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Productive systems, competitive pressures, strategic choices and work organisation: an introduction

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1. Introduction

Since the 1970s the responses of American firms to intensified competitive pressures have resulted in the emergence of a variety of new organisational forms designed to improve firm performance. Innovative management methods, work organisation, human resource practices, cooperative labour relations and relational links with suppliers are widely believed to improve competitive performance through their positive effects on labour productivity, product quality, organisational flexibility and firm responsiveness to an ever-changing environment (Konzelmann Smith, 1995; Katz and Sabel, 1985; Delaney, Ichniowski and Lewin, 1988; Kochan, Katz and McKersie, 1986). But these changes have been far from universally successful. Studies of cooperative labour–management programmes in the US have revealed that few have yielded significant long-term gains in terms of improved organisational performance.

Part of the problem may be that what constitutes a truly cooperative system has yet to be developed in the United States. Nonetheless, the belief that cooperation benefits performance continues to dominate popular opinion as well as the professional literature, and the benefits of cooperative approaches remain the focus of much study. At the same time, it is well known, especially among workers and organised labour, that many firms continue to employ adversarial approaches to labour relations as part of their effort to solve competitive problems. A dichotomy therefore appears to be emerging in labour–management relations, with both more cooperative and increasingly adversarial approaches being used (Cutcher-Gerschenfeld, McKersie, and Walton, 1989).

The papers in this volume provide in-depth analyses of firms' strategic responses to changes in technology, regulation and competition. Frost's study of a Canadian steel plant analyses the interrelation between conflict and cooperation and shows how the firm stand taken by the union over disputes is instrumental in securing effective cooperation. By contrast, Forrand's study of machine tools documents the part played by non-cooperative and conflictual relations in the decline of the US machine tool industry. The comparative study by Batt and Darbyshire of the transformation of the telecommunication industries in America, Britain and Germany concentrates on the impact of different regulatory and collective bargaining systems on the introduction of revolutionary new technology, and on how these forces reshape markets and industrial organisation. Konzelmann and Yokun's study of dental services in the US analyses how technical developments influenced the pattern of demand for the services of dentists and dental

hygienists and how this is managed (or, more precisely, not managed) within the hierarchical relations established and maintained by legal regulations. The paper by Birecree and Woolley investigates the distribution of costs and benefits between taxpayers, students (and their parents), administrators and academics resulting from the combined effects on higher education in Virginia of changes in patterns of demand, new technology, and budgetary constraints imposed by the state. Persson shows how problems thrown up in Sweden by the institutionalisation of industrial relations resulted in institutional and policy developments which created a pervasive cooperative environment and made a significant positive contribution to the pace and direction of Swedish economic development.

The first section in this introduction discusses the essentially cooperative nature of production and how the relations of production have the dual role of securing cooperation in production and resolving conflict over distribution. The second section addresses the question of how, in theory, these problems are resolved. It is argued, starting from the position that the operation of free markets secures cooperation and settles the question of distribution between highly individualistic agents, that economists have devised arguments as to why large, hierarchically organised firms have come to serve the same purpose. The third section argues that productive systems with organisations and institutions which are rooted in this individualistic economic ideology have proved vulnerable to competition from systems with directly cooperative productive relations. The fourth section briefly reviews research which suggests that replicating the benefits of cooperative work organisation has proved difficult in hierarchical employment situations. The fifth section outlines the main findings of the case studies and draws conclusions about organisational requirements for developing and maintaining cooperative work organisation.

2. Productive systems: an analytical framework

Productive systems consist of the stages of production of particular products or groups of products and the linkages between the different stages.[1] Within productive systems, at each stage of production, labour, equipment and materials work in combination. None can operate without the others so that the failure of any to perform its productive functions adequately lowers the joint product of the whole. This technical interdependence extends to relations between the different stages of production. The *operational efficiency* (i.e., the effectiveness of the utilisation of productive resources and the meeting of product specifications) of productive systems depends on how well products and processes are designed, labour is trained, materials and components are prepared and productive tasks are performed. Success in this respect will be determined by how well labour and the means of production work together within each stage of production and how well the different stages of production mesh. Consequently, cooperation between the agents of production (the owners and/or controllers of labour, the means of production and the different stages of production) is a technical necessity which determines the resource cost and quality of the output of the productive system and hence its competitiveness.

