

The theory of labour and the theory of location

by Michael Storper and Richard Walker

Location theory is in upheaval. In previous articles, we have pulled together various threads of the expanding empirical and theoretical critique of the neoclassical orthodoxy that has long ruled the field of industrial geography (Storper, 1981; Walker and Storper, 1981; Walker, 1982). The effort to recast location theory in terms of a marxian model of capitalist reproduction led us to reconsider the 'labour factor' as a force in the distribution and movement of industry in contemporary capitalism (Walker and Storper, 1981). The importance of labour in corporate location decisions has been suggested by several surveys (Luttrell, 1962; Stafford, 1974; Townroe, 1975; Moriarty, 1977). But one cannot rely on such data, given the considerable methodological and empirical shortcomings of survey research. The impact of labour on location has also been felt directly by workers in many basic industries as factories in established industrial areas have been shut down and new ones opened in non-unionized, low-wage areas. Efforts to explain such shifts by reference to wage and unionization differentials alone have not been terribly successful, however. Therefore, a new look at labour is called for. This will take us far afield from the realms ordinarily considered by location theorists. It requires more than elevating the relative weight given to labour as a locational factor. It means rethinking the nature of 'labour' itself² and hence the nature of the location 'problem'.³

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² Our terminology needs to be clear from the start. Due to a clash of categories between marxist and non-marxist theory, we adopt the following convention: 'work', 'production', or 'the labour process' is the activity ('concrete labour') and 'labour', 'workers' and 'labour force' are the people ('labour power'). This does not conform to normal marxist practice, but is easier for the general reader.

³ We only go half way in doing the latter in this paper. We have already recast the location problem from the side of capital in a previous article (Walker and Storper, 1981). The conclusions arrived at here should not, therefore, erroneously be taken to mean that labour is the only force affecting location or is always the most important factor, or that the partial approach of studying industries one by one instead of the aggregate movements of capital is entirely satisfactory.

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I Increased locational capability and the declining importance of non-labour factors of location

Marx was prescient in seeing the progressive 'annihilation of space' by capitalist development. That process does not occur simply through development of more efficient means of transport and communication, however. Capital accumulation implies a restless drive to penetrate new markets, free up additional sources of wage labour, develop the forces of production, lower the time of turnover, and the like⁴ (Harvey, 1975a). As a result, markets, competition and production have in our time become worldwide for many industrial commodities. Global capitalism has wrought fundamental changes in the logic of industrial location.

The increasingly global span of capitalist production relations, broadening and deepening of the world market, development of the forces of production and circulation, and concentration of capital in increasingly enormous corporations, have led to an unprecedented spatial 'generalization' of capital. This has opened up a much wider horizon for location decisions (Vernon, 1977; Caves, 1980; Barnet and Muller, 1974; Blair, 1972; Palloix, 1975; Froebel *et al.*, 1980; Mandel, 1975; Tanzer, 1980; Scherer, 1970). Vernon calls this the 'global scan', but we prefer the term 'locational capability' because it involves not merely looking but doing. The globalization of capital has at the same time reduced cost and revenue differentials among industrial sites in terms of securing the necessary input and output markets for industrially produced goods. This means a decline in the importance of these non-labour 'factors' in the locational calculus.

The main sources of increased locational capability are:

- 1 Transportation and communication improvements have lowered the costs and time of circulation, bringing a wider geographic market within the range of any industrial plant. As this is multidirectional, it lessens the pull of any one market. Technological change has reduced the weight of many products, accelerating this process.
- 2 The growth and deepening of world markets that comes with expanding industrialization and economic development of peripheral areas further contributes to market spreading. Standardization of consumer demands across cultures adds to this effect.
- 3 Similarly, internationalization of markets and production opens up new sources of inputs and reduces the level of differentiation in the cost, quality and availability of most inputs from place to place.
- 4 These developments mean increased competition through the breakdown of protected markets and entry of lower cost producers. This forces firms to look farther for new markets and entry of lower cost inputs. Increased scale of production and expansion of capacity in general add to this pressure.
- 5 The growth of multiple component assembly systems and of multiple sourcing as a strategy for assuring stable supplies make it harder to target a single best

⁴It also implies a restless drive to reorganize employment relations in space. See below, conclusion.

location with respect to input markets. (Joint outputs have the same effect on output markets.)

6 Advances in processing technology and developments in synthetic materials have reduced the quantities of many raw materials consumed in production, lowered materials costs and broadened the range of available supplies for many materials. Raw materials have traditionally been the most locationally fixed of all inputs.

7 New forms of automation have increased the separability of the constituent parts of production processes; Blair (1972) calls higher automation 'decentralizing technology', in that it replaces rigid mechanically-integrated systems with electronic controls, permitting greater versatility and smaller production facilities (for the same or greater output).⁵ This separability frees different workplaces to seek their best location without being bound to other workunits with different needs.

8 The intrafirm organization of production and marketing systems severs strict dependence of subsidiary production units on external markets for many inputs and outputs (including movements of commodities, information, capital and labour-services). This frequently allows them greater flexibility in seeking optimal locations with respect to external markets.

9 Large corporations can pursue the locational search in an increasingly rationalized way, including specialized, technical and computerized decision making and the careful internal weighing of relative profits of subsidiary units.

10 The enormous power of large corporations, directly or via their influence over the state, gives them an unprecedented ability to shape the conditions of 'factor supplies' in any location, opening up previously unthought of sites in rural areas, urban redevelopment zones, etc.

Of course, locational capability is not equal across all industries. The global scan is more a tendency than an accomplished fact. In general, however, locational differences in the availability, cost and quality of non-labour commodities are diminishing.⁶

II The unique nature of labour

With the trend towards greater locational capability, labour moves to the forefront because of its degree of spatial differentiation. As capital develops its capability of locating more freely with respect to most commodity sources and markets, it

⁵ At the same time, it appears that production processes are becoming more heterogeneous and specialized, while the work performed within production units is becoming more homogeneous, making the search for an appropriate labour supply less ambiguous (Hansen, 1981).

⁶ We eschew the common term 'locational freedom' used to describe this development as it wrongly implies that capitalists are free to ignore the profit differentials that do exist. The evidence is that firms are becoming more, not less, exacting in their location decisions (Walker and Storper, 1981).

can afford to be more attuned to labour force differences. Under the pressure of competition this becomes a necessity. The reasons for labour's persistent geographic distinctiveness lie in the unique nature of labour as a 'factor of production' — its embodiment in human beings. While this may appear obvious, its significance has been lost on generations of neoclassical economists and location theorists, who have persisted in treating labour in the same terms as 'true' commodity inputs and outputs. By reducing labour to strict commodity terms, price (wages) and quality (skills), they have repeatedly underestimated its importance in location decisions (Fuchs, 1962; Hoover, 1948; Wheat, 1973; McLaughlin and Robock, 1949; Creamer, 1935; Estall and Buchanan, 1961).

Human activity (work) is the irreducible essence of social production and social life. Labour is fundamentally different from every other production input because people are conscious subjects of production (Marx, edn 1967). To confuse labour with true commodities means adopting the following incorrect assumptions: the worker is the same as the objects of work; production is a purely technical exercise, a system of machinery that workers do not in any sense direct or contribute to (i.e. they act only as dumb animals with respect to its operation); the production process is devoid of social relations and social life that affect worker behaviour; wage-work equals slavery, i.e. purchase of labour gives the capitalist complete ownership of the worker, rather than merely the right to employ the worker for a limited period of time; children are raised solely for the purpose of becoming workers for hire; labour has a fixed, objective cost of reproduction; the ownership of the means of production is the same as the 'ownership' of one's own person; and the former confers no special power or benefits to the capitalist.⁷

True commodities can be industrially produced, purchased at a consistent price and standard quality, owned outright and employed in a strictly technical manner, however and whenever the owner wishes.⁸ Their purchase and use can thus approach a standard of performance versus cost and they are susceptible to a geographic leveling process, as just indicated. Labour takes a commodity form but is not a true commodity; it is a *pseudo-commodity*. As a result, it remains idiosyncratic and spatially differentiated. Four dimensions of the pseudo-commodity labour can be distinguished: conditions of purchase, performance capacity, actual performance and reproduction in place.

⁷These propositions represent a thoroughly alienated view of social life and production; they are, of course, the basis of neoclassical economics, which marxists consider a form of commodity/capital fetishism. The distinction between labour and true commodities, then, goes to the heart of the marxist critique of political economy (Bowles and Gintis, 1975; 1977; Gintis and Bowles 1981). Indeed, Marx's way of capturing the essence of the difference is the labour theory of value and the theory of surplus value; labour (work) creates 'value' simply because it is the irreducible human element in production (Marx, edn 1967). Unfortunately, Gintis and Bowles (1981), in their otherwise fine work, skirt this point and end up attributing positions to Marx that he manifestly did not hold.

⁸This is somewhat less true for plants and animals than inanimate objects.

1 *Conditions of purchase*

Labour must be purchased on the market; in this sense it appears in a commodity form and has a price, the wage. Wages are still the largest single element of input costs on the average for all workplaces and a significant item for every single manufacturing industry (Lynch, 1973; Moriarty, 1977; USBEA, 1978).⁹ This alone makes labour important for location. Moreover, it need not be the largest factor as a proportion of unit costs to be the most important in location, because cost differences between locations are what count, and these are the product of unit input costs times variation in input prices. But the price of labour is normally more complex than just wages. The conditions of purchase for labour include such things as safety and health, security and regularity of employment, prospects for advancement and fringe benefits, etc. Such considerations never enter the picture where true commodities, such as forklifts, are concerned. Yet they often matter more than wages to workers, and they certainly invoke real costs for whoever must bear the burden of their presence or absence, workers or capitalists.

As a factor in location, conditions of purchase vary widely over space. Not only are wage differentials still substantial in the US (USBEA, 1978; Borts, 1970; Segal, 1960; Kearney, 1980), but such things as occupational safety and health standards vary even more (Kerlin *et al.*, 1975). International differentials are greater still (Mandel, 1975).

