International Labour Review, Vol. 129, 1990, No. 5

Work organisation and local labour markets in an era of flexible production

Michael STORPER and Allen J. SCOTT *

Introduction

In both the United States and Western Europe the old post-war patterns of industrial development and labour relations seem to be giving way to a new order. The central sectors of the production system are no longer focused to the same degree on the mass production of consumer durables. Instead, three very different groups of industries now account for a steadily rising share of employment and output growth in all the major Western economies: *(a)* high-technology manufacturing; *(b)* revitalised design-intensive craft industries; and *(c)* financial and producer services, especially those directed to the corporate sector.

In these industries *flexible production methods* constitute a basic principle of organisation, in contrast to the mass production methods which characterised the dominant sectors of the post-war period. "Flexible production methods" comprise the variety of ways in which producers shift promptly from one process and/or product to another, or adjust their output upward and downward in the short run without strongly deleterious effects on productivity.

The differences between flexible and mass production methods will be defined in greater detail later in this article, but it can be stated provisionally that flexibility may be attained *within* the firm through the use of general-purpose equipment and machinery (often programmable) or craft labour processes, and *between* firms through social divisions of labour. In the latter case flexibility is achieved by fragmentation of the production process into multiple units, often in separate firms, thus facilitating rapid change in the combinations of vertical and horizontal linkage between the units, and permitting rapid shifts between products and different output levels. Our overall objective in this article is to identify the principal forms of work organisation that are emerging in the context of this changing structure of production.

* University of California, Los Angeles.

1. Forms of industrialisation: Fordism and flexible production

Fordism

Fordism refers to the technological and institutional paradigm that characterised the major capitalist economies for much of this century, when mass production methods were introduced into such rapidly expanding assembly industries as cars, consumer durables and electrical machinery. The central element of the Fordist mass production system was the moving assembly line, which formed the basis of an advanced technical division of labour and explained the characteristic drive in mass production industries towards an ever-wider scale of operations and increasing vertical integration. For the system to work efficiently, final outputs needed to be standardised and production runs continued for as long a time as possible. The specifically Fordist pattern of labour relations and labour markets consisted of a complex body of rules and practices governing the labour process (i.e. task structure and work rules), wage-setting procedures, recruitment and lay-offs, etc.

These rules and practices were usually codified in multi-year employment contracts, which typically included numerous detailed job descriptions, putting bounds on the range of tasks any worker was permitted to undertake. At the same time internal labour markets were established restricting recruitment for higher-level positions to a firm's existing labour force and holding recruitment from outside to a minimum. Partly as a consequence, industrial communities in the era of Fordist mass production were often characterised by segmented labour markets, consisting of a core group of high-wage blue-collar workers and a periphery of low-wage workers employed in unstable secondary production.[1] In these ways, the stability in production processes and the standardisation of outputs sought by core mass production firms were reinforced by an institutionalised rigidity in their labour relations and labour markets.

The structure of mass production was accompanied, at the macro-level, by Keynesian welfare-state legislation introduced from the 1930s onwards in all the major capitalist societies. After the Second World War, this legislation helped to secure high levels of social stability combined with steadily increasing aggregate demand throughout North America and Western Europe, thus "legitimising" the whole mass production system.

The rise of flexible production

During the 1950s and 1960s vigorous routinisation of Fordist production processes, standardisation of final outputs and oligopolisation of markets

[1] D. M. Gordon, R. Edwards and M. Reich: *Segmented work, divided workers: The historical transformation of labor in the United States* (Cambridge, Cambridge University Press, 1982); S. Berger and M. J. Piore (eds.): *Dualism and discontinuity in industrial societies* (Cambridge, Cambridge University Press, 1980).

were accompanied by falling production costs and rising real wages. None the less, mass production ultimately ran up against technological and social limits to its expansion, mainly owing to the increasing difficulty of achieving high levels of productivity gain. They were even more keenly felt as a result of the rise of Japan and the newly industrialising countries, which caused many hitherto stable oligopolistic markets in North America and Western Europe to become increasingly contested during the 1970s and 1980s.

In these circumstances, the options for Fordist industry were stagnation or radical adjustment. Many industrial sectors and geographical regions did indeed stagnate; in others new pathways to industrialisation opened up in response to the intensifying fragmentation, contestability and instability of markets. Two pathways in particular have encouraged producers to seek greater flexibility in the technical and social relations of production so as to make product and process configurations more readily adjustable. One involves a restructuring of Fordist mass production (as in virtually all the major consumer durables industries) through various combinations of automation, subcontracting and new employment relations making for more supple work rules and labour market practices. The other has been opened up by the rise of the three main flexible industrial groupings mentioned in the introduction to this article. Such industries share several major features: a focus on relatively unstandardised outputs; a tendency towards deep social divisions of labour in the form of fragmented and specialised production units; and a trend towards increasing openness, competitiveness and volatility in local labour markets. Together, these two pathways account for a major part of the economic change currently observable in major capitalist societies.