A central feature of the necessary cooperation within productive systems is the sharing

[1] For discussion of the concept of productive systems see Wilkinson (1983), Tarling and Wilkinson (1987), Konzelmann Smith, (1996) and Birecree and Konzelmann (1997). What constitutes a particular productive system depends on the purpose of the analysis: whether it is, for example, a workplace, a firm, an industry or an economy.

of information. This is important in a technical sense to ensure, for example, that all agents of production are equally well informed about the best means of production and that components are designed and produced in such a way as best to fulfil their productive purpose. Success in production will also depend on access to information on the latest products, processes and forms of organisation. Here, cooperation is important because of the problem-solving benefits of working together and because the sharing of information increases the pace of diffusion and development of new processes and products and, hence, the pace of technical progress of the productive system. The *operational efficiency* of a productive system depends, therefore, to an important extent on the generation and transmission of technical information, and its *dynamic efficiency* requires the generation and diffusion of information on new products and processes and ways they can be improved. Both operational and dynamic efficiency are critically dependent on cooperation.

In examining productive systems and the forces operating upon them it is important to differentiate between the *technical* and the *social relations of production.* Technical relations of production are the functional inter-linkages between labour, equipment and materials in the production process and are therefore objective and impersonal associations determined by the technicalities of products and of the methods by which they are produced. By contrast, the social relations of production are the subjective and personal associations between the agents of production which form the social network within which the technical relations of production are formed and the productive tasks of labour and the means of production are jointly undertaken. Social relations of production play a central role in determining the effectiveness of technical cooperation and, hence, operational and dynamic efficiencies.

The nature of the technical relations of production plays an important part in forming the social relations of production. In artisan production, tools are controlled and guided by individuals, and technical operations both within and between production stages are directed and coordinated by skilled craft workers. In artisan systems, therefore, diffused interpersonal social relationships are pervasive. This form of organisation typifies relationships within dentistry in the US and until recently in higher education in Virginia. This is highlighted in the case study by Konzelmann and Yokum (this volume), and by the use made by Birecree and Woolley (this volume) of the metaphor of the *artisan village* to characterise the traditional institutions of higher education.[1] However, the greater the mechanisation and automation of production, the more the pressure is for the social relations of production to become centralised.

At the macro-level the social relations of production are structured by the political and legal systems. The political and legal system mediates economic relationships by determining the form taken by commercial and employment contracts, setting standards for production, employment and trade, administering procedures for resolving disputes, regulating private organisations and institutions, determining what constitutes breaches in rules and regulations, and imposing sanctions. These rules, norms, procedures and sanctions are embedded in company and trade union law, competition policy, labour, product and capital market legislation and welfare state rules.

At the micro-level, the social relations have three functions in the management of production: direction, coordination and command. Direction involves such *entrepreneurial* decisions as choice over the composition of output, the methods of production and the

[1] In this respect, it is interesting to note that Adam Smith (1974) explained that the word *university* was an ancient term for incorporated trades which regulated appenticeships.

marketing strategy; coordination synchronises productive activity; and command exercises the control and imposes the sanctions necessary for coordination. Each of these functions will require a degree of formal authority and a network of more informal interpersonal relationships among participants in the productive process, although this mix will vary between managerial systems. Together, they serve to secure effective cooperation in production and therefore work in the mutual interests of the partners in production by securing for them the best possible outcome in terms of the largest aggregate return for their collective effort. However, while the parties to production relationships derive mutual benefits from cooperation in production, from which their incomes are ultimately derived, they compete over the proceeds because what one gets the others cannot have. Each production relationship is therefore by its nature both cooperative and rivalrous, so that the social relations of production have the dual and potentially conflicting roles of securing cooperation in the *process* of producing and agreement over distribution of the *outcome* of production. But there may be a trade-off. The pursuit of distributional self- or group interests could precipitate a retaliatory withdrawal of productive cooperation, a lowering of operational and dynamic efficiencies and a reduction of the proceeds from production. The trade-off can be seen, in effect, as one between short-term separate interest in the share of the pie and a longer-term shared interest in the size of the pie (Burchell and Wilkinson, 1997).

In neither the short or long term, however, is the size of the pie likely to be exclusively determined within the productive system. Each productive system is subject to continuous pressures from the technological, market, social, legal and political environments within which it operates. In turn, similar processes within productive systems, both independent of and in response to external pressures, initiate changes which also help mould their environment. These forces are important in determining the competitiveness of productive systems. Competitive success generates additional resources for distribution and increases the prospects for increased cooperation and operational and dynamic efficiencies. Competitive failure risks the opposite: a degenerative cycle of conflict over distribution, withdrawal from cooperation in production and declining economic performance. The important question is then: how can the common interests in production and the divergent interests in distribution be reconciled?

