efforts that allow employees to use their newly acquired skills and problem-solving capabilities. States must go beyond individual programmes to create *training systems* that have a strong local institutional base and can evolve and respond flexibly to changing demands on labour. Employees must be able to return to formal training as needed, and to integrate this process into the normal course of their working lives.

Publicly-supported training runs the risk of creating large subsidies to firms for training they would undertake anyway. To avoid such subsidies, training programmes should be administered as grants or contracts with targeting and performance criteria established by the states.[1] One alternative is to target firms and workers most unlikely to have the resources to undertake training on their own—small and medium-sized firms; frontline rather than managerial workers, who now receive most of the training (Carnevale, 1990); and minority workers and women, who are the least likely to receive training (Lynch, 1989). Another alternative is to require larger firms to provide matching funds or demonstrate that public funds supplement existing efforts. States can also target training related to total quality and collaborative team work. States such as Illinois and California have already developed some of these alternatives (Batt and Osterman, 1993).

[1]Countries such as France that have imposed a pay-or-play system based on a straight training tax have found that small firms usually end up subsidising larger firms. Small firms without the resources to do the training end up paying the tax which goes into a public fund; small firms also lack the slack time on production lines to train workers and the administrative capability to access the public fund.

To enhance system-building, state-administered training programmes may provide incentives for creating training networks among small firms in conjunction with community organisations, trade unions, community colleges, and local employment offices. Within the workplace, labour-management training committees provide another vehicle for building institutional support for training, for ensuring that training programmes meet the needs of the workforce, and for monitoring programmes to ensure quality and accountability.

To guard against training that is too narrow to provide employees with portable skills, training programmes should build in occupational certification requirements. The development of occupational skill criteria and the accreditation of training programmes offered by community colleges, technical schools, vendors, and in-house training staff reduce the costs to firms of identifying appropriate training curricula and increase the portability of worker credentials.

*Promoting employee and union participation.* A number of policy alternatives are available to counter the perverse incentives (Smith, 1991; Wever and Allen, 1992) that discourage managers from adopting more participative work systems. The most direct route, put forward by a number of researchers and policy makers, is to mandate elected employee councils modelled after European works councils (Smith, 1991; Rogers and Wootten, 1992; Freeman and Rogers, 1993). These councils could replace existing employee involvement programmes that, as in the *Electromation* case, violate American labour law because they are essentially company unions. Legislation could clarify the rights, areas of responsibility, and sanctions available to such councils.

Alternatively, Congress could build on existing legislation that provides special tax treatment to firms with Employee Stock Ownership Plans (Levine, 1992). Support for ESOPs grew in the 1980s in part to increase employees' sense of ownership in firms, and hence their participation in performance improvements. But the empirical evidence suggests that meaningful employee participation only occurs when structures are in place to provide a vehicle for participation (Levine and Tyson, 1990; Eaton and Voos, 1992). Tying ESOP tax subsidies to the creation of such structures would help establish this critical link.

These policies do not take the place of reforms needed in existing labour legislation to overcome the obstacles to participation facing unions. The lack of enforcement of current labour laws has created obstacles to union organising, long delays in union elections, and managerial disregard for the duty to bargain contracts that drain resources and deter unions from assuming the leadership role required in partnership activities. Additionally, given the increasingly widespread use of self-managed teams, current interpretations of labour law (e.g. *Yeshiva*) that exclude from coverage workers with some supervisory responsibilities must be reconsidered. Indeed, there is no reason to exclude from protective labour legislation lower level supervisors and managers whose working conditions, degree of employment security, and work responsibilities increasingly resemble those of frontline employees.

A major obstacle to greater participation is lack of employment security both at the individual level due to 'employment-at-will' and more generally due to firm

restructuring and downsizing. But the employment-at-will doctrine has been increasingly challenged in courts over the last decade through tort law, and unjustly fired employees have won large awards. As a result, one state has already passed legislation prohibiting unjust dismissal with broad support from the business community; and 17 others are considering it (Tomkins, 1988; Hahn and Smith, 1990; Krueger, 1991). The broader issue of employment stabilisation must be addressed by macroeconomic policies as well as by labour market policies and regional economic development strategies that support the adoption of high performance work systems and enhance the viability of small- and medium-sized firms.

*Increasing firm commitment to stakeholders.* Both US law and the operation of American capital markets favour the interests of a firm's shareholders over those of other stakeholders—its employees, managers, directors, suppliers, customers, and the community in which it is located. Moreover, shareholder value tends to be narrowly defined as current stock price (Porter, 1992). Managers who sacrifice short-term stock price for other goals face the threat of a hostile takeover, a shareholder revolt that replaces top management, or a law suit. This may happen, for example, if a firm increases retained earnings in order to invest in intangibles such as R & D, organisational redesign, or worker training and thereby reduces dividends, causing a sell-off of the stock and a short-term decline in its price. Retained earnings are the major source of investment in new technology and organisational change. Yet, managers are penalised for using them to maximise long-term shareholder value.