2. Labour relations and labour markets in flexible production systems

Labour flexibility refers in general to a logic of tailoring labour inputs in production to shifting levels and qualities of outputs. There are three major domains of labour relations in which producers may attempt to introduce flexibility. First, they may seek to make wage rates downwardly adjustable and strike wage bargains on an individualised (hence politically defused) worker-by-worker basis, rather than with occupational groups as a whole. Second, they may seek the advantages of *internal* (intra-firm) flexibility through strategies that enhance the redeployability of the workforce across the shop-floor. Third, they may seek *external* flexibility through strategies that promote quantitative adjustments of their labour intake. Any given employment situation will represent some specific mix of these three tendencies.

Internal and external flexibility

Internal flexibility has several major dimensions. *Polyvalent skills and aptitudes* enable workers to perform many different kinds of task inside the production unit. Such flexibility is also secured by a *broadening of job categories* in the workplace and, as a corollary, by giving more scope for shifting workers between different machines and job stations. In large enterprises these methods may be associated with the *reorganisation of workers into flexible groups or teams*.[2]

External flexibility results from a number of practices by means of which employers rapidly adjust their direct labour inputs. It is primarily achieved through *turnover*, which is likely to be particularly high where output levels fluctuate widely and where workers are easily replaceable. A special case of turnover is temporary lay-off and recall, which combines the advantages to the firm of employment flexibility with buffer stocks of labour that can be called upon as needed. Flexibility is also boosted by *increasing the ratio of temporary to permanent workers* in the firm's labour force. In addition, through the use of *part-time workers*, firms are able to adjust labour inputs more effectively to peak and slack times in their production schedules.[3] *Subcontracting* has become a major source of external labour flexibility since it enables firms to deal with rapidly changing labour needs by increasing or decreasing the volume of work they give out to other firms. Subcontracting also allows firms in primary labour markets to put out work to firms in secondary labour markets, which helps to keep the two categories of labour separate and heads off possible demands by low-wage workers for employment conditions closer to those of high-wage workers. Subcontracting may also take the form of homeworking, which reduces the firm's overhead costs.

Flexibility and the security of labour

Internal and external flexibility are managerial strategies for adjusting production under conditions of competition, and their impact on workers' levels of security is substantial. Following Standing,[4] we distinguish three principal forms of workers' security: *employment security*, the extent to

[2] J. Atkinson: *Flexibility, uncertainty and manpower management*, Report No. 89 (Brighton, University of Sussex, Institute of Manpower Studies, 1985).

[3] S. Christopherson: *Peak time, slack time: Trends towards labor flexibility in the reported and unreported economy* (Paper prepared for the United States Congress, Office of Technology Assessment, 1986) shows that involuntary part-time work in the United States has increased in the 1980s as a percentage of total employment. The *Daily Labor Report* (Washington, DC), 18 July 1985, stated that 28 per cent of the United States workforce was not on regular payrolls because of temporary work, freelancing, contracting and part-time work. In addition, D. Yankelovic et al.: *The world at work: An international report on jobs, productivity, and human values* (New York, Octagon Books, 1984) report that 22 per cent of all American workers were in the above categories in 1984, 7 percentage points more than in 1954.

[4] G. Standing: *European unemployment, insecurity and flexibility: A social dividend solution*, WEP research working paper (Geneva, ILO, 1988).

which a worker is guaranteed a job with a particular firm; *job security*, the degree of fixity of the worker's tasks within a particular firm; and *labour market security*, the worker's ability to remain employed within a given labour market but possibly in a series of different jobs.

Employment security may in some circumstances be positively associated with *internal flexibility*, especially where high levels of firm-specific "human capital" are at stake. In this case, employers are encouraged to introduce remuneration and promotion systems designed to stimulate on-the-job learning, effort, commitment and co-ordination. Schemes such as profit-sharing, bonus pay, seniority-based salary increments, stock options and generous fringe benefit packages are also often implemented. Job security clearly goes against the grain of internal flexibility, at least as understood in the Fordist system, i.e. the right to perform a job defined in minute detail by contracts and work rules. Labour market security may be either enhanced or diminished by internal flexibility, depending on how far the different skills acquired by a worker on various jobs are firm- or sector-specific.

External flexibility, for its part, has largely negative effects on employment security (and hence also on job security). Even here, however, there are countertendencies at work as, for example, where high levels of subcontracting actually stabilise production. Thus many firms in the Emilia-Romagna region of Italy offer high levels of employment security to their workers because they supply a sufficiently broad spectrum of clients and can maintain relatively constant levels of output. External flexibility also has complex and varying impacts on labour market security. Some workers continue to enjoy labour market security, their skills allowing them to move easily from job to job, while external flexibility makes others more vulnerable. What emerges, then, is a mosaic of different types and levels of security and vulnerability.