2 *Performance capacity*

In determining the cost per unit output of any commodity the purchase price must be weighed against performance, or use value. The effective cost of labour, as opposed to its purchase price, includes relative productivity. Here again labour takes a commodity form. But the productive capacity of labour, like the conditions of purchase, is a complex matter. It includes not only technical skill, narrowly defined, but other necessary 'skills' of the labour process, such as creativity when faced with new problems, patience, self-direction, adaptability, emotional stability and more. Some empirical studies of industrial location have committed the error of measuring only wage cost (purchase price) differentials, ignoring quality; others have considered quality in terms of skill differences alone; and even skills are usually measured only in terms of a general scale of skilled to unskilled that considers only the relative scarcity of skills not the specific skills needed for particular tasks¹⁰ (Fuchs, 1962; Wheat, 1973).

The performance capacity of various workforces is known to vary markedly between regions (Scoville, 1973). Skilled labour forces are frequently associated

⁹ Singlemann and Browning (1980) even argue that production workers have *increased* their share of employment in basic manufacturing.

¹⁰ 'General skill' corresponds to abstract labour (the value-creating aspect of work in general) and 'specific skill' to concrete labour (the use-value creating aspect of a particular kind of work).

6 *The theory of labour and the theory of location*

with particular places; in the UK, for instance, one finds metalworkers in the midlands, office professionals in London, miners in south Wales, academics in Oxbridge, etc. (Massey and Meegan, 1978).

3 *Performance and labour control*

The most fundamental difference between labour and true commodities is that there is no guarantee that the employer will get what is paid for, even in the fairest exchange. Performance capacity is not the same as actual performance because of the worker's ability consciously to limit or otherwise regulate his or her work effort.¹¹ Workers, unlike machines, must willingly engage their capacity for work and have the power to resist their use by the capitalist. The intensity, continuity and quality of work that can be got out of workers, with what degree of supervision, monitoring and punishment, is of fundamental importance to the employer. The usual term for the problem of eliciting performance is 'labour control'. Control is a double-edged sword, however, since it is not enough that workers follow the employer's orders; they must actively participate in production (Aronowitz, 1978; Cressy and MacInnes, 1980; Burawoy, 1979a). Capitalist production contains a fundamental contradiction between the need for labour control and the need for thinking, creative working people.¹²

Despite its exclusion from classical location theory, labour control is a basic consideration in location decisions, because of wide variations among labour forces (Low-Beer, 1978; Gallie, 1979; Durand and Durand, 1971; Mandel, 1975; Estall and Buchanan, 1961; Gordon, 1978; Massey and Meegan, 1978; Schmenner, 1978; Blauner, 1964).

4 *Reproduction in place*

The performance capacity, degree of compliance and purchase price of labour are socially produced. A certain portion of labour reproduction happens in the workplace, through the active participation and social interaction of the workers there. But workers, unlike true commodities, are free to leave the plant at the day's end. Thus a substantial part of labour's reproduction takes place in the home and community, beyond the reach of the employer and of capitalist production relations. In other words, workers can not be industrially produced as are true commodities.¹³

For the vast majority of workers, the place of employment lies within the range

¹¹This is not the same as the limitation of performance in the machine or the human by reason of being involuntarily in poor working order.

¹²Worker control is as important in capital-intensive industries as in labour-intensive ones, it should be added. In sophisticated systems, worker responsibility and initiative are essential to productivity and continuity of production; conversely, the potential for sabotage is great.

¹³This is also true of other animate things, which helps account for the uniqueness of agriculture as a branch of industry. See MacLennan and Walker (1980).

of the daily journey to work and back. Of course, long distance migrants who move their place of residence, permanently migratory workers, and seasonal migrants with roots outside the industrial capital nexus are significant segments of the labouring population in many cases (Piore, 1979; Burawoy, 1976). But special emphasis must be laid on local labour markets, the relative immobility of labour and the irreducible element of geography in placebound homes and communities in the reproduction of labour.

A measure of stability is necessary for workers' sanity, nurture and happiness. More is demanded where children are concerned. It takes time and spatial proximity for personal support systems to evolve out of the chance contacts of daily life. Much longer is needed for the central institutions of daily life—family, church, clubs, schools, language (dialect), sports teams, union locals, etc. — to take shape. These outlive the flux of individual participants to benefit and be sustained by generations. The result is a fabric of distinctive, lasting local 'communities' and 'cultures' woven into the landscape of labour¹⁴ (Fischer, 1976; Warren, 1978; Timms, 1971). Transformations in the form, purpose and location of capital can generally be achieved with greater speed than can changes in the supply, location or performance of labour. Borts (1970), for example, shows that labour migration is insufficient to close interregional wage differentials. The same is true of differences in skills, work attitudes or any other dimension of the 'labour factor'.

III The formation of labour demand: review and critique of existing models of labour markets, labour process and sectoral development

We have so far suggested why labour supply remains differentiated, but the hypothesis that labour is critical to industrial location also rests on the continuing differentiation of labour *demand*. To begin with the search for the determinants of labour demand in capitalist workplaces we must turn to the literature on labour markets, labour process, and product sector development. First some basic terms are needed with which to frame the issues.

At its most basic, the demand for labour rests on three conditions.

- 1 Workers must carry out certain tasks at an adequate level of performance.
- 2 Compensation must be at a rate sufficient to attract and retain workers at this performance level.
- 3 Unit labour costs (performance versus compensation) must be consistent with the economic survival of the unit of capital (firm or workplace).¹⁵ We will call these three elements of labour demand: 1 *capital* conditions (which we will limit to a treatment of *sectoral* conditions only); 2 *workplace* conditions or production itself; 3 *the labour market*, in which an exchange is made

¹⁴We will consider the relation between communities and work experience further in section IV, below.

¹⁵The first two correspond to characteristics of labour previously introduced. The first condition combines performance capacity and actual performance (control), the second condition combines purchase and reproduction. The third introduces the reproduction of capital.

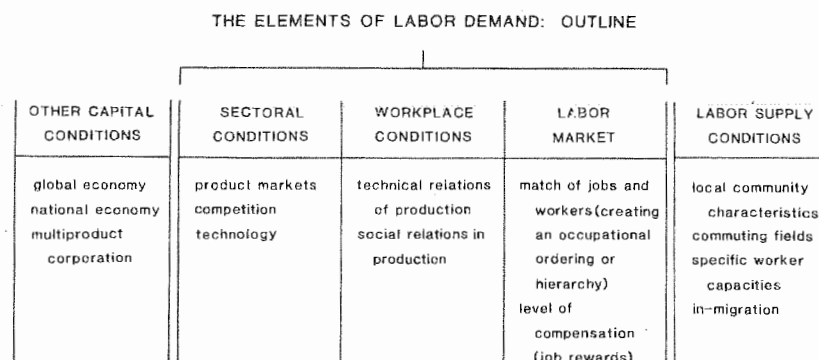


Figure 1 The elements of labour demand.

in light of labour supply. The three-part framework is shown in Figure 1. Non-sectoral capital conditions and labour supply conditions are included to round things out. This framework will be used to illustrate the principles of the various models discussed below. The purpose of this discussion is to extract valuable insights about each of the three elements of labour demand from existing models in order to build a more comprehensive theory of employment. Each model contributes something but none suffices as it stands.

1 *Conventional synthesis: the neoclassical human capital model*

Neoclassical economics is the most comprehensive and widely-accepted approach to labour demand and labour markets. Neoclassical labour economics is based on the same assumptions as all neoclassical theory: exchange is the central economic process; price is the key signal and shortrun clearing mechanism; substitution is the main adjustment process by which equilibrium is reached; individuals participate freely in the market with the goal of maximizing their utility, both as consumers and as suppliers of factors of production. Labour economics simply relaxes the usual assumption of homogeneous labour and admits the existence of an occupationally differentiated labour force (Becker, 1964).

On the supply side, individuals sell their labour to acquire income in light of their utility functions, which contain some tradeoff between consumption (income) and leisure time. The two determinants of income (and axes of the shortrun labour curve) are hours worked and the wage rate at a given skill level. If workers wish to raise their wage rate in the long run altering the long run supply curve for labour, they will increase their skills through expenditures of time and money on schooling or training. On the demand side of the labour market, firms buy labour in order to produce goods under conditions of perfect competition. At equilibrium, labour is paid a wage equal to the value of its marginal product, which depends on product markets (output price), production technology and, again, the skill levels of individual workers (marginal productivity). If there is disequilibrium in the labour market,

owing, for example, to a shortage of workers of certain skills, firms will substitute cheaper inputs for expensive labour, either through short-run adjustments or long-run investment in labour-saving technical change. (Workers would in such a case also adjust their training to develop scarce skills.) When all is said and done, the determinant variables of the model are utility functions, production functions for particular products and the costs of labour training.

The model is thus perfectly symmetrical: individuals invest in their skills, or 'human capital', in the same way as firms invest in plant and equipment, or 'fixed capital'. It is also perfectly equilibrating, given long and short run substitution possibilities in labour supply and labour demand. The outcome is optimal (efficient) because adjustments insure that no excess profits or wages (labour rents) are earned for long. And it is perfectly fair, because the market is a meritocratic allocator of rewards to individual performance; workers have as much discretion to adjust their training as capitalists have to adjust their production technique and input mix. Malfunctions can only occur through exogenous distortions of markets, such as through unionization, minimum wage standards, sectoral monopoly, racism, etc.

In terms of our tripartite scheme, the neoclassical human capital model shows the following features: 1 sectoral conditions are represented by consumer demand in product markets and perfect competition; 2 workplace conditions are represented by the marginal productivity of labour, as determined by technology; 3 the labour market, where most attention is focused, is a pure exchange that results in an occupational structure based on skill, which is freely available to all who care to make the investment in themselves (see Figure 2).