In contrast to the German or Japanese systems, in which the dominant investors in a firm are corporations or institutions that hold large stakes and are permanent owners, more than 85% of the stock of publicly traded companies in the US is owned by individuals or by institutional investors that act as agents for individuals (Porter, 1992). The goal of institutional agents (e.g. pension funds, mutual funds), who are evaluated on a quarterly or annual basis by the appreciation of the stocks in their funds, is rapid appreciation of their shares in relation to some stock index. Both individuals and institutional investors in the US are transient owners, ready to move to another company in search of higher short-term gains.

This leads American investors into speculative behaviour that erodes the concept of ownership in the corporate sector and has had a profound effect on corporate governance, especially with respect to corporate control (Crotty and Goldstein, forthcoming). The rise since the 1950s of the 'market for corporate control'[1] prevents corporate managers from making financial commitments to long-term investments and from recognising their obligations to all stakeholders, not just investors. Both the focus on short-term performance and the rise of the market for corporate control inhibit the shift to high performance work systems. First, they undermine the ability of large shareholders to act as 'patient' capitalists. Second, they reduce the ability of managers to invest in research and development, new

[1]This term refers to the ability of present or potential stock holders to exercise control over the investment decisions of corporate managers, most notably, though not exclusively, through the threat of a hostile takeover of the company (Lazonick, 1992).

process technology, new work organisation, and training. Finally, they undermine the ability of the firm to undertake long-term employment contracts with its employees (Lazonick, 1992).

A number of policy measures to reduce the focus on short-term stock price performance and to increase the financial commitment of firms to all of their stakeholders, not just the owners of stocks and bonds, have been proposed (Crotty and Goldstein, forthcoming). These include taxing short-term capital gains at significantly higher rates than long-term; subjecting securities transactions to a modest trading tax to weaken incentives for speculation and churning; adopting or strengthening state laws regulating hostile takeovers to protect the rights of employees, restricting 'greenmail', placing representatives of stakeholder constituencies on boards of directors, and giving longer-term shareholders more of a voice. Workers should have a larger role in deciding the policies of their pension funds; pension funds should be encouraged to engage in long-term shareholding and to take a more active role in the companies in which they hold stakes.

*Building interfirm collaboration and quality standards.* Transformed production systems require new forms of interfirm co-operation and co-ordination. Total quality production depends upon reducing the arm's length relationships between firms—building strategic alliances between competing firms or vertical linkages among tiers of suppliers and customers (Grabher, 1991; Campbell, 1992). Some state governments have already taken an active role in facilitating network relations among firms to enhance research and development, the adoption of new technologies, and the provision of related technical training; others have encouraged public–private partnerships to provide export promotion. These efforts should be evaluated and further diffused, perhaps as part of an industrial extension programme. A system of state or regional-level industrial extension programmes would provide a vehicle for disseminating information and providing guidance to firms on the adoption of new work organisation and human resource practices. Industrial extension programmes could also assist firms in meeting quality standards. The ability of firms to meet quality standards could be enhanced through the establishment of a third-party registration system, similar to those in Europe, in which the government certifies auditing companies to rate the ability of firms to meet their customers' quality standards (Holusha, 1992).

*Ruling out the low wage path.* Many proposals that have been put forward in other contexts also have the effect of limiting the excesses of predatory pricing behaviour by firms following a low-wage strategy. Such policies include a national health care plan; a universal family leave act; pro-rated pension and vacation benefits for part-time workers; mandated portable benefits for temporary workers; indexing of the minimum wage to one-half the average wage; the elimination of tax code provisions that encourage firms to move production jobs out of the US; and the development of international labour standards to accompany trade agreements (Rothstein, 1993).

These policies are 'preventive' (Sengenberger, 1990) because they make it more difficult for firms to follow a competitive strategy based on low wages. It is

important to rule out this option if firms are to be encouraged to pursue a high performance strategy. In the early stages the costs of organisational transformation are high and firms pursuing a high performance strategy are especially vulnerable to competition from low wage firms. Thus, it may be unprofitable for an individual firm to transform its production system—despite the potential efficiencies of team-based production, total quality management, and more participatory structures—if it can be undermined in the short run by firms following a low wage strategy. Ruling out the worst excesses of such behaviour removes an important obstacle to organisational transformation in firms that wish to pursue this path.

## 6. Conclusion

US firms face numerous obstacles in implementating transformed production systems. These include dilemmas facing unions, perverse incentives for managers, and the barriers to diffusion that arise from an out-moded institutional framework. An industrial strategy adopted by the federal government should include measures to support the transformation of production processes in US firms and promote a more efficient combination of the factors of production. Competition among national economies in the coming decades will be waged not only in the domain of critical new product technologies, but in the domain of process technology and work organisation as well. Government policy has a key role to play.[1]

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