Industrial organisation and labour flexibility

The precise ways labour flexibility strategies are implemented tend to be compatible with technological and organisational structures of production. How these latter inter-relate is of special interest in terms of the emerging flexible technological-institutional system. The resulting blends are not necessarily coterminous with specific industries or groups of industries. They constitute particular work processes within industries, each of which may exhibit given forms of flexibility. By specifying these combinations, we can see how flexibility strategies (internal and external), industrial organisation and various sorts of employment and labour market security and insecurity are inter-related.

A combination that we might call *labour-intensive flexible specialisation* is often found in industries such as garment-making, leather-working, certain metallurgical trades, motion pictures and many kinds of services, all of which

are characterised by high levels of market competition with rapid and continual product differentiation. Capital investment per unit of labour tends to be rather low, and production is fragmented into many specialised establishments bound together in shifting transactional networks. The workforce comprises a mix of skilled craft workers and unskilled production workers. The former type is exemplified by designers in the garment industry or writers in the motion picture industry.[5] Because of the instability of such industries, a proportion of the skilled labour force may be expected to move relatively frequently from job to job, but this does not usually entail long periods of unemployment. Unskilled production workers in labour-intensive flexibly specialised industries are exemplified by sewing-machine operators in the garment industry or ink-and-paint workers in the animated film industry of Los Angeles.[6] These workers, whose wages are generally low, often below the legal minimum, also face considerable employment instability and are prone, unlike more skilled workers, to chronic unemployment.

A second combination, *technology-intensive flexible specialisation*, refers to industries characterised by small- and medium-sized batch production using sophisticated (frequently computerised) equipment. Examples are found in the semiconductor industry, as well as the machinery or craft industries of the "Third Italy" using ultra-modern technologies.[7] As in the case of labour-intensive flexible specialisation, these production processes are commonly vertically disintegrated, with many links between specialised firms. Typically, the labour force is split between skilled and unskilled workers, though skilled workers predominate. However, even unskilled workers tend to acquire some firm-specific skills because tasks are often comparatively unstandardised in such establishments and workers have to be trained to cope with collective work routines. Labour turnover is likely to be low in these firms.

Semi-continuous serial production occurs in a number of industries producing in medium-sized batches, as in aircraft and computer mainframe construction and in old mass production industries that have been heavily restructured (e.g. General Motors' projected Saturn car plant). In such industries the labour force usually consists of a nucleus of engineers and technicians together with large numbers of skilled and semi-skilled manual

[5] M. Storper and S. Christopherson: "Flexible specialization and regional industrial agglomeration: The case of the US motion picture industry", in *Annals of the Association of American Geographers* (Washington, DC), Vol. 77, 1987, pp. 104-117; A. J. Scott: "Industrial organization and the logic of intra-metropolitan location III: A case study of the women's dress industry in the Greater Los Angeles region", in *Economic Geography* (Worcester, Massachusetts), Vol. 60, 1984, pp. 3-27.

[6] See references cited in note 5 and A. J. Scott: "Territorial reproduction and transformation in a local labour market: The animated film workers of Los Angeles", in *Environment and Planning D: Society and Space* (London), Vol. 2, 1984, pp. 277-307.

[7] A. J. Scott: *New industrial spaces* (London, Pion Press, 1988). The "Third Italy", where small and medium-sized enterprises predominate, comprises the North-East, the Po Valley, the central area and the Adriatic Coast.

workers. The latter may or may not be unionised, but in either case they differ from traditional mass production workers in having more broadly defined jobs and being more easily transferable between workstations. Where the team concept is applied, jobs may rotate between workers. These forms of internal flexibility may be complemented by occasional lay-offs and recalls as a way of adjusting to production fluctuations. Flexibility is commonly further enhanced by the formation of networks of subcontractors who make just-in-time deliveries of parts to core firms.

Systems house manufacturing is concerned with the production of large-scale leading-edge high-technology products, often one-of-a-kind, such as complex communications systems or space exploration hardware. The manufacture of these products is generally carried out by a prime contractor employing a labour force comprising a high proportion of managerial, administrative, technical and R&D workers, and a low proportion of blue-collar workers in fabrication and assembly. Many of these workers acquire firm-specific skills through working in teams. They also enjoy employment security. Labour flexibility resides in the pronounced polyvalency of workers' skills in the prime contract firm, together with the use of tiers of subcontractors to regulate indirect labour inputs and gain access to expertise outside that of the prime contractor.

De-skilled service production characterises the "back offices" of large corporations and a variety of high-volume food preparation and non-speciality retailing sectors. Increasingly, work in these sectors tends to be "Taylorised", hence de-skilled, and the kind of labour demanded is supplied by such social groups as suburban married women, adolescents and minorities.[8] De-skilled service work is often part-time and temporary, and the workers enjoy few fringe benefits. Typically, they suffer from job, employment and labour market vulnerability.