3. Cooperation and distribution in economics

Economists have traditionally put strong emphasis on the self-motivation of individuals, who are portrayed as being driven entirely by their own selfish interests. On the other hand, specialisation by way of the division of labour is regarded as a central driving force of economic progress, and the more specialised individuals become the more necessarily dependent they are on others (Marshall, 1947). The important question then becomes: how can this interdependence be made compatible with individualism? In addressing this question, Adam Smith (1974) established the economics' orthodoxy by identifying exchange as both encouraging the division of labour and coordinating the increasingly specialised parts of the system. The propensities in human nature to 'truck, barter and exchange one thing for another' (p. 117) leads to the division of labour and, as a result, 'in civilised societies' individuals stand 'at all times in need of the cooperation and assistance of the great multitudes' (p. 118); needs that are met 'not by the benevolence of the butcher, the brewer or the baker' but in exchange where they have 'regard for their own interest' (p. 119). Self-interest thus provides the incentive for securing the benefits of

specialisation, free exchange provides the opportunity, and the system of exchange—the market—coordinates the individual production and consumption decisions securing societal cooperation.

Cooperation, therefore, does not appear as a problem in orthodox economics in which productive processes are conceptualised as being driven by self-seeking individuals motivated by exchange opportunities and bought into cooperation by the impersonal working of market competition which also determines distributional shares. The prerogative afforded to individuals has been extended by theory and practice to include the managers of large, hierarchically organised corporations on the grounds that they evolved as the result of market forces (Berk, 1994). The corollary of this is that the regulation of individuals or corporations, even when they have reached a dominant market position, risks interference with market forces and welfare loss. On the other hand, collusion between individuals or groups is *in restraint of trade* and should be discouraged.

The idea of authoritarian social relations of production as one of the driving forces of economic progress also draws support from the perceived de-skilling effect of the division of labour. Fundamental to this process is the progressive simplification of the tasks undertaken by individual workers, the reduction of their discretion over the execution and pace of work by mechanisation (which embeds the coordinating and control functions in the machine) and the development of scientific management (to perfect the coordinating and command function of management). As capitalism has evolved, so the story goes, technology and managerial authority has progressively substituted for workers' skills and control. The hierarchical command structuring of management is reinforced by the contract of employment which underpins 'managerial prerogative', grants managers rights to the 'cooperation' of the employees in areas not covered by explicit or implicit agreement and therefore vests in the employer powers which go 'beyond contract' (Fox, 1974). The same idea, in a different form, is found in the Marxian distinction between labour power and labour, but with quite different implications: it is because the worker contracts to submit him/herself to the employer's orders for the duration of the contract term that the resulting performance of the contract gives rise to the possibility of the employer's expropriation of the surplus from production (Deakin and Wilkinson, 1996).

4. Adversarial productive systems and competitive failure

The consequence of the development of theories of the inevitability of managerial coordination and control and the incorporation of these into the practice of management is that the mass of jobs became low trust and this imposed a 'limitation on human collaboration' (*ibid.*, p. 362) Low-trust relationships result from the imposition of formal rules and close supervision on workers; the managerial coordination of workers' tasks; the use of technological and managerial constraints and monetary incentives in preference to self-imposed standards for determining the pace and quality of work and the use of punishment, more rules and tighter supervision if standards are not met. Within this fundamentally alienating and antagonistic environment industrial relations became premised on a 'behavioural acceptance of divergent purpose' (*ibid.*, p. 29), with workers and management having different ends or values: requiring a precisely balanced exchange in the short term; carefully estimating the costs and benefits of concession; restricting information in their own interests; limiting mutual dependence and readily imposing sanctions against ill-will or default on obligations (*ibid.*, p. 362). Where it emerged, collective bargaining came to provide the basis for compromise usually by the acceptance

by the unions of managerial prerogative and the recognition by management of the right of unions to represent their members and negotiate on their behalf about the *effects* of management decisions.[1] However, in such adversarial circumstances the primary function of collective bargaining becomes the regulation of conflict, and collective agreements embody the peace terms and the procedures by which the terms of the truce are policed and the industrial peace preserved (or not, as the case may be).

American producers took the lead in developing low-trust work organisations. These, when combined with technological leadership and large-scale mass production, appeared to give the US economy competitive supremacy. But organisational and technological leadership was not the only reason for the continuing market success of the US. Until the early 1960s the US markets were to an important degree closed to foreign competition. Furthermore, the high demand for products in the early post-war period created a sellers' market in which oligopolistic producers could impose upon their customers the variety and quality of goods dictated by their production priorities and the price and non-price consequences of their adversarial social relations of production. From the early 1960s, however, the US markets were progressively opened up to foreign competition to which US producers increasingly succumbed.