The basic shortcomings of the neoclassical model are the following. 1 Labour markets do not allocate rewards so clearly on merit because skills are not freely accessible to all workers and capitalists are not necessarily interested in (or capable

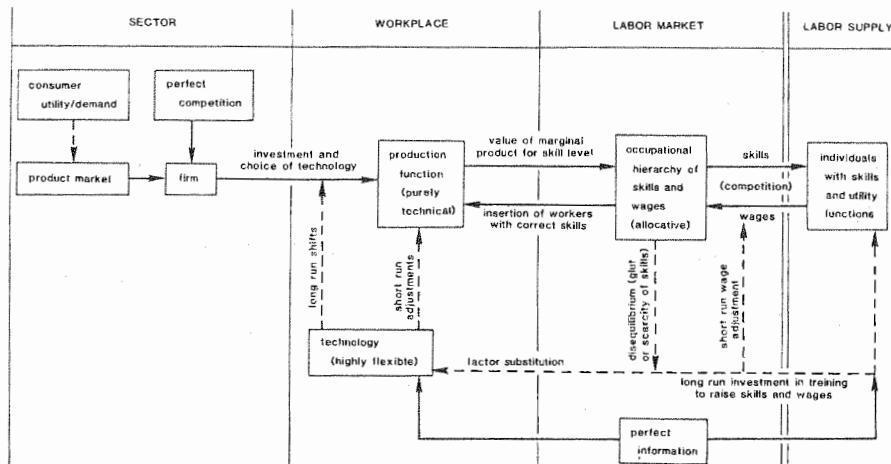


Figure 2 Neoclassical human capital model.

of) allocating jobs meritoriously. The neoclassical labour market is both too perfect (in knowledge, for example) and a lifeless exchange mechanism that matches workers and jobs, but is devoid of a real bargaining and conflict (see section IIIb). 2 Production cannot be reduced to technology alone, absent social relations in the workplace. Workers internalize technology interact in human, non-technical ways through their work roles, and jostle with employers over control of the nature and pace of work. Therefore, labour demand cannot be reduced to (technical) skill alone (see section IIIc) and technical change cannot be directed solely by external price signals (see below). 3 Sectoral conditions cannot be reduced to perfect competition and consumer demands. In particular, the technological constraints, imperfections of competition and employment relations in a sector create distinct development paths for different industries (see section IIId). 4 Workers reproduction cannot be reduced to the acquisition of education or training (see section V) (cf. Bowles and Gintis, 1975).

Because technology is central to any conception of production and labour demand, some comments are in order concerning the neoclassical theory of price-induced technical change. If one took the neoclassical view to its limits, production functions in different sectors would converge over time because they face the same aggregate capital and labour supply curves.¹⁶ In fact, sectors remain distinct because of forces of divergence as strong as those of convergence, at the centre of which are the technical characteristics of real products (see section IIId). The neoclassical model is wrong on two fronts. First, in the short run, the self-evident fixity of capital sunk in plant and equipment is a barrier to free marginal substitution of inputs. Hence the marginal products of capital and labour cannot be calculated and equilibrium prices will have no unique significance. Second, in the longer run, technological substitutions are also constrained, not merely by the physical embodiment of technology in machinery, etc., but by the distinct physical characteristics of different products and the limited ways such products can be used or produced. The production of engine blocks simply cannot be equated with the production of cotton batting. In the process of invention relative prices cannot be carefully weighed into the scientific and technical calculus. As the lure of competitive advantage drives firms to introduce new products and processes, the only criterion is that they sell better or cost less than what exists; beyond that, optimal adjustment is so much pie on the sky. Though subsequent corrections are normally substantial in any production process technology after it is put into operation, by the time any sort of optimal input mix can be approached, disequilibrium comes again from the introduction of new technologies¹⁷ (Harcourt, 1972). Empirically, the theory of induced technical change has not been corroborated

¹⁶ Assuming each begins with the exogenous introduction of a new product and process thanks to autonomous technical invention. This is the deadend reached by Samuelson during the Cambridge-Cambridge debates on the theory of capital, which the defenders of neoclassical theory resoundingly lost (Harcourt, 1972).

¹⁷ As Harvey (1981) points out, equilibrium or zero excess profits essentially means crisis for capital (cf. Mandel, 1975).

(Thurow, 1975; Hamer, 1973). Nor has the geographic version of technical substitution been tested out. The resource endowments of a region (relative factor prices) do not determine the kind of technology an industry adopts. Persky (1978), for example, shows that factories in the lower-wage southern USA are no more labour-intensive than higher-wage northern factories in the same industry.

Despite its flaws, the neoclassical approach rests on some valid principles that are often forgotten or taken for granted in other models. 1 Work productivity is an important attribute of labour forces which varies with training, experience and other factors. 2 Wage rates are affected by the relative scarcity of different kinds of labour. 3 Some technical adjustment and input substitution in response to price differentials takes place. 4 The pressure of competition is critical to industrial evolution even in the age of oligopolistic corporations.

2 *Labour market operations: labour queue, labour market segmentation and labour exchange models*

These models grew out of a critique of human capital theory, job-training programmes and the prevailing ideology that poverty is the fault of its victims because they are not very productive workers. They reverse the neoclassical order of priority, away from the worker as bearer of skills and keeper of his/her own fate, and toward the job as determinant of position in the occupational hierarchy and system of rewards. Valuable insights are thereby gained into the power of employers and employment over the condition of workers, the significance of discrimination and other matters. But certain problems remain.

The first principle of labour queue theory (shown in Figure 3a) is that skills are something acquired on the job rather than through prior education or training (Thurow, 1975). Only actual production generates the degree of realism necessary to polish work skills. Job experience also helps inculcate norms of industrial discipline, good work habits and so on. It is not a matter of workers becoming personally more productive, however, but of their being prepared for particular jobs. 'The marginal product resides in the job not in the man (*sic*)', as Thurow (1975) puts it. The second principle of the model is, therefore, that jobs come with essentially predetermined and fixed characteristics such as skill requirements, productivity and rewards (The sectoral conditions that generate the actual set of jobs are not a topic of inquiry.) The input mix in production is also fixed. Labour demand thus varies only by the costs of on-the-job training.

The problem for an employer is to pick and train workers so that they can generate the normal marginal products of jobs with the least investment in training. Employers rank potential workers on the basis of training costs, thus establishing a *labour queue*. But as they lack information on specific workers, employers must use indirect indicators of the costs necessary to produce standard work performance. For new workers and entry level jobs, background characteristics serve as the principal basis of selection. The problem is to find those background characteristics that are good predictors. Education level and performance is one

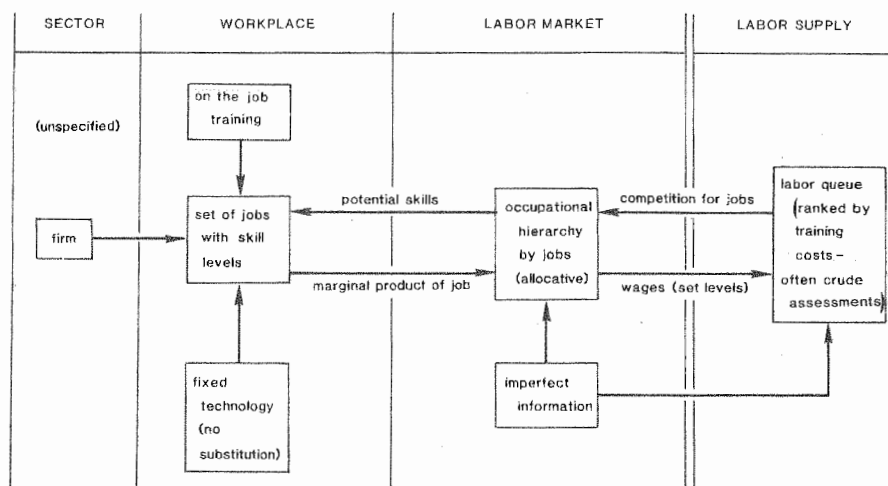


Figure 3a Labour queue model.

such indicator because the ability to absorb one type of training may translate to another and success in school requires a kind of work discipline and attention to orders. For most industrial jobs, however, individuals are treated as classes according to features of the population to which they belong, such as race, sex, age, appearance, psychological attributes or IQ. This forms the basis for systematic discrimination in the labour market – the allocation of certain kinds of people to certain kinds of jobs with set rewards. Employers' subjective principles are, in this situation, as important a source of discrimination as real correlates of background and job performance.

In the labour queue model the labour market is not the site of wage-bidding over worker skills but a way of allocating training slots.¹⁸ Preferred workers in the queue get the best jobs. Workers compete for slots on the basis of background rather than willingness to accept low wages for given skills. Indeed, the training function makes the suppression of direct wage competition profitable, since that would encourage firms to bid workers away from each other after they had invested in worker training and would discourage workers from training each other on the shop floor.¹⁹

¹⁸The labour queue model reverses neoclassical assumptions about short and long run market clearing mechanisms. In the wage competition (neoclassical) model, wages fluctuate in the short run to clear markets and these wages then induce shifts in the long run supply and demand curves. In the queuing model, supply and demand curves shift in the short run to clear markets. That is, employers alter hiring requirements and the amount of on-the-job training they provide. There is no feedback from the wage bargain to technological change.

¹⁹According to Thurow (1975), this is also one reason why rigid wages and seniority rules are just as common in non-union as in unionized sectors of the economy; they regulate the social order of the workplace.

The strengths of the labour queue model are: 1 the emphasis on job characteristics in setting the conditions for the labour exchange; 2 recognition that skills and productivity are important features of jobs and the workers who fill them; 3 recognition of the importance of on-the-job learning and training costs; 4 recognition of an imperfect labour market in which discrimination plays an essential role.

Shortcomings of the model are as follows: 1 It ignores sectoral conditions (or regards them in strictly neoclassical terms) (see section IIIId). 2 The origins of technology are unexamined. Strictly fixed coefficients, without feedback, simply reverses the neoclassical assumption of perfect substitution (see section IIIa). 3 Social relations in production are restricted to training between workers (see section IIIc). 4 It is a logical contradiction to speak of the marginal product of a job where there is no factor substitution (see section IIIa). 5 Both new and old workers do, in fact, enter the labour market with recognizable differences in skills and work attributes that cannot be reduced only to background characteristics such as race (see section V, below). Employers are less blind to the work performance and reward demands of different labour forces than this leads one to believe. 6 Wages can be bid down for any given skill or other labour characteristic to some degree (see section IIIa).

Several further criticisms of labour queuing are contained in the closely related labour market segmentation theory, to which we now turn.