Professional and managerial teamwork is common in business and financial services, R&D activities, and in the "front offices" of large corporations. It has a strong resemblance to systems house manufacturing in the sense that it is focused on variable but highly co-ordinated and information-intensive interactions between workers. Most are skilled, well-remunerated white-collar workers, complemented by another group, mainly women, performing support and clerical tasks. Polyvalency of basic skills, combined with firm-specific skills, characterises a large proportion of the labour force. Here, too, subcontracting takes the form of specialised professional inputs (e.g. legal, financial, engineering, advertising or public relations services).

Table 1 shows some of the principal ways in which the above-mentioned (idealised) combinations of technological and organisational relations interact with various forms of labour market flexibility.

[8] K. Nelson: "Labor demand, labor supply and the suburbanization of low-wage office work", in A. J. Scott and M. Storper (eds.): *Production, work, territory: The geographical anatomy of industrial capitalism* (London, Allen and Unwin, 1986), pp. 149-171.

Table 1. Forms of internal and external labour market flexibility and combinations of technological and organisational relations

System of technological and organisational relations	Types of labour market flexibility								
	Internal flexibility				External flexibility				
	Polyvalent skills	Broad job categories	Redeploy-ability	Teamwork	Turnover	Temporary work	Part-time work	Sub-contracting	Home-work
Labour-intensive flexible specialisation	●				●			●	●
Technology-intensive flexible specialisation	●							●	
Semi-continuous serial production		●	●	●				●	
Systems house manufacturing	●		●	●				●	
De-skilled service production					●	●	●		●
Professional and managerial teams	●	●		●				●	

Note: Cells containing an asterisk denote those forms of internal and external labour market flexibility that are afforded most scope by different combinations of technological and organisational relations.

3. The geography of flexible production and flexibility in local labour markets

The resurgence of flexible production has been associated with dramatic changes in the geography of production, and their causes have to be understood if one is to appreciate the nature of flexibility and security in local labour markets. The locational pattern of jobs (and workers' places of residence) in many ways determines the type of flexibility that may be introduced into a labour market.

As noted above, flexible production in North America and Western Europe has emerged primarily on the basis of three industrial groupings (viz. diverse forms of revitalised craft industries, high-technology manufacturing and business service production). It was also pointed out that these forms of production are often fragmented into many specialised individual units linked in a network of input-output and subcontracting relations. In such production networks, groups of producers with especially dense inter-relations tend to be located in close proximity, which enables them to reduce costs of external transactions and maximise access to the social and informational context of the production system. Accordingly, the recourse to increased flexibility in the modern economy has been marked by a decisive reagglomeration of production and a resurgence of the specialised industrial district.[9]

Local labour markets

In such environments the local labour market becomes an important analytical category. It is mainly in dense local labour markets that external flexibility of labour tends to rise, and in such situations the contradictory role of the local community as a source of flexibility and as a shackle on it is thrown into strong relief.

Employers located in small and isolated places have the advantage that much of their labour force has few alternative employment opportunities: workers are, in essence, their "captives", and when laid off are likely to be immediately available for recall. This does not generally apply to skilled upper-tier workers who typically participate in wider regional and national (even international) labour markets and who may move elsewhere if laid off.[10]

Employers located in dense and multifaceted labour market areas are less able to secure a captive labour force and there are abundant alternative employment opportunities for those laid off. Employers, however, are

[9] A. Marshall: *Industry and trade: A study of industrial technique and business organisation and of their influences on the conditions of various classes and nations* (London, Macmillan, 1920); M. Bellandi: *The Marshallian industrial district* (Florence, Università degli Studi di Firenze, Discussion Paper No. 42, 1986); G. Becattini: *Mercato e forze locali: Il distretto industriale* (Bologna, Il Mulino, 1987).

[10] R. H. Topel: "Local labor markets", in *Journal of Political Economy* (Chicago), June 1986, pp. S111-S143.

usually able to find new recruits from the large local labour pool and may also benefit from the much greater diversity of skills available in large population centres. The great number of employment alternatives in such centres also increases the probability that skilled workers will secure re-employment without migrating. The net result, *ceteris paribus*, will be greater flexibility in job-holding and tenure patterns in larger, as opposed to smaller, local labour markets.

Thus, under conditions of locational agglomeration, employers will be more disposed to lay off workers – even skilled workers – when production levels decline. Since many such employers in agglomerations face extremely competitive and unstable output markets, we may presume that they prize this kind of flexibility. At the same time, laid-off workers in large centres are more likely to find alternative employment within a given time than workers in small centres (holding the rate of unemployment constant in both cases). By the same token, quit rates are also likely to be higher in larger centres.

Hence, the speed of rotation of workers through the local job system is likely to correlate positively with the size of the local labour market, and periods of unemployment in larger centres are likely to be relatively frequent but relatively short.[11] This proposition would seem to apply particularly to those categories of upper-tier workers whose skills are more sector- and agglomeration-specific than firm-specific. Obvious examples include job-hopping Silicon Valley engineers, creative workers in the Los Angeles entertainment industry and the financial analysts and account executives of the world's major business capitals.