This *new competition* (Best, 1992) is broadly based on rapid product and process innovation, improved design, greater variety and high quality, as well as keener prices. It came from Japanese, German, Italian and other producers who had evolved high degrees of cooperation with their workers and suppliers. Within these productive systems employment relations are non-hierarchical and overtly cooperative; inter-firm links are *relational* rather than hands-off; and the state, trade associations, trade unions and other organisations and institutions separately and together intervene in markets by setting norms and rules, standards to regulate competition and the relations between the *social partners*. The outcome has been high levels of operational and dynamic efficiency.[2] This results from the mobilisation of the skills and knowledge of workers and suppliers in the innovation and improvement of products, processes and the organisation of production as well as from improved labour productivity, the effective utilisation of equipment and materials and effective quality control (Howes, 1991).

Such high levels of competitive performance rested on the ability to build relationships closer to what Fox described as high trust. The requirement of these include: mutual commitment to the joint productive effort; the recognition of the inappropriateness of close supervision; a cooperative relationship between related work areas rather than standardised, externally imposed coordination; the taking for granted that loyalty, support and goodwill are essential for the exercise of high discretion; and the recognition that dispute resolution is a question of problem solving rather than harsh discipline. Traditionally, in the US, high-trust employment relations were confined to a narrow range of high-level managerial and professional jobs, although those of certain craft workers, technicians, clerical workers, lower professionals and supervisory and

[1] See Batt and Darbyshire (this volume) for a discussion of the *effects* of bargaining.

[2] Applebaum and Batt (1994) in their extremely valuable study identified four main systems of cooperative production: Japanese lean production; Italian flexible specialisation; German diversified quality production; and Swedish sociotechnical systems. The Japanese and Swedish systems are more firmly rooted in Taylorist mass production than the German or, particularly, the Italian. But what the four systems have in common is the importance given to high levels of worker training and the success they have achieved in closely involving workers at all levels in the organisation and management of production, in product and process innovation and in the development of organisations and institutions designed to facilitate cooperative working relationships.

administrative staff included high-trust elements. The success of the emerging, competitively successful productive systems was to extend high-trust relations to include the whole workforce.

5. The response of US management to the new competition[1]

American managers are attempting to come to terms with the reality of the new competition. Nevertheless, the strategies they are adopting are designed more to reform than to revolutionise traditional forms of work organisation. New managerial methods range from *flexible mass production* to what Applebaum and Batt refer to as *American team production.* Mass production has been made more flexible and inventory management improved by incorporating computer, micro-processor and information technology-based systems within existing structures, and costs have been cut by replacing full-time staff with workers on short-term contracts, part-timers and contingency workers. Greater interchangeability among skilled workers has been achieved by cross-training but usually within the context of more broadly based de-skilling programmes for production operatives. The objective of team working when introduced has been designed more to save on supervision and administrative costs than to develop working systems based on highly skilled, versatile workers motivated towards making major contributions to high-quality production and to process and product innovation.

Human resource management is a second, widely deployed strategy designed to secure greater worker involvement. This draws on industrial psychology theories of motivation, behavioural theories of job enlargement and enrichment, and organisational behaviour theories of better communication and employee involvement, The idea is that firms will reap the rewards of greater worker motivation and improved job performance by increasing job satisfaction, enlarging and enriching jobs, providing more challenges and opportunities, developing new skills and engaging workers' interests by designing wage systems that recognise individual differences and reward employees accordingly. Human resource management rests on a unitary model of the firm and is therefore incompatible with traditional 'pluralistic' industrial relations systems. Nevertheless, the incorporation of workers' representatives into managerial processes through works councils or other integrating institutions is seen as an important part of the new approach to work organisation. For this to happen, collective bargaining needs to be 'integrative' rather than 'distributive'. Trade unions, if they are to play any part, rather than compete with management need to assume the role of coordinators of strategic processes and facilitate the achievement of managerial objectives, which are to be regarded as progressing the mutual interest of all the firm's *stakeholders.*

Flexible mass production has done little to change 'the fundamental nature of the production system or threaten the basic organisation or power structure of the firms' (Applebaum and Batt, 1994, p. 22.). It continues to rely mainly on price competition, which is not a viable long-term strategy when the main challenge is coming from low-wage countries. Similarly, downsizing and the closing-down of less efficient plant bring one-off benefits and risk the long-term effects of worker antagonism and demoralisation. Like flexible mass production, human resource management does little to challenge the logic of mass production, although it does give the management more labour-force flexibility. Nevertheless, the source of competitive advantage comes more from lower labour costs,

[1] This section draws heavily on the study by Applebaum and Batt (1994).

savings from the reduction in the cost of conflict management, and from the greater flexibility available to management in the deployment of labour, rather than a more fundamental development of cooperative work relations and increased reliance on the creativity of the workers. Thus neither flexible mass production nor human resource management has succeeded in fundamentally improving the long-term competitiveness of US firms.