Labour market segmentation theory shares some features of labour queue models, but moves farther away from the tenets of the neoclassical approach. Figure 3b is a composite portrayal of the model, since there are differences among the proponents of what is variously known as labour market segmentation, dual

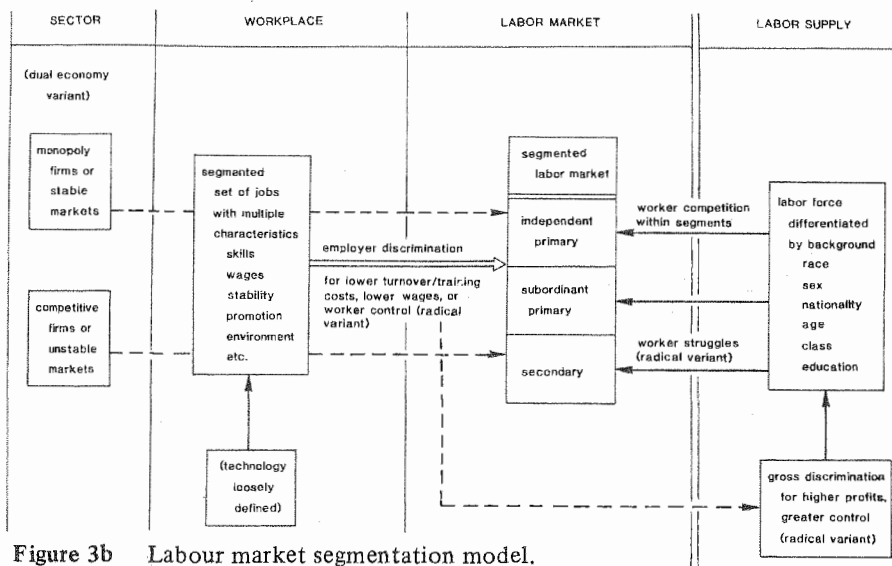


Figure 3b Labour market segmentation model.

labour market and internal labour market theory (Doeringer and Piore, 1971; Edwards, Reich and Gordon, 1975; Bluestone, 1971; Williamson, 1975; Freedman, 1976; Piore, 1978; Edwards, 1979; Reich, 1981). There are five basic contributions of this school of thought.

First, the labour market is not a linear queue but a series of discrete segments of jobs and workers between which there is little or no mobility. There is still no generally agreed upon number of hierarchical segments, definition of substantive characteristics, or elucidation of causal forces. The following represents a common scheme. 1 'Independent primary' segment: wages are high, employment fulltime and steady, work usually self-directed and workers technically skilled. Opportunities for advancement are good. Most professional, craft and managerial jobs fall into this category, while industrial production work falls into the next two segments. 2 'Subordinate primary' segment: jobs are more routinized and mechanized. The common designation for such labour is semi-skilled. Wages are relatively high, jobs fulltime and regular, but prospects for advancement limited. 3 'Secondary' segment: jobs are low wage, unstable, deadend, boring and closely controlled by management. Poverty research has shown that an increasing proportion of industrial jobs fall into the secondary labour market, holding those workers in dead-end positions of poverty or near-poverty (Bluestone, 1971; Harrison, 1980).

Second, as implied in the preceding characterization of segments, the labour market exchange includes not only a wage and a job defined by skills, but a whole set of considerations such as stability of employment, prospects for advancement, work autonomy, routinization and job hazards.

Third, the process of job and worker matching in the labour market supports the labour queue notion that workers are not necessarily channeled into jobs on the basis of their skills or education. It has been shown that when occupation is introduced as a control variable in regression studies, returns to education have a wide range (Doeringer and Piore, 1971; Freedman, 1976; Bowles and Gintis, 1976).

Here there is a parting of ways within the general school of thought.²⁰ Dual labour market and internal labour market theory emphasize reduction of turnover and training costs as a reason for insulating primary jobs and workers from the vagaries of the market (Williamson, 1975; Doeringer and Piore, 1971). Some add that primary workers themselves favour segmentation because they can engage in training without creating a glut of workers that will threaten their jobs (cf. Thurow, 1975).

Radical labour market segmentation theory goes farthest in emphasizing discrimination. In this view, employers are not so much worried about training costs and imperfect information as aware of the usefulness of discrimination in the process of bargaining between employers and workers over the terms of the labour exchange. An active bargaining process and class conflict are introduced in this

²⁰Thanks to Kristin Nelson for pointing this out to us.

model in place of the purely allocative function of the labour market in neo-classical and labour queue models. Workers are sought who can be made to accept lower wages and poorer conditions for the same work or who will accept the terms of bad jobs (Edwards *et al.*, 1975; Reich, 1981).

Fourth, worker control is introduced as a major consideration in hiring. For example, if women are more docile, they can be more easily controlled on the job, as well as being less inclined to organize into unions to demand better wages and working conditions. The weight given to labour control is much greater among the radical labour market segmentation theorists than among the others of this school, such as Doeringer and Piore.

Fifth, many labour market segmentation/dual labour market theorists introduce sectoral conditions in the form of the dual economy model. Product markets and/or firms are divided into two groups: those characterized by small firm size, high competition, low profits, weak or unstable demand, and a low level of technical development versus those characterized by large oligopolistic firms with high profit margins, stable markets and a high degree of mechanization. One writer may give more emphasis to stable versus unstable product markets (Piore, 1979), another to monopolistic versus competitive firms (Friedman, 1977), but the purpose is essentially the same: to correlate labour market segments with distinct sectors of the economy. The dualism idea is also applied *within* markets or firms, giving rise to *internal* labour market segments. For example, a firm may maintain a primary segment of full, full year workers while hiring secondary labour during employment peaks, such as harvest-season canning.

All five points above may be regarded as significant contributions to an understanding of the operation of real labour markets. But the following improvements need to be made. 1 The sectoral position of the firm — particularly as portrayed in the highly simplified categories of dual economy theory — does not adequately correlate with the conditions of employment won by the workers, which may be better or worse than expected (Dunlop, 1962; Freedman, 1976; Edwards, Reich and Gordon, 1975) (see section IV). 2 Conflict and bargaining are not confined to the labour exchange but extend to the nature of the labour process itself in a way that labour market segmentation theory only hints at.²¹ In general, labour market segmentation models do not take up the social relations in production (see section IIIc). 3 Labour segments are rooted in the nature of production and jobs, so hiring policies cannot be reduced to control and maximizing exploitation, as in some versions of labour market segmentation theory. In the extreme, skill designations of jobs are seen as merely a cover for hiring discrimination; all workers are considered capable of learning every job within a short time; and schooling is thought to be wholly an exercise in social control. If this were so, there would be no segmentation, as all workers would be driven down to the lowest common denominator (see sections IIIa and b). 4 Technology, in so far as it is given any

²¹ With the principal exception of Edwards's (1979) important but not wholly successful effort to unite labour market and labour process theory.

significance, erroneously appears as fixed or fully under the control of the employer (see sections IIIa and c). 5 As a result of the failure to consider production with any care, labour market segments are portrayed as a jumble of empirical features, useful only as a crude first approximation to the complex divisions within the working class.

In order to correct certain problems in labour market theory, we must look more closely at labour process and sectoral dynamics. In the meantime, we can extract the best elements of the neoclassical, labour queue and labour market segmentation models regarding the labour market and combine them in a new formulation, the 'labour exchange model', shown in Figure 3c. In this model, the labour exchange is a process of bargaining as well as allocation of workers to jobs. Definite performance capacities (broader than 'skills') are needed on the job and some workers have these already while others do not. Prior capabilities are not always essential, however, because of the possibility of on the job learning. The labour market is segmented thanks to both the hierarchy of jobs and the efforts of employers to divide workers in order to win a favourable exchange bargain for themselves. The segmentation is more complex than the tripartite model noted above, however. Discrimination on gross background characteristics is widespread because of imperfect information, employer prejudice and advantages gained by employers from creating divisions in the working class and exploiting those who are weakest. Entrapment of workers in certain labour market segments is common as a result. But there is the possibility of manoeuvre on both sides of the bargain, rather than complete capitalist domination and manipulation (Gordon, 1980). Job compensation consists of a complex set of rewards, not wages alone. No definite assertions are made about either the workplace (production relations) or sectoral conditions.

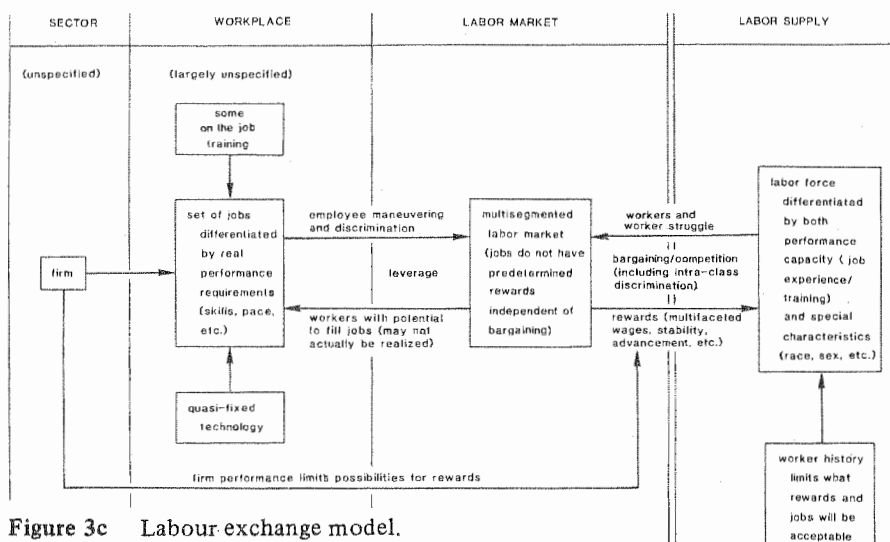


Figure 3c Labour exchange model.

3 *Workplace conditions: industrial sociology, labour process, and production relations*

Industrial sociology is principally concerned with the organization and social dynamics of the workplace (Burawoy, 1979b; Woodward, 1965; Blauner, 1964; Ouchi, 1977; Kalleberg and Griffin, 1978; Sabel, 1978). This is an area almost wholly ignored by economists. Traditional industrial sociology had three lines of inquiry, each drawn from a broader concern in the discipline that goes back to the classical writings of Marx, Weber and Durkheim. The first, linked to organization theory, seeks the determinants of internal workplace social organization and of success in achieving organizational goals. The second, derived from social alienation theory, looks at the subjective experience of work and seeks the sources of worker satisfaction or dissatisfaction in the nature of work, workplace social interaction and employer-worker relations. A particular focus has been on the workers' propensity to revolt. The third line of study examines social stratification and the division of labour. Whereas economists tend to locate the origins of worker stratification and differentiation in the labour market, the sociologists emphasize the organization of the firm and the production process. All three research traditions share a common polarity between those who emphasize determination by technology and those who stress the causal force of social process and the subjective. Together the three types of industrial sociology have shed considerable light on the workplace as a social system in itself.