Limits to local labour market flexibility

Local labour markets are also frequently characterised by communal forms of social life that may create barriers to flexibility. Industrial capitalism has been marked by recurrent attempts by workers to curb the exploitative tendencies of employers, to better their conditions and maximise the rewards of work. Workers organise to protect themselves from the vagaries of change in wages, tenure and working conditions, seeking collective forms of protection against the potentially negative effects of all varieties of flexibility. Because industries are often geographically concentrated, the concrete conditions faced by workers tend to have a strongly place-specific character, which is reflected in union organisation and actions, notwithstanding the wider territorial scope of some unions' jurisdictions.[12]

[11] Evidence in support of this contention has already been advanced by H. Jayet: "Chômer plus souvent en région urbaine, plus longtemps en région rurale", in *Economie et statistique* (Paris), Mar. 1983, pp. 47-57.

[12] A. Dawley: *Class and community: The industrial revolution in Lynn* (Cambridge, Massachusetts, Harvard University Press, 1976); S. Hirsch: *Roots of the American working class: A study of nineteenth century Newark* (Philadelphia, University of Pennsylvania Press, 1978); J. Bodnar: *Worker's world: Kinship, community and protest in an industrial society, 1900-40* (Baltimore, Johns Hopkins University Press, 1982); T. Hareven and R. Langenbach: *Amoskeag: Life and work in an American factory city* (New York, Pantheon Books, 1978).

Even without formal organisations, the evolving attitudes and expectations of workers may create substantial barriers to managerial authority, as is illustrated by the recent reshuffling of manufacturing regions in the United States and Western Europe. To meet the challenges posed by a strongly organised working class and intensified international competition, a massive programme of restructuring and relocation of capital was set in motion in the late 1960s, and has continued to the present day.[13] It has taken the form of a flight of capital from many established industrial regions, the multiplication of branch plants in peripheral areas and the rise of new growth centres in regions with previously low levels of industrial development.[14]

Location of flexible production

Industrial districts of flexible production are mainly developing in places insulated from older foci of Fordist mass production, enabling producers to avoid institutionalised work norms and practices built up around Fordism. For example, some design-intensive craft-speciality industries have grown up on the basis of renascent craft communities, while others have been established in entirely new locations. High-technology industry has tended to appear in new suburban extensions of larger metropolitan regions and in previously unindustrialised communities, often far from former heartland regions. New service sectors have gravitated to central business districts (many of which had suffered prolonged disinvestment and job loss).

Employers have been relatively successful in reconstructing employment relationships on their own terms in the growing centres of flexible production in the United States, where unions are weak and strikes almost unheard of. Nevertheless, as industrial localities age, relations between workers and employers may tend to become more confrontational. When the Midwestern region of the United States first became industrialised, for example, it was virtually free of major labour conflicts, and employers found the labour force much more compliant than on the eastern seaboard. Yet the Midwest subsequently became the site of the most politicised and persistent labour conflicts in United States history. It seems equally possible that the new industrial heartlands of contemporary capitalism will one day see their growth checked by contestation and conflict. The precise forms such conflicts will take cannot however be predicted from the past experience of other regions.

---

[13] D. Massey and R. Meegan: *The anatomy of job loss: The how, why and where of employment decline* (London, Methuen, 1982); B. Bluestone and B. Harrison: *The deindustrialization of America* (New York, Basic Books, 1982).

[14] Scott: *New industrial spaces*, op. cit.; see also A. J. Scott and P. Cooke: "The new geography and sociology of production", in *Environment and Planning D: Society and Space*, Vol. 6, 1988, pp. 241-244.

4. The new flexible production complexes of North America and Western Europe

Each of our three industrial groupings (craft industries, high-technology manufacturing, and business and commercial services) has its distinctive forms of agglomeration, labour flexibility, employment security and vulnerability. A preliminary overview of this interweaving is given in table 2, and each type is treated in turn below.

Flexible specialisation

In *design-intensive craft-based complexes* there are two main forms of flexible specialisation: *labour-intensive* and *technology-intensive*. These occur, in varying proportions, within different sectors and in different places. Examples are: the fashion clothing industry in New York,[15] the motion picture industry in Los Angeles,[16] the textile industry in parts of the Third Italy,[17] and the printed circuits industry in southern California.[18] All involve labour-intensive phases carried out by unskilled workers and skilled craft workers that are combined in different degrees with other phases involving sophisticated, often computerised technologies. Industries like these all tend to produce in small batches, owing either to customisation of outputs or to product differentiation in the face of highly competitive and uncertain markets. Flexibility in these agglomerations is commonly achieved in the external labour market through turnover and subcontracting (including homeworking). The community also plays a decisive role in maintaining and mobilising supplies of labour.

For example, the New York clothing industry is much given to vertical disintegration, and intricate networks of specialised subcontractors and sweatshops (providing such services as cutting, sewing, pleating and buttonholing) develop around manufacturers. The mass of unskilled workers in the industry is composed primarily of immigrants – Jewish and Italian in the pre-Second World War decades and Dominican and Chinese today – often employed at the minimum wage level and below.[19] Recruitment is largely through networks of family and friends rooted in the community, which enables employers to modulate turnover in response to changing business conditions.