Appelbaum and Batt do, however, distinguish two 'coherent' types of 'high performance' work system: the *American lean production* model and the *American team-based* model.

> The lean production model...relies...on managerial and technical expertise and centralised co-ordination and decision-making... The team-based model combines the principles of Swedish socio-technical systems with those of quality engineering and locates the source of competitive advantage and continuous improvement in the front-line, or production-level work force. It therefore more thoroughly decentralises discretionary decision-making. In addition, it incorporates structures for the representation of workers' interests at several levels of the organisation: the work unit or shop floor; intermediate levels (department or establishment); and the strategic or corporate level. (*ibid.*, p. 7)

While both models are considered to be 'high performance' systems that yield comparable improvements in performance outcomes in the short run, potentially they affect employees very differently. American team-based systems improve efficiency and performance by incorporating structures and incentives that encourage higher levels of employee participation and cooperation. The American lean production system, however, relies heavily upon traditional institutional structures that can adversely affect employee motivation to cooperate at high levels, thus reducing its long-term effectiveness when compared to the team-based system.

The case studies of American companies included in this collection reveal little evidence of the development of high performance systems of either variety. However, those from other countries provide important insights into how such systems might be developed.

6. Cooperative and antagonistic relations in the case-study industries

The purpose of this special issue is to examine closely the structures and dynamics which operate to encourage or discourage cooperation in production. The value for this purpose of the case studies is that, first, they are cast within a broad institutional context and, second, they allow international comparisons. In the Canadian steel plant studied by Frost, the driving force for change was increasingly high-quality standards demanded by steel users. Effective response to this product market pressure required the reorganisation of work, higher skilled and more multi-skilled workers and the diffusion of greater responsibility for production to the shop floor. To facilitate this, union and management established procedures and organisational structures for joint control, founded on the acceptance of the need for mutual consent to changes in the workplace including reorganisation, training, contracting out, technological change and workforce scheduling. *De facto* co-determination did not, however, prevent the local union officials from rigorously defending their members' interest in opposition to management's initiatives. But success in this drew the union leaders into developing, together with their members, alternative ways of solving problems, ones which the membership found acceptable. Local union

leaders' action in militantly opposing *and* in securing acceptable settlements to disputes was fully supported by a responsive national union. Multi-level strong and decisive action served both to strengthen the local unions as effective representatives of their members' interest and to legitimise their involvement in the joint control of work reorganisation, technical change and related issues. The strategic use of conflict and cooperation therefore secured for the union a greater role in workplace governance.

The embodying of electronic and computer technology into machine tools transformed the products and the markets of the machine tool industry. In this process, world leadership was lost by US producers and gained by the Japanese. Japanese progression to world dominance was characterised by high levels of cooperation between developers, producers and customers of machine tools, encouraged and coordinated by the state. Employment relations were equally cooperative and included high levels of job security and substantial investments in worker training, together with forms of work organisation which reflected respect for technical expertise and knowledge of workers and which were designed to encourage maximum participation in product improvement and the innovation of products and processes.

By contrast, the retreat of US industry from world leadership was marked by the abandonment of its traditional core strengths of dependence upon workers' skills, quality products, close relations with customers, and continuous technical change. The lack of effective collaboration between machine tool producers and with customers seriously impeded essential learning processes. Among large firms, agglomeration, the selling-off of assets, the relocation of production to low-wage countries and the failure to invest in training and technology sapped the ability to compete. Individually, small firms lacked the resources to develop new products and collectively they failed to create the institutions to compensate for this weakness. The absence of a shared research and development effort meant that competition between innovating firms and with research laboratories, often for Defense Department funds, led to wasteful duplication of research. Moreover, the dominance by the Defense Department and car producers biased the development towards large systems to the neglect of 90% of the world market. The absence of any broadly based collaborative effort to innovate and to develop competitive products had its counterpart in the continuing adversarial labour–management relations. These, and the widely held belief among managers and development engineers that technology could be substituted for skill, encouraged firms to undervalue the contribution of technical skills and knowledge, to pursue lower-skill strategies, to control closely and coerce their workers, to neglect training and wage war on trade unions. The irony of this was that a further major constraint on industrial performance was the chronic skill shortage and the competitive bidding of firms for what remained of the machine tool industry's skilled labour force.