Three facets of the social system of the workplace have been identified in traditional industrial sociology. These are shown in Figure 4a: 1 *Individual tasks* in the detail division of labour, each requiring particular physical and mental operations (concrete skills), degrees of autonomy, pacing, etc. 2 *Task interaction*, or the juxtaposition of jobs in an organized technical system of work, involving sequences of operations, movement of material to and from work sites, group tasks, etc. Small groups processes have received the bulk of attention here.²² 3 *The authority system*, including both external command and internalized values, by which individual performance, group interaction and the overall organization of work are regulated.²³ The identification of these specific components of the workplace system is a major contribution over the simple 'technical skill' view of what constitutes work. But traditional industrial sociology fails to put them in the correct social context.

Over the last decade a new, radical school of thought has grown up within the field of industrial sociology. This literature can be designated as 'labour process studies'. It tries to unite the three traditional lines of inquiry — organization, alienation and stratification — within a single investigation of class struggle in the

²²There are, of course, forms of worker interaction during the workday that lie outside the boundaries of the job, in lunchrooms, union activities, etc. These can be very important to worker consciousness and solidarity.

²³The three components of workplace society can be further subdivided, but need not be for the purpose of this paper.

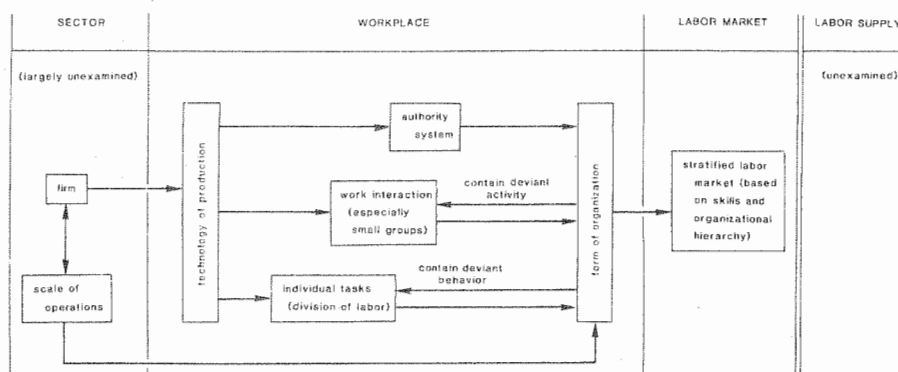


Figure 4a Industrial sociology model: technical determinant variant.

workplace. Whereas conventional theorists view the workplace as a unified social system in which 'authority', 'rules' and 'organization' are adopted for the collective good and management is a benign party setting things right, radical labour process analysts begin with a class divided society and a labour process controlled by the capitalist class for the purpose of profit-making and self-perpetuation. This school rejects the managerial viewpoint of most industrial sociology. The concept of *control* is central (see Figure 4b). So is the stress laid on the non-technical aspects of the organization of work and the use of technology and work organization as a managerial tool for breaking worker militancy (hence the balancing of technology with workplace social relations in Figure 4b). Indeed, the strength of worker bargaining power on the shop floor is seen as affecting the course of technological development. In place of the neoclassical model of price-induced technical change, they stress *control-induced* innovation.

Distinct variants of the radical labour process approach need to be differentiated. Beginning with Braverman (1974), Stone (1974), and Marglin (1974), the 'classical' marxist argument was reasserted concerning workers loss of control over production and progressive deskilling. Capitalists use work rationalization (Taylorism) and mechanization to break the power of skilled workers. Control over the conceptualization, pace and direction of work is gradually transferred from workers to management, aided by the machines built by modern science and engineering. As machines replace skilled workers, less skilled, lower paid labour is required; and, in the process, unions and other forms of worker solidarity, which rely on the social cohesion grown of particular shared skills, jobs and work experience are undermined (Montgomery, 1979). A grim picture has been painted of de-skilled, homogenized, closely controlled, boring and badly paid manual labour in the twentieth century. Edwards (1979) takes the model further by arguing that

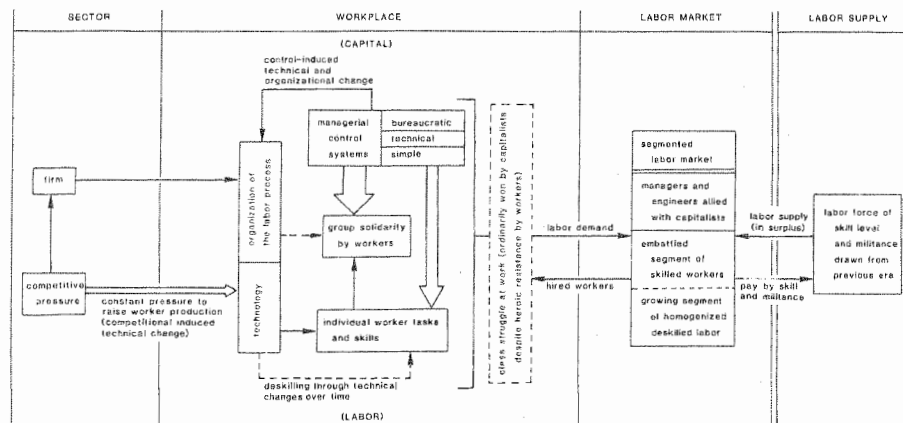


Figure 4b Labour process model: capital logic variant.

there is not one means of control — deskilling — but three — simple, technical and bureaucratic — appropriate to different labour processes and stages of capitalist development.

The capitalist drive to control and deskill workers is undeniable, and has transformed virtually every occupation in the course of capitalist development. Without recognition of this central dynamic, one cannot adequately grasp the history of work and industry. But the whole story is more complex than it is often portrayed.

In reaction to what has been called the 'capital logic' model of the Braverman school, some marxist writers have pointed out that the capitalist is not in complete control of the workplace. All workers retain an essential measure of control over the conception and execution of work, if only to deal with the inevitable failures of equipment and need for communication in a group labour process.²⁴ The common labourer, the skilled worker in automated manufacture or the office secretary must repeatedly exercise creativity in meeting the unexpected challenges of the job (Pfeffer, 1979; Burawoy, 1979a). This no machine can do. Because workers actively participate in production management secure their cooperation if anything

²⁴Considerable confusion arises because of the common misuse of the term 'skill'. A garment worker, for example, is generally considered unskilled but she is not. The work tasks and work pace typically demanded by employers require a standard of performance few people can reach without long experience. But because the basic capacity to sew is widely available and the people who are the bearers of it (women) are not highly regarded for such skills, garment work is not seen as anything special. This is a confusion of the abstract and concrete dimensions of work, i.e. the specific work is difficult but the supply of workers for such jobs is abundant, so their capabilities carry little scarcity value. Or, to take another case, literacy might make a worker skilled in certain contexts (England in 1823; Chad in 1982) but not in others; it's all relative to the general level of the working class.

is to be accomplished (Aronowitz, 1978; Cressy and MacInnes, 1980; Burawoy, 1979a; Gordon, 1980).²⁵ This does not mean of course, that worker power is necessarily great; most workers are in positions stripped of traditional vestiges of strength, while those who do retain greater control in their jobs are always subject to attacks of capitalist 'rationalization'. Nonetheless, some measure of bilateral power exists in all workplaces.

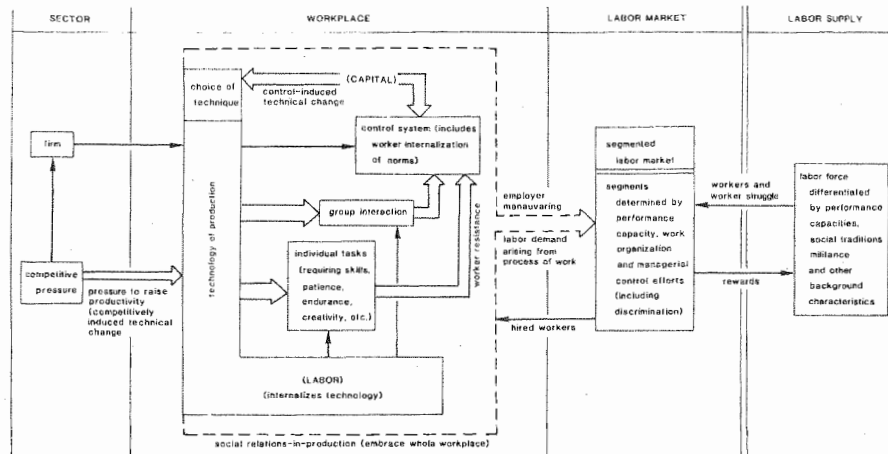
The balance of workplace power rests on the nature of the work. Therefore, the actual leverage enjoyed by workers will vary among different industries and jobs (e.g. Mills, 1979). Discovering these differences means, first, looking closely at technology and the way concrete labour processes demand specific tasks, behaviours, task interaction, and central authority; second, paying close attention to the way tasks, task interaction and job performance values form a basis for worker militance; and, finally, analysing how employer control systems attempt to cope with the independence of labour (Gordon, 1980).

Finally, if we are to give full weight to the social relations of production, we must go beyond the impoverished view of social dynamics and structuration of most industrial sociologists and labour process analysts. Workplace society only *begins* with the delineation of tasks, work interaction, and managerial control systems. As Burawoy (1979a; 1971) has so deftly argued, workplace society, or what he calls *relations in production*, develops a life of its own which neither workers nor managers nor technology determine directly. They all contribute to the process but the outcome is something no one fully intends. Work becomes a kind of 'game' which diverts attention from the essential class relations and purpose of production. Ironically, workers end up cooperating in their own exploitation, despite the continual struggle for dignity, independence and control in their work.²⁶

In place of the industrial sociology and labour process models we offer a 'bilateral production relations' model that combines the insights and criticisms just discussed (see Figure 4c). It includes the three basic components of the workplace — tasks, interaction and authority (control) — but set in a class context. Managerial control is less overwhelming than in the 'labour process' model and the technical component is stronger. The technical organization of work provides a concrete basis

²⁵This insight fundamentally alters the meaning of technology or forces of production to include an irreducible, living, human element (Levine and Wright, 1980). Technology, as knowledge and method of production, cannot be separated from the workers who participate in that production. It is therefore a fetishism of capital to isolate 'technology' or to see its control lying solely in the hands of management. Furthermore, to speak of 'choice of technology' by management is to simplify a more complex process involving interaction and struggle between capital and labour (and accompanying social refraction) before any technology is fully operational. The radical theorists of labour control have correctly deobjectified technology, but have in the process too often dissolved its specificity. The problem of mastering nature must be counterposed to the problem of one class mastering another. Reality lies in the tension between the social relations and social forces of production.