---

[15] R. D. Waldinger: *Through the eye of the needle: Immigrants and enterprise in New York's garment trades* (New York, New York University Press, 1986).

[16] M. Storper: "The transition to flexible specialisation in the US film industry: External economies, the division of labour, and the crossing of industrial divides", in *Cambridge Journal of Economics*, June 1989, pp. 273-305.

[17] Becattini, op. cit.

[18] A. J. Scott: "Industrial organization and the logic of intra-metropolitan location II: A case study of the printed circuits industry in the Greater Los Angeles region", in *Economic Geography*, Vol. 59, 1983, pp. 343-367.

[19] Waldinger, op. cit.

Table 2. Employment security and industrial organisation in flexible production complexes

Type of production complex	Job security	Employment security	Labour market security
Design-intensive, craft-based production:			
Labour-intensive flexible specialisation:			
– Skilled workers	L	H	H
– Unskilled workers	L	L	L
Technology-intensive flexible specialisation:			
– Skilled workers	H	L	H
– Unskilled workers	L	L	L
High technology production:			
Technology-intensive flexible specialisation:			
– Skilled workers	H	H	H
– Unskilled workers	L	L	L
Systems houses	L	H	L
Professional and managerial teams	L	H	L
Semi-continuous serial production	L	L	L
Business and financial services:			
Labour-intensive flexible specialisation	L	L	L
Professional and managerial teams	L	H	H
De-skilled service production	L	L	L

Note: H = High. L = Low

The motion picture industry of Los Angeles is organised on similar lines to the New York garment industry, although it has a higher proportion of skilled workers. Even so, rates of labour turnover are high and skilled workers move frequently from job to job within the industry and from subsector to subsector (e.g. television, video-recording, and so on) within the entertainment industry complex.[20] This mobility is facilitated by the organisation of workers into unions and guilds which regulate entry into the workforce and ensure minimum wage levels.

The high skill levels of workers such as designers and patternmakers in the New York garment industry and writers and animators in the Los Angeles motion picture industry derive in part from informal sources rooted in the local craft community, as well as from formal training establishments like New York's Pratt Institute or the film schools at UCLA and the University of Southern California.

[20] S. Christopherson and M. Storper: "The effects of flexible specialization on industrial politics and the labor market: The motion picture industry", in *Industrial and Labor Relations Review* (Ithaca, New York), Apr. 1989, pp. 331-347.

High-technology production complexes

These complexes present a rich amalgam of technological, organisational and labour market patterns. In the major high-technology centres of the United States and Western Europe (such as Silicon Valley and Orange County in California, Boston's Route 128, or the Scientific City of the southern Paris region), we find various mixes of: *(a)* technology-intensive flexible specialisation, such as silicon foundries in the semiconductor industry; *(b)* systems house manufacturing, exemplified by producers of large-scale communications systems; *(c)* professional and managerial teams, as in the case of firms engaged in software development and integrated circuit design; and *(d)* semi-continuous serial production, as in the assembly of electronic hardware. Labour-intensive, flexibly specialised forms of production, providing such services as printed circuit board assembly and subcontract machining, are frequently linked to these core activities.

In California's Silicon Valley and Orange County the labour force is sharply divided into a skilled, well-remunerated upper tier and an unskilled, low-wage immigrant tier.[21] Many highly qualified workers in these complexes (e.g. engineers and scientists in the computer and communications systems industries) are able to perform a variety of broadly defined tasks, many of which require high levels and shifting patterns of co-operation with fellow workers. Semi-skilled production technicians, too, are frequently engaged in broadly defined tasks within teams. Since many workers have firm-specific skills and behaviours, flexibility in the upper tier is basically achieved within the firm and these workers enjoy a fairly high level of employment security. However, some qualified workers (e.g. computer scientists and electrical engineers in Silicon Valley) possess both sector- and agglomeration-specific skills, and change jobs at short intervals as projects come and go, and in search of professional advancement.[22]

These complexes also support large numbers of independent, specialised professional consultants, thus allowing firms access to critical skills without obliging them to engage specialised staff on a full-time basis. While such workers lack employment security, they do have considerable labour market security.

Lower-tier workers in semi-continuous serial production in Silicon Valley and Orange County include a high proportion of women born in the United States. By contrast, lower-tier workers in more flexibly specialised

[21] A. J. Scott and D. Angel: "The US semiconductor industry: A locational analysis", in *Environment and Planning A*, Vol. 19, 1987, pp. 875-912; A. J. Scott: "High technology industry and territorial development: The rise of the Orange County complex, 1955-84", in *Urban Geography* (Silver Spring, Maryland), Vol. 7, 1986, pp. 3-45; A. Saxenian: "The urban contradictions of Silicon Valley: Regional growth and the restructuring of the semiconductor industry", in *International Journal of Urban and Regional Research* (London), Vol. 7, 1983, pp. 237-262.