The driving forces for change in telecommunication were technical developments and product market reregulation. Fibre-optic cable and the digitalisation of switching and transmission systems created telecommunications systems which are largely maintenance free, have greater capacity to transmit voice, video and data, provide higher quality services and the means of integrating a wide range of communication, media and entertainment services. In the US and the UK product market reregulation was driven by business interests which stood to gain from the new technology, the lucrative long-distance market, cheaper international communications and the rapid integration of computer, entertainment and telecommunications markets. These objectives where secured through the Justice Department and courts in America and business interest groups operating within the governing Conservative Party in Britain. The pace of

reregulation of regional telephone systems went much more slowly in America where state legislatures continued to protect non-corporate consumer interests. In Germany, worker and consumer interests successfully blocked reregulation until it was imposed by the European Commission.

Regulatory changes in the telecommunication markets in America and Britain were *asymmetric.* They were designed to end the monopoly power of the existing operators (AT&T and British Telecom) by excluding them from the new cable or wireless communications sectors and by opening up the long-distance telephone and equipment markets to new entrants. The pattern for post-reregulation industrial and market organisation was set by AT&T's adoption of a global strategy and the use of new technology to cut costs, eliminate labour and segment the product and labour markets. The levels of service offered vary between market segments. At one extreme, large business customers are served individually by college-educated managers while, at the other, residential customers are served through automated systems by operators who are required to handle around 80–90 calls per day and are located in a small number of mega-centres: sweat shops where operators are closely and electronically monitored. Joint labour–management work innovations, while receiving considerable publicity in the 1990s, have had little impact on actual practice and union influence on AT&T's strategy has been confined to maintaining high relative wages and negotiating generous severance and early retirement packages in exchange for labour peace. Similarly, BT, despite 90% union membership, has restricted union influence by moving from joint regulation and a low supervision/high trust industrial relations system to a human resource strategy involving higher levels of supervision and control and very high levels of job loss.

The slower pace of reregulation of Regional Bell Operating Companies (RBOC) helped protect organised labour. Of the two companies included in the case study, NYNTEX had a history of union (CWA) militancy. This involved the forming of alliances with other unions and consumer interest groups and opposing corporation before the Public Utilities Commission (PUC). NYNTEX has used technology strategically to automate and eliminate work, to build a smaller, highly skilled flexible workforce while maintaining unilateral management rights with respect to operational decision-making. The union, CWA, has increasingly exchanged high wages, retraining and union security and expansion into non-union subsidiaries for much more substantial employment reductions than in other regional companies. Agreements designed to improve relations with NYNTEX have required the CWA to develop 'public policy issues of common interest', including supporting the company's deregulatory objectives before the Public Utilities Commissions. Despite, therefore, the apparently amicable settlements in recent negotiations, the traditional labour–management roles have been preserved, with management retaining decision-making authority and the union negotiating the *effects* of management action. The outcomes have been very similar at Bell South despite the long amicable and cooperative relationship between CWA and the corporation. The union has collaborated in the introduction of Total Quality Control and has supported regulatory reforms favourable to Bell South. However, there has been no institutionalisation of participation or any denting of managerial prerogative. The union in Bell South has been more effective at preserving employment than in NYNTEX, but only at the cost of low relative earnings. More recently, management has loosened its commitment to cooperative relations with the union and this threatens the industrial relations system.

The German approach to restructuring the telecommunications industry has been to reinforce co-determination at the level of the industry and the firm. Works councils have

been modified in response to the concerns of employees about post-privatisation organisation, and employee representation on the supervisory boards has been made strong even by German standards. Under this regulatory framework high universal standards for telecommunications services were established. De-unionisation was ruled out as an option by the political negotiations by which the union, DPG, retained bargaining rights with Deutch Telekom (DT) and secured them in any subsidiaries the company might establish. The combination of legally enforceable employment rights, union representation and works councils (with extensive rights over the introduction of new technology and rationalisation, regrading of workers, transfers and appointments) exerted strong pressures on corporate strategies and the pattern of work reorganisation. This has precluded widespread technological displacement, downsizing and cost minimisation and has required protracted negotiation over change. By closing off this option and the possibility of segmenting the domestic product market, the new regulatory framework has obliged DT to offer a universally high level of service and to adopt a revenue-enhancing, up-market strategy. This strategy has been fostered by the retention by DT of the largest cable TV network in the world, which has allowed it to develop an integrated, high quality, upmarket, multi-media service. DPG lent its strong and active support by bringing forward numerous revenue-raising suggestions.