²⁶In order to capture this independent element of social life created in the workplace, a structural realist mode of analysis is needed. We return to this theme in section IV.



on which worker militance and solidarity may develop and managerial control systems arise to cope with resistance (as well as to direct the production process). Worker command over aspects of technology, as well as over their own beings, creates a situation of bilateral power, even though capital is dominant. The social dynamics set in motion on an everyday basis complicate matters by giving rise to distinctive rules of social life within each industry and workplace. Sectoral conditions are left open, with the restriction that the technological differences among industries are significant to the social order of the workplace. Labour markets are segmented based on the conflicting demands for technical performance and managerial control. In other words, the labour exchange is not based simply on a struggle over rewards for jobs of given skill (or individual performance capacity, however measured). It includes manoeuvring over job control in light of the often contradictory need for high performance.

The sociological literature on the workplace opens up a world of production unknown to neoclassical theory and labour market economics. But it needs to be integrated within a larger framework that includes the labour exchange and sectoral conditions.²⁷

4 Sectoral conditions: product cycle and divergent development models

The dynamic flow of job creation begins with the development of product commodity sectors, in which the possibilities for profits, growth and technical change

²⁷Edwards (1979) has attempted such a marriage. We shall offer our own version in section IV.

are embedded.²⁸ Sectoral conditions set limits on the bargaining between labour and capital and the form which relations in production can take.

Sectoral conditions can be segmented into three components: product markets (sales and prices), production costs (input prices and productivity) and organization (e.g. market concentration, degree of competition and vertical integration) (Walker and Storper, 1981). The models to follow share a belief in a systematic relation among the three based either on the stage of development of a commodity sector (the product cycle model) or the specific character of the physical product (the divergent sectoral development model).²⁹

The product cycle notion originated with Kuznets's and Burns's observations about the rise and fall of industries (Burns, 1934). Historical figures were said to show that the output of various commodities followed a pattern of introduction, rapid expansion, maturity (growth at a declining rate) and eventually decline. This pattern was subsequently embraced by location theorists, who tied it to varying explanatory frameworks. Hoover (1948) appears to be the first appropriator, linking the product cycle to the evolution of *production* from specialized craft to standardized machine production. This movement results in a progressive deskilling of labour, in a manner akin to the classic marxist model (see section IIc), and is accompanied by an increase in the scale and capital intensity of factories. Because land and unskilled labour are to be found more cheaply outside the dense industrial cores of cities, the product cycle leads to industrial decentralization (Schmenner, 1978; Rees, 1979; cf. Massey and Meegan, 1978).

Raymond Vernon, whose name is most commonly associated with product cycle theory, subsequently emphasized the *marketing* aspects of the cycle, from specialty product with a small market to mass consumption item (Vernon and Hoover, 1959; Vernon, 1960; 1966). Indeed, production changes almost disappear from the picture, an oversight Vernon subsequently modified (Vernon, 1979).³⁰

In a third variant, the product cycle is portrayed in terms of the organizational evolution of sectors from highly competitive and innovative firms to oligopolistic,

²⁸ Again, we ignore several important forces – aggregate business cycles, the state, technological revolutions, corporate organization, financing and variations among firms within sectors – in order to focus on an issue of great importance to job creation: product-constraints on accumulation in particular branches of capital.

²⁹ The three components would, of course, have to be treated separately for a fully accurate specification of sectoral conditions. But that complication must be left aside for now.

³⁰ Vernon's writings have primarily been addressed to international trade and the invasion of foreign markets by multinational corporations, who first gain a market foothold through export then ultimately shift production abroad. International location offers special problems such as cross-cultural marketing, trade barriers and national investment controls which cannot be treated here.

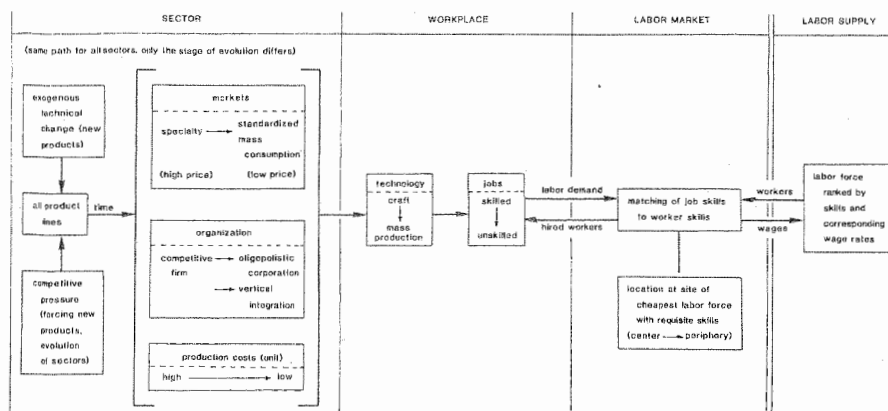


Figure 5a Consolidated product cycle model.

vertically integrated giants that command large, mass production facilities and far-flung marketing systems (Markusen, 1982).³¹

A strong implication of product cycle theory is that the three components of sectoral conditions – markets, production costs and organization – can be linked systematically. For example, larger markets offer the possibility for mass production; mass production facilities create pressure to expand markets; the cost of large scale production facilities requires large investments and are a barrier to entry, encouraging larger organizations; large integrated firms tend to out-compete small firms by virtue of their greater access to markets, finance, etc., thereby further increasing concentration. Markusen (1982) has made an effort to tie together the three components under the rubric of the 'profit cycle'. A unified product cycle model is shown in Figure 5a.

In one sense the product cycle model is a useful 'ideal type' that directs attention to strong tendencies in the nature of capitalist production toward product innovation, extension and eclipse, productivity growth through standardization and mechanization, and the centralization of capital. But it both oversimplifies those tendencies and tries to read directly from structural tendencies to real life results.³² It therefore unravels when one looks at the real experience of commodity sectors.

³¹ A fourth variant sees innovation diffusion in space as the central process. Older industrial concentrations in inner-cities or mature regions have a growth advantage because of their innovation potential which is eventually lost as peripheral areas, which have accumulated more and more industries over time from the decentralization of mature industries, cross the threshold to become innovation and growth centres in their own right (Norton and Rees, 1979). This variant, in which space is an active variable, is not to be confused with the other three variants, on which it builds, in which spatial decentralization of industry is simply the passive result of industry maturation.

³² That is, the product/profit cycle theory needs to be grounded in a marxist model of capital accumulation based on a structural/realist methodology (see section IV).

a Markets (output growth): The growth pattern discovered by Burns does not hold up empirically. Gold (1964) has found wide diversity in product output growth patterns from which no single generalized 'cycle' can be derived. That is many industrial sectors grow, decline and grow again, at differing rates, depending on their ability to modify products, find new product uses, make productive innovations to lower cost or raise quality, and diversify within one general production line (without becoming a different industry).

b Production: Mechanization and deskilling, while powerful tendencies, are not so simple in form and consequence as product cycle models intimate. First, technical change is not automatically linked to size and maturity of markets. Second, technological progress does not always mean deskilling and employment relations cannot be reduced to technical job skills (see section IIIc). Third, automation in today's electronic world does not necessarily mean larger, more capital-intensive plants; workplaces are shrinking in many industries (Blair, 1972; Schmenner, 1978).

c Organization: Increasing sectoral concentration can be undermined by competition brought on by market growth, product innovation, high profits, lower production costs abroad and the complacency of the successful. As a result, industries often go through countercycles of deconcentration (Storper, 1982).

d Location: There is no universal pattern of decentralization of plant location with the maturation of industries. Some become more spatially concentrated over time, some hardly change, and some decentralize without going through the predicted increase in automation or firm size. Nor is there an aggregate movement out of 'core' areas by all industries. Studies of the 'seedbed' function of central cities have shown decentralization to be more a result of the differing industrial bases of cities compared to suburbs than of high birth rates of firms at the centre and decentralization over the lifecycle of the firm (Struyk and James, 1974; Cameron and Latham, 1981). Product cycle models of location begin from the faulty assumption that the greater aggregate dispersal (locational capability) of factories today as compared to the past is the cumulative effect of the decentralization of individual industries over time. On the contrary, most industries, if sufficiently disaggregated by product/commodity (to the 4, 5 or even 6 digit level of the Standard Industrial Codes (SIC) in the US Census of Manufactures), are remarkably concentrated in their location today (Storper, 1982). It appears that the degree of spatial concentration varies more *between* product types than *over time* for each one. Therefore, the distinctive location patterns of industries must be explained before one can tackle the cases of decentralization.

In place of the product cycle we propose a 'divergent sectoral development' model centred on the unique characteristics of every commodity or product line (see Figure 5b). The necessity of disaggregation and industry case studies is a fundamental axiom of our work (Walker and Storper, 1981; 1982; Massey, 1978; 1978b). One must not only analyse the common forces acting on different branches

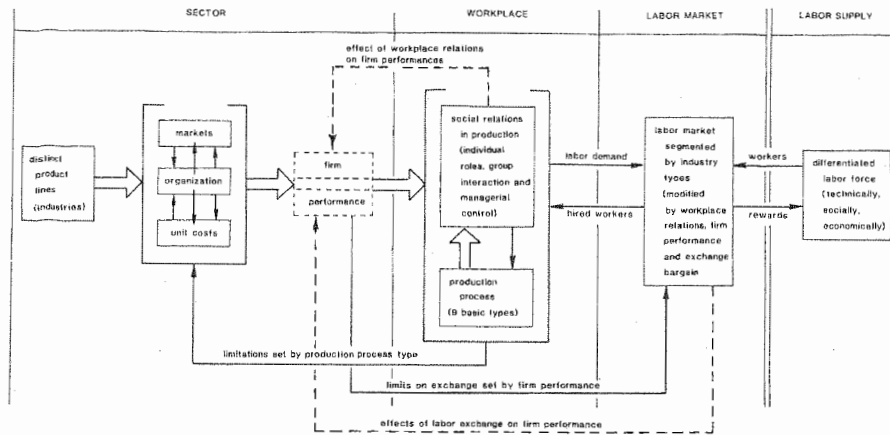


Figure 5b Divergent sectoral development model.

of industry but study what makes them *distinct*. Otherwise, aggregation can mask as much as it reveals. This approach retains the idea of systematic, structural forces driving industrial evolution, but escapes the excessive generalizations of the product cycle; that is, it considers the particularities of industries as a necessary prism through which structural forces are refracted into specific outcomes. After all the historical contingencies of sectoral development have been stripped away, and the common underlying forces of capitalist production relations accounted for, something remains: an irreducible structure imparted by the specific physical and social properties of the product to be produced, transported and consumed. The common forces of competition, class struggle, etc. have led industries down different evolutionary paths because each one faces fundamentally different sets of possibilities and limits in marketing, production and organization (Scherer, 1970; Bain, 1966).