[22] D. Angel: *Production, labor markets and location: A case study of the US semiconductor industry*, Unpublished Ph.D. dissertation (Los Angeles, University of California, Department of Geography, 1988).

sectors in the same regions are drawn increasingly from immigrant groups, mainly Hispanic and Asian.[23] In these cases, we find forms of external flexibility like those described in design-intensive craft-based complexes. In addition, lower-tier workers may suffer prolonged periods of unemployment between jobs, especially during market downturns.

Silicon Valley, Orange County, Route 128 and the Scientific City are all examples of high-technology industrial complexes that have grown apace since the 1950s and 1960s in areas with little history of industrialisation. Yet it has been possible to re-establish the bases of communal life in relative isolation from the habits and traditions of older industrial regions, with their attendant organisational rigidities. Instead, particularly in Silicon Valley and Orange County, we find strongly neo-conservative attitudes, low rates of unionisation and business-oriented municipal governments. This is part of what we have described elsewhere as the "politics of place".[24]

Business and financial services complexes

These are found above all in big cities. They comprise three main combinations of technological, organisational and labour market relations: *(a)* labour-intensive flexible specialisation, as in the case of small firms providing clerical, legal and management consulting services; *(b)* professional and managerial teams, particularly corporate head offices and a variety of large-scale service providers; and *(c)* de-skilled service production, especially exemplified in the work performed by entry-level clerical staff.

Here again internal flexibility is largely associated with a core of upper-tier workers, consisting primarily of managers and professionals in large business and financial corporations, most of whom acquire firm-specific skills as they deal with an ever-changing array of problems.[25] At the same time, there is a large complement of upper-tier workers whose experience in and knowledge of the local business community make them highly sought after. This category includes commodity futures agents in Chicago, advertising executives in New York and international currency dealers in the City of London.

Lower-tier workers in business and financial service complexes are overwhelmingly women, playing a role analogous to that of immigrants in the lower tier of labour-intensive, craft-based complexes. Part-time work is

---

[23] A. J. Scott and A. Paul: "Industrial development and regional growth in Southern California, 1970-1987", in D. J. B. Mitchell and J. Wildhorn (eds.): *Can California be competitive and caring*? (University of California, Los Angeles, Institute of Industrial Relations, 1989).

[24] M. Storper and A. J. Scott: "The geographical foundations and social regulation of flexible production complexes", in J. Wolch and M. Dear (eds.): *The power of geography* (London, Allen and Unwin, 1989).

[25] P. Osterman: "White-collar internal labor markets", in P. Osterman (ed.): *Internal labor markets* (Cambridge, Massachusetts, MIT Press, 1984), pp. 163-189.

highly developed in service complexes, permitting firms to vary their direct labour inputs while minimising their outlay for fringe benefits. Temporary work is also important, and over the past decade there has been a notable increase of temporary help agencies in large cities, a phenomenon which facilitates contracting and recontracting between firms and the temporary workforce.[26]

The spread of homeworking, often by means of remote computer terminals, further contributes to overall labour flexibility in business and financial services complexes. In recent years, much of the work performed by this lower tier of the labour force, especially in the insurance and banking sectors, has been routinised and Taylorised. This has de-skilled many types of clerical work and enlarged the pool of employable workers.[27]

In addition, where whole departments have been de-skilled, they are often shifted to suburban locations where they can tap large supplies of part-time labour, mostly married women. In a case study of "back offices" in the San Francisco Bay area, it was shown that the presence of married women in the suburban community constitutes a storehouse of informal "skills" particularly valued by local employers in the service industries, such as willingness to take orders and to convey an image of compliance and friendliness in contacts with the public.[28]

The labour force in service complexes and their "back office" extensions generally remains unorganised. Recently, however, there has been significant growth of unionisation among lower-tier workers and of guild-like professional associations among upper-tier workers.[29] Unions of lower-tier workers have responded to routinisation and Taylorisation by seeking – much as older industrial unions once did – to improve remuneration levels, codify job categories and increase employment security.

5. Problems and policies

Flexibility has always been an element of labour relations and labour markets under capitalism – in the nineteenth century as in the twentieth – though the precise shape taken has varied markedly over time. In the period identified as Fordist, flexibility seemed to recede in the face of strong technological and institutional structures promoting stability and predictability. However, as noted at the beginning of this article, in the recent past flexibility has again come to the fore as a major feature of

[26] G. Mangum, D. Mayall and K. Nelson: "The temporary help industry: A response to the dual internal labor market", in *Industrial and Labor Relations Review*, July 1985, pp. 599-611.

[27] B. Baran: *The technological transformation of white-collar work: A case study of the insurance industry*, Unpublished Ph.D. dissertation (University of California, Berkeley, Department of City and Regional Planning, 1986).

[28] Nelson, op. cit.