In US dentistry, the main environmental impact has been the fluoridation of water supplies. Demand for restorative treatment carried out by dentists has declined while that for preventative care provided by dental hygienists has increased. The decline in the demand for dentists' services coincided with an increase in the number of dentists following the 1960s policy decisions to expand dental provision. The over-supply of dentists resulted in widespread closures of training courses and an intensification of competition between dentists. Dentists are overwhelmingly male and dental hygienists are exclusively female. Despite the growing relative importance of preventative care, its increasing range and sophistication and the professionalisation of dental hygienists, the traditional hierarchical and paternalistic employment relations have remained intact. These are enshrined in legal regulations. The training, qualifications and duties of dentists and dental hygienists are closely regulated by the states. State Dental Boards, which administer regulations, and Councils of Dental Education, which oversee training, are dominated by dentists organised by the American Dental Association. By regulation, only dentists can own and operate dental offices and they are directly responsible for all treatment given in their offices. Legally, then, dental hygienists are the employees of dentists, who determine their pay and are required to monitor their work closely. At the same time, the incomes of dentists are increasingly dependent on services generated by dental hygienists and, more directly, because dental hygienists often make the diagnosis which leads to restorative treatment performed by dentists. The changing balance between the two occupations has created divisions which have been sharpened by the growing demand for equality of treatment for women, the increasing financial pressure to which women are subject and by the competitive pressure on dentists. The regulatory system, dominated as it is by dentists, functions to prevent an easy settlement to the differences between the two professions.

The important problem facing higher education in the US is the need to compete in a rapidly changing market with declining numbers of young people and increasing demands for degrees from more mature students. For state-funded institutions this pressure is exacerbated by tight budgetary constraints driven by anti-tax politics. The policy response from the Virginia State Government has been a restructuring of higher education, the

responsibility for which has been devolved to the administrators of higher education institutions. Administrators have taken control over the changes in the institutional structure of the Virginia State colleges and universities, as well as over how and when these changes will be implemented In this process, the traditional organisational role of academic staff has been subverted.

Computerisation and new information technology have provided powerful new tools for higher education both in teaching and research. But in the reorganisation new technology has been primarily used for labour saving and cost containment. Academic *products* have been standardised and teaching mechanised by the sub-division of knowledge and its reproduction as standard packages for computer networks, videos, interactive televised classes and other information technology devices. The commodification of knowledge and the mechanisation of teaching allows labour saving by means of large electronic classes, high student–teacher ratios, distance learning and satellite uplinks, and leads to de-skilling, downsizing and the replacement of teachers with technology. Complementing these changes is a segmentation of the labour market, with a growing secondary sector of contingency workers among the rapidly expanding post-graduate population and a declining *primary* sector of permanent jobs. Completing the *Fordist* package is a retreat from the idea that the quality of higher education is guaranteed by the professional standing of academics, to one of continuous monitoring by means of individual assessment of teaching, research and service. Tenure is also under threat, with the suppression of tenured posts as they fall vacant. The ability of faculty to resist the adverse effects of these developments is seriously hindered by Virginia's right to work legislation and the laws prohibiting trade union membership and collective bargaining for public employees.

7. Conclusions

The case studies in this volume demonstrate the powerful forces exercised by new technology, market forces and socio-political forces in transforming productive systems. But they do not operate in isolation. Rather, they often work in combination and the changes they make and the responses to them shape and are shaped by the social relations of production. The effect of fluoridation and the destabilising effects it had on the relationship between dental hygienists and dentists, for example, could not be resolved cooperatively because of the continued dominance of the dentists in the setting and administration of standards, and the legal codification of their managerial authority. In Virginia, the political power of the taxpayers was the driving force for restructuring higher education. Cost saving provided the motive and new technology and the weak bargaining power of the unorganised academics provided the opportunity to impose hierarchical managerial systems, the standardisation of educational products, the segmentation of the labour market and a more Fordist, low-trust form of work organisation. In machine tools, Japanese producers transformed the market by their success in incorporating electronic and computer technology into their product, an achievement rooted in cooperative social relations. The inability of American producers to respond to this competitive challenge largely stemmed from the non-cooperative, highly adversarial productive relations in the US. By contrast, in similar market circumstances, the Canadian steel firm combined with its organised workforce to create procedures for developing the cooperative employment relations necessary for meeting market demands for high-quality products. Freed from

regulation, AT&T used technology to match automated, standardised services for residential customers with Fordist employment relations for their providers—a use of technology denied to the regional telephone companies by the continued consumer protection by regulation. Moreover, where competition was most intense, in the market for communication systems for large companies, AT&T was obliged to offer a high-quality customised service requiring high-trust social relations for its delivery. In Germany, the combined effect of the protection of the interests of consumers and workers in the re-regulation of telecommunications was the preservation of good employment relations and high standards of customer services in all market segments.