Market size and growth rates depend on product uses, adaptability, substitutes, durability, innovation and the like. For example, petrochemicals spawn new variants with new uses by the thousand each year, while shoes can change only slightly in style and little in function. Different products also have substantially different production methods with widely divergent potentials for standardization, mechanization and other means of rationalization to raise productivity. The kind of continuous flow, automated processing possible in chemicals can only be dreamt of by the garment industry. Technology is quite specific to the physical processes involved.

Developments in markets and production processes are closely linked, and are, in turn, essential determinants of the competitive structure of the industry. Furthermore, all three conditions — markets, production technology and sector organization — may feed on each other in cumulative fashion, so as to propell an industry further along a particular growth path (Victorisz and Harrison, 1973).

Although, *n*-different commodity sectors could be studied individually, some

degree of aggregation is possible on the basis of an analysis of production. Sector conditions, suitably disaggregated, tend to cluster around distinct productive processes. Production is also the heart of the matter as far as labour demand at individual plant location is concerned. In our research we have found it possible to classify industries in terms of a limited number of types of production process. This has proven more satisfactory than any other simplified classification scheme such as capital intensive versus labour-intensive industries or monopoly versus competitive sectors. Production processes consist of several discrete work units each with its own technology, but one or two technologies usually dominate. The kinds of technologies found in manufacturing today can be reduced to a few general types, based on the particular mix of conversion process and material transfer involved. They range from manual assembly to continuous processing. Each one generates a distinct set of employment problems and possibilities with which management must deal in its hiring policy and labour relations, giving rise to a characteristic kind of 'labour demand' (Storper, 1982; Storper and Walke 1983).

The deal that can be struck with labour in the workplace and in the labour market is limited by the nature of each product. Hence labour demand will diverge widely among specific industries. Conversely, as one begins to aggregate specific commodities into broader industrial sectors, e.g. moving from auto engines to motor vehicles to transportation equipment, the distinctive character of labour demand (and location) becomes blurred.

IV A structural theory of employment and job creation

We propose a theory of employment that goes beyond any previous conception of 'labour demand'. It begins from the partial reformulations previously established: the labour exchange model, the bilateral production relations model and the divergent sectoral development model. Only the main points will be repeated and these will be recast as necessary to take account of the following general propositions.³³

- 1 The model must unite the three realms of labour market, workplace, and sectoral conditions, and recognize the interpenetration of the three.
- 2 The fulcrum of the model must be the labour process, where jobs are actually created and recreated. Production lays the foundation for the labour exchange. So close are the two, in fact, that they must be united in a single relation of employment.
- 3 The terms of the model must be recast to reflect class relations of cooperation and conflict.

³³We present the whole model at a level of abstraction that provides only a tool for analysis, not a substitute for it. It has proven useful in our own empirical studies, but yields no *a priori* answer to the question why industry X generates jobs Y without concrete study of that industry. This necessarily follows from the structural-realist approach to the nature of scientific inquiry (see text below).

4 The model must present employment as a continuous process in which capital (the firm), labour and the employment relation between them are all reproduced over time.

5 A model of employment must be cast in structural-realist terms (Bhaskar, 1975; 1979; Sayer, 1979; Keat and Urry, 1975; see also Williams, 1976). That is, it involves both underlying 'structural' relations and their logic, of which the human actors are largely unaware, and human agency and contingent circumstances. Indeed, the two poles are necessary conditions for each other. Together, structures and agency/contingency generate the actual events of everyday life. Such a conception necessarily includes the flow of history, indeterminate (non-predictable) outcomes, and contradictory outcomes, including those so severe as to threaten the reproduction of either the actors or of the social system itself. This approach is antithetical to positivist and structural-functionalist modes of analysis.

6 A model of employment must portray job creation as a social process structured simultaneously by three things: technical relations of production (the transformation of nature); social relations in production, labour reproduction and labour markets (relations of class and, at a different level, the logic of social sub-systems within any of these realms); and economic relations (accumulation of capital, including the production of value, circulation of value, competition, etc.). We leave the ordering of the three structuring relations open for further debate.

The model consists of four parts: the exchange relation, the production relation, the employment relation and sectoral development. The reproduction of labour is treated in section V. The model is shown in Figure 6 in a schematic form (for further details refer back to the partial models shown in Figures 3c, 4c and 5b).

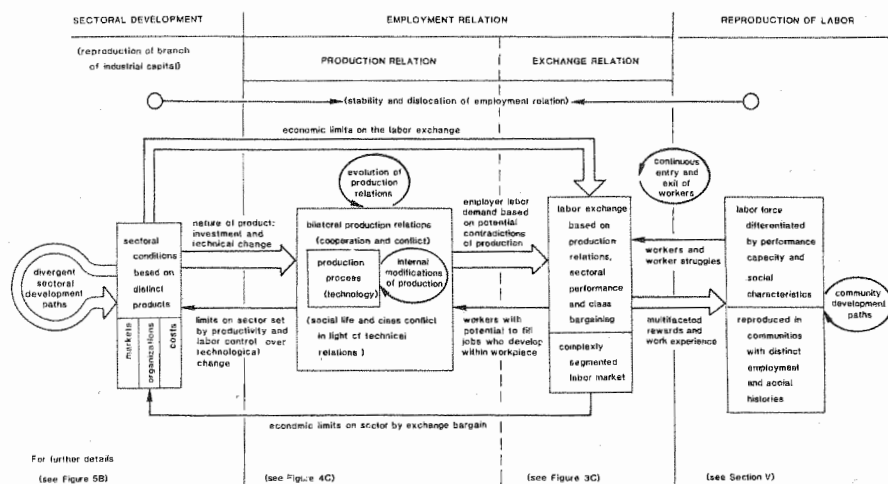


Figure 6 Employment – job creation model (schematic).

1 *The exchange relation*

The labour exchange is a continuous process that is renewed each time the worker return to the factory or the capitalists issue a paycheck, buy materials or invest in equipment.³⁴ A predetermined 'labour demand' exists only at the moment: a wholly new labour force is hired and production begins afresh. That moment is extinguished as soon as the living processes of labour exchange and production are underway. The labour exchange is also a process of bargaining over the distribution of the social product (the rate of surplus value), in which power, conflict, leverage and advantage are the watchwords, not equality and fairness. This bargaining process cannot be confined to the realm of distribution, however, since the basic terms of the exchange are established in production: in the performance capacity and actual productivity of labour. The labour exchange is more vital than merely fitting worker qualities to job slots and paying a commensurate wage because production itself is a living process, rich in dimension and flexible in nature. Indeed, the power balance in production is fundamental to the exchange bargain that will be struck.

If the labour exchange is built upon production, it is not reducible to the latter. The exchange relation must mediate between the conditions internal and external to the workplace, i.e. between production and the realms of capital reproduction (sectoral development) and labour reproduction (community development). While the latter realms strongly reflect the pressures and limits of production (see section III d and section V), they have independent dimensions which create tension within the labour exchange and the employment relation generally. The terms of the exchange are thus inherently unstable and may come in for question at any time by either labour or capital.

2 *The production relation*

Production is a social process and the workplace a society in miniature, structured by the way nature is transformed by human action (technology) and the class character of capitalist production. Every labour process contains a technical problem of transforming given inputs into desired outputs. Every technology has three dimensions: individual tasks, interaction among tasks, and group direction. Because technology is social and work a human activity, however, these are not strictly mechanical dimensions. They depend on individual and group behaviour involving a spirit of cooperation and creative participation by the workers. Given the class nature of the workplace, however, adequate performance in the eyes of management cannot be secured solely on the basis of cooperation and worker self-direction. Therefore, the third dimension, group direction, comes to include a major element of managerial control. Against this coercive force, workers have a countervailing source of power in their command over the technology and activities of work. The degree to which they come to realize their power and to exercise it

³⁴See the comments on capital circulation and investment in Walker and Storper (1981).

depends greatly on the consciousness and social fabric that develops through the collective experience of work. Different types of production processes not only produce different commodities; they are differentially conducive to worker resistance. The encounter between the classes is greatly complicated, however, by the way everyday social relations in the workplace take on a life of their own that is only tangentially related to class conflict.

The character of the labour exchange derives from the particular combination of performance capacities (including but not limited to technical skills), worker resistance and managerial control mechanisms emerging in production. The 'labour demand' made by management will be for a labour force that meets its performance standards in terms of both capacity and cooperation without demanding too high a reward in exchange. That is, the labour exchange must reconcile the contradictory demands of management for performance and control.

Labour demand must be put in a dynamic context, as well. There is no one determinate technology for every production problem, given the multiple solutions to any problem that human ingenuity is capable of generating and the inherently social, rather than mechanical, nature of production. As a result, technology is both the basis of class struggle and workplace relations and the outcome of same. Over time, capitalists try to introduce certain technologies as a weapon to reduce worker power and reward, while workers resist unwanted change and seek to improve the exchange bargain. The course of technical change, not just the nature of work and level of reward in the present, is thus a basic point of contention between the classes.

3 *The employment relation*

The production relation and labour exchange together constitute the employment relation between labour and capital. Here the two classes come together in a relation that is at once a market transaction, a labour process, a site of struggle and a scene of daily life. Employment is, moreover, a necessary relation into which both labour and capital must enter in order to complete their cycles of reproduction. It is the fulcrum of every capitalist industry and of every working class community.