[29] C. C. Heckscher: *The new unionism* (New York, Basic Books, 1988).

capitalist production and labour markets, bringing with it a new set of problems for labour and the communities concerned. The major economic and political issue is the revival of intensified competition and privatisation and the decline of institutional co-ordination of final output and labour markets. The main negative effects, which are appearing on a number of fronts, particularly in the United States, may be characterised as follows:

1. High levels of competition, especially among the small firms typically found in areas with a large concentration of flexible production, often result in rapid increases and decreases in a firm's demand for labour, as well as in high rates of firm closure and start-up. As a consequence, a large proportion of the social costs of competition are transferred to workers in the guise of involuntary turnover and in the resulting need for them to reinvest at frequent intervals in job search.
2. Unbridled competition also underlies the tendency for firms to reduce wherever possible the number of workers enjoying employment security and increase the number of more precariously employed workers, some of whom may even be highly skilled. This fragmentation of the labour market into groups with different levels and types of security and vulnerability leads to *income* variation resulting from differential access to working time over and above that based on skill differences and the corresponding hourly *wage* differentials. It has thus far proved extremely difficult to develop policies to deal effectively with these heterogeneous forms of vulnerability.
3. Unregulated external flexibility in labour markets may have important effects on wage levels, since workers with high levels of either employment or labour market security have, by definition, greater bargaining power than workers with little security. It therefore appears that unregulated external flexibility has contributed to the wage polarisation observed in industrial societies in the 1980s, widening the gap already created by skill differentials.
4. Increasing flexibility is also manifest in the rapid growth of vulnerable or dependent firms and production units, particularly sweatshops (reminiscent of nineteenth century industrial conditions), in many major cities throughout North America and Western Europe. The chief victims of this phenomenon are unskilled workers, frequently women and immigrants.
5. It follows that the costs to family and the community at large are onerous. During the past two decades in Western Europe, and even more so in the United States, successive waves of labour immigration have given rise to masses of urban poor attached to the sweatshop economy. In the United States, competition from this new proletariat has undercut Blacks in many labour markets, thus contributing to overall unemployment and helping to recreate an urban underclass. The inevitable result is a heavy increase in public aid and other expenditures required to deal with such problems as violence and drug abuse.

6. The rise of flexible production has considerably accelerated the decline of traditional labour unions, and thus contributed to the diminished political power of the working class as a whole. As a result, many workers have experienced a steady erosion of wage and benefit levels, even in those centres (of flexible production) that are growing most rapidly.
7. The uncertainties endemic in flexible labour markets diminish the incentive, both for firms and workers, to invest in on-the-job training and the acquisition of new skills. Ultimately, this may not only reduce the competitiveness of some flexible production agglomerations, but also launch some workers on a downward wage spiral with its attendant polarisation of wages.

Current policy options in North America and Western Europe are far from providing an effective means of combating these problems.[30] Orthodox economic theory notwithstanding, it appears unlikely that market forces alone can overcome them; indeed, they stem precisely from unbridled market competition and erosion of the social safety net. New policies are needed which directly address the radical changes in production and social life described in this article.

To be successful, such policies must seek ways of regulating competition by constructing formal mechanisms to help spread the costs of flexibility more equitably, and eliminate instabilities which might threaten the efficiency of the system itself. They must also achieve these goals without dampening the positive aspects of flexibility, particularly its ability to transcend the rigidities and standardisation of mass production. Some of the literature suggests that policies of this sort have already been put in place effectively in parts of Japan, West Germany and Italy, but a definitive judgement must await further detailed research findings.[31]

In view of the open-endedness of the emerging system of flexible production, Western societies face many political dangers and opportunities. One danger, as experience has shown, is that the notion of flexibility can be revived by managerialist ideologies and implemented in such a way that it benefits a few at the expense of the many. At the same time, the new flexible work and labour market arrangements of contemporary capitalism continue to gain ground and to generate tensions that are increasingly difficult to handle under the existing system of labour relations and labour law inherited

[30] R. Boyer (ed.): *La flexibilité du travail en Europe* (Paris, La Découverte, 1987); B. Harrison and B. Bluestone: *The greater U-turn: Corporate restructuring and the polarizing of America* (New York, Basic Books, 1988).

[31] L. Scarpitti and C. Trigilia: *Strategies of flexibility: Firms, unions and local governments – The case of Prato*, Paper presented to the Conference on New Technologies and Industrial Relations: Adjustment to a Changing Competitive Environment, Massachusetts Institute of Technology, Feb. 1987; T. A. Kochan et al.: *The transformation of American industrial relations* (New York, Basic Books, 1986); M. Piore and C. Sabel: *The second industrial divide: Possibilities for prosperity* (New York, Basic Books, 1984).

from the classical period of high Fordism.[32] The opportunities lie in finding a new set of political measures that would enable labour and local communities to address the problems identified above, while seeking to enhance such positive aspects of flexible production as reskilling and the possibility of greater worker autonomy. It must be accompanied by further efforts to deepen our understanding of the new realities of flexible production organisation.

[32] Heckscher, op. cit.