From the experiences recorded here it seems that effective representation is an important condition for the development and maintenance of cooperative social relationships. In America, managerial prerogative restricts participation in decision-making over the organisation of production and technical and other forms of. change. Any involvement, other than that by managers and those they represent, is confined to the outcomes of managerial decisions. The freedom of managerial action is tempered when markets make *exit* an option and when regulations set standards which cannot be lowered. But if these restraints are weak, or are lifted, managers can and do act opportunistically, by restructuring the technical and social relations of production to distribute the gains towards themselves and those they represent and displace the costs to others. Any influence employees and others might have depends on how well organised they are, and even so is limited to the distributional and other effects of managerial decisions. Notwithstanding the short-term benefits to management of the largely unrestricted exercise of their prerogative, the longer-term costs include the detrimental effects on productivity and the commitment of employees of increased insecurity, low morale and the creation of antagonistic, non-cooperative and low-trust employment systems.

The Canadian steel case provides important insights into the benefits of cooperative relations and the conditions for their development and exploitation. The agreement establishing joint-control created the possibility of worker representation in the process as well as in the effects of change. But co-determination did not deter the union leaders from acting decisively in their members' interest and this reinforced trust within the union. Leaders and members could then work together to develop viable alternative strategies to managerial proposals which were more in the employees' interests. As a consequence, an environment for generating and maintaining effective cooperation in production was established at all levels, with positive benefits for competitiveness and hence the long-term viability of the plant and the employment it offered. These developments were set in the wider context of strong support for local actions from the national union and growing collaboration between employers and unions at the national levels. Together, these created a more general *cooperative environment* within which local cooperative social relations of production could be developed.

In the German telecommunications industry, the cooperative environment was further reinforced by the much greater representation of residential consumer and employee interests in the political decisions on reregulation than in America and Britain. This ensured consumer interests were protected by standards and by the supervisory boards of companies and that worker interests were represented at the industry firm and plant level. By narrowing the strategic options open to corporate management, worker and consumer representation in the process of change led to a much wider distribution of the gains from technical change than occurred in America and Britain. Moreover, a basis was laid for the development of a high-quality, multi-media information technology network with

cooperative social relations of production which extended to the active involvement of trade unions in technical and service developments.

Effective representation and the related acceptance by unions and their members of responsibility for change played a central part in the evolution of the Swedish *model* and the cooperative environment it engendered described in Persson's paper. An early settlement between capital and labour at the national level established the rights of managers to manage, the rights of unions to organise and represent their members, and the rights of employees to share in the benefits of technical change. The trade unions combined strong representation, a commitment to technical progress and *wage solidarity*, by which wages were fixed by national bargaining so that poor performance by firms could not be compensated for by low pay. The political wing of the Swedish labour movement responded to the high levels unemployment in the late 1920s by accepting the state's responsibility for joblessness and from this commitment developed the welfare state. The Swedish government also came to accept responsibility for the high rate of job displacement resulting from rapid technical change and developed active labour market policies combining high-quality training, job creation and measures to encourage labour mobility. In the 1960s the disruptive effects of rapid economic progress and the growing shop floor opposition to Taylorist work organisation led to the enactment of a series of measures designed to limit managerial prerogative. These included the outlawing of unfair dismissal and the protection of the physical and psychological health of employees and the establishment of rights to paid leave for education. New legislation also introduced co-determination, which gave unions the right to negotiate local agreements for the joint control of hiring and firing, work assignment and disciplinary matters. Involvement by unions and their members in the introduction of innovations in technology and the improvements in work organisation and environment contributed significantly to the development of socio-technical systems in which job satisfaction, responsibility and learning are an integral part of the social relations of production. The beneficial effect of these developments are reflected in the growing employer support for them and the recognition of their beneficial effect on competitiveness.

The decision to cooperate means giving a hostage to fortune because the benefits of cooperation are unlikely to accrue immediately. It must be taken on trust by individuals when deciding to cooperate that their action will be reciprocated. Trust, in the sense that it is used here, simply means the reliance on and confidence in the truth, worth, reliability, etc. of a person or thing. The hallmark of an effective cooperative relationship is that the parties give open-ended commitment to cooperate, based on their expectations that significant benefits will result for them. Important factors for creating such positive expectations can be predicted to include: fairness of treatment, job satisfaction, high quality of work environment and, particularly, income and job security. The scope for determining these can be expected to depend on the conditions within the particular workplace *and* those within the productive system of which the workplace is a part. The quality of the network of relationships within the productive system, the prosperity and dynamism of the economy within which it trades, and how supportive to cooperation are the social and political environments within which it operates will be instrumental in creating the conditions for achieving terms and conditions of employment favourable to creating employment relationships which are mutually advantageous to the parties involved. The papers in this volume demonstrate how important the independent representation of workers is for the development of environments which are supportive of cooperative social relations and the long-term economic and social benefits they engender.

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