The employment relation is a site both of conflict and cooperation. Capital and labour are captives of each other and of the production project they must carry out. Neither is free to get all it wants from the employment bargain, though capital is in a structurally dominant position. Labour depends on capital to invest, purchase the means of production and set production in motion; its demands must be within the limits set by the successful reproduction of the unit of capital on which it depends. Capital depends on workers to participate actively in the labour process, to perform at a level of proficiency and reward sufficient to create a profit and to return another day to work again; it is limited in its demands by the standards of work and living conditions labour can and will accept. Within these bounds, however, a variety of technical, economic and social outcomes of

the employment relation are possible. A greater degree of resistance may earn for workers a higher wage and better working conditions than one would expect on the basis of labour scarcity, cost of training, traditional standard of living or effort alone. This has been the case in the US auto industry for many years. Conversely, a powerful system of managerial control, aided by a divisive organization of work and a socially weak labour force, may lead to extreme levels of economic exploitation and human degradation, despite a high level of industry prosperity and ability to pay. This has been the case in California agriculture for a century.

The outcome of the employment relation will, in turn, contribute to the development paths of industries and communities. If the employment relation is too favorable to labour, it can threaten the competitive position and reproduction of the unit of capital. If it is too favourable to capital, it can literally destroy the workforce, socially and physically. More likely, a compromise is arrived at. But the stability of such compromises is repeatedly threatened by the underlying contradictions of the employment relation. Dissatisfaction may arise from the side of the workers, who come to recognize their strength and realize the possibility of achieving a better bargain from capital. Or it may arise from the side of capital, whenever competitive pressures, general business downturns, merger, managerial turnover, greed, etc. cause management to try to increase work pace, lower wages, cut 'redundant' workers or otherwise increase the rate of surplus value (profit). Of special significance is the resistance that workers, unions and traditional 'rules of the game' offer to work rationalization schemes and technical innovation. Whole new labour forces may have to be procured in order to introduce new and often less favourable conditions of employment to workers.

4 *Sectoral development path (reproduction of a branch of industrial capital)*

The employment relation is fundamentally shaped and constrained by the reproduction of capital. Job creation thus expresses the conjuncture between employment and the tactical space of the unit of capital (work unit or firm) in the economic world. The sector stands out in the study of manufacturing workplaces by virtue of the distinctive nature of products. But the sector does not evolve through an exogenously determined process of technical change; it develops through the constant interplay of the economic conditions of the unit of capital with the employment relation.

Each industry faces a different set of production, marketing and organizational opportunities. These characteristics create definite employment opportunities. Firms can only go so far in their *rapprochement* with labour and still meet the competition. Thus industries offer distinctive economic possibilities for creating jobs that are stable or unstable; high or low wage; high or moderate in pace; deadend or offering advancement; and so on. At the same time, the limited set of sectoral production possibilities constrains the production relations that may arise in the workplace. Of course, the competitive, sectoral constraints on the firm are not absolute. We stress again the potential contradictions that may threaten

the firm's survival. Therefore, firms must repeatedly find or create a labour supply that confines the contradictory tendencies of the employment relation within the economic bounds of the sector. This statement amends in a profound way the rather flat, non-relational formulation of the 'universal logic of labour demand' presented earlier (section III).

* * *

In sum, an adequate conception of the 'labour demand' in any industry requires a *structural model of employment and job creation*. Jobs are produced and reproduced through human practical activity in the workplace and the labour exchange. That practice is grounded in and constrained by the economic conditions of reproducing units of capital and by the technical conditions of producing different commodities. Despite the characteristic patterns this structuration lends to different industries, job creation cannot be reduced to a determinate outcome of the basic forces of technology, capital accumulation or class struggle. Employment, or 'labour demand', is the outcome of a unique social-historical process that is not analogous to the way demand arises for true commodity inputs.

V Labour supply and the reproduction of labour

We have yet to discuss how the jobs created in industry connect with 'labour supplies'. Just as the concept of 'labour demand' has been modified, 'labour supply' must be expanded beyond the neoclassical sense of a truck-load of cabbages coming into market. In section II it was argued that labour supply was differentiated geographically because workers were tied to their reproduction in specific communities, which form only under conditions of some stability and localized social interaction.³⁵ While we cannot go into the sociology of working class communities in this paper, some additional points need to be made about the most fundamental force in community formation: the relation to employment (see generally Joyce, 1980; Anderson, 1971; Bott, 1971; Sewell, 1980; Hershberg, 1981; Walkowitz, 1978; Aminzade, 1981; Foster, 1974; Smelser, 1959; Hirsch, 1978; Hareven, 1978; Dawley, 1976; Cumbler, 1979; Friedlander, 1978; Friedman, 1977; Ware, 1935; Sennett and Cobb, 1972; Bluestone and Harrison, 1980; Saxenian, 1981; Christopher, 1982; Pred, 1981).

As argued above, the sale of labour is an ongoing relation of employment. The connection between employment and worker communities must therefore be seen

³⁵ There are three problems with this formulation with which we will not deal here: 1) there is, of course, community-without-propinquity and communities whose key feature is a lack of social stability; 2) we speak only of communities here, ignoring all other spatial/social levels at which workers interact; 3) size and content of 'community' is left undefined; and 4) we assume a fully capitalist society and workforce, even though people without capitalist work experience are being drawn into the labour force all the time. These are necessary simplifications to make a basic point and would have to be modified in a sophisticated treatment.

in terms of *reproduction*. That is, through this relation the labour force is created or altered and the employment relation is maintained or recast over time.

To begin with, labour supply is not a fixed set of characteristics to be inserted into job slots, but an ensemble of qualities that people bring into the employment relation that may be developed, contradicted or refracted by their experience with their work. Labourers are not reducible to existing skills and other background features. They must be seen as a bundle of potentialities based on past development in and out of work. Workers are profoundly shaped by work experience and the social relations in production.

The creative power of work carries over into community formation in a variety of ways, including time constraints, work group contacts, incomes, shared interests, values of cooperation or competition, union militance, etc. Employment experience accumulates over time in the traditions and institutions of the community. For this reason, the industrial history of an area is essential in explaining the character of the local workforce.³⁶

The work-labour reproduction connection is necessarily geographic, furthermore. Communities literally grow up around industries, because of the limitation of daily commuting.³⁷ Commuting fields are often the best approximation of labour force 'regions'. But simple distance is not sufficient to account for the distribution of housing, especially in complex urban areas, for several reasons. The most important is the fragmentation of communities because of social segregation. To the degree not usually appreciated, such divisions are reproduced, if not created, by the segmentation of labour in employment (Harvey, 1975b; Feldman, 1981; Erickson and Yancey, 1979; Walker, 1981b; Christopherson, 1982; Saxenian, 1981). Labour segmentation carries over into the housing market through work group networks, shared values and interests, income range, steering by real estate exclusionary prohibitions of existing communities, etc. A second reason is the positioning of workers with respect to a multiplicity of job opportunities. Families with workers in different labour market segments pose an obvious location dilemma. Finally, the shifting industrial and social base of an area deposits layers of communities adjacent or on top of one another in a complex mosaic that is only imperfectly adapted to present conditions. Commuter transit does not just create the spatial division between home and work; it must overcome the gap.

The ties of community to workplace are not entirely unconscious products of employment. On the one hand, employers understand, if imperfectly, the relationship of community to qualities of the workforce and to the creation of

³⁶The economic structure of a community also influences the availability or composition of the labour force. For example, male employment and wage opportunities can encourage or hinder female labour force participation, which in turn may determine whether industries with a strong demand for female labour locate in the community.

³⁷While commuting fields have become much distended and overlapping in the automobile era, the journey to work has not ceased to be a formative force on the location of work residence (Feldman, 1981).

suitable employment relation. Location policies are essential to this relationship. Simple reinvestment in existing plant and the clustering of like facilities together rest on the commonplace that a characteristic labour pool will develop around a particular industrial base and perpetuate itself through community institutions and traditions. Conversely, relocation is a way of breaking those stable relations. Other employer strategies addressed to community dynamics include: outside recruitment of workers without ties to local communities; discriminatory hiring from several local communities into different job categories to divide workers; providing special housing or company towns to exert greater control outside the workplace; relocation to greenfield sites away from existing cities to sever old community ties; and direct intervention in community politics. On the other hand, workers also struggle over the workplace-community link by manipulating the institutions of hiring (e.g. through family and ethnic networks), locating their homes to increase access to a variety of job opportunities, migrating long distances, and the like. Furthermore, in building communities and creating a life outside work, they do not restrict themselves to work values and experiences alone. The latter form a base of action, but sometimes as a negative counterpoint against which working people struggle to assert a life of their own.

In sum, given the relative slowness with which communities change, the combination of different industrial histories of places, different forms of community-workplace linkage, and the independent element in community culture results in the persistent differentiation of community development and of workforces.

In recent years, a number of attempts at a comprehensive theory of working class behaviour have been made. These include the embourgeoisement theories of Zweig and Blauner; the theories of worker as consumer put forth by Touraine, Goldthorpe and Lockwood; the new class theories of Mallet and Gorz; and Pizzorno's notion that worker militancy is rigidly cyclical. These theories are based on reductionist or essentialist notions about the working class and the roots of ideology and alienation. Real events have proved each to be at least partially wrong. A more productive avenue of inquiry is to study the processes of working-class socialization and struggle in light of the structural relations and historical conditions presented by capitalist development. One should explore the ways in which people create themselves out of the material they have to work with; this is the theme of working-class historiography since Thompson's pioneering work (Thompson, 1964). In carrying out this research task, it is essential to account for the persistence of working class diversity rather than trying to explain it away. The linkage between work and community in space is fundamental to such an account.

VI Conclusion: the spatial division of labour

Because labour demand and supply remain differentiated across industries and places, the geographic distribution of industry is literally a *spatial division of labour*.

This division is much richer than portrayed by centre-periphery or other simple models. The geography of industry may be more accurately described as a 'mosaic of unevenness' (Walker, 1978). The uneven mosaic of industry is a predictable result of capitalist development because of the divergence among industries and the way people are reproduced in stable communities linked to employment base. But industrial location is more than an allocation problem — as in conventional location theory — with the terms altered to emphasize labour. Because labour is fundamentally different from other locational 'factors', the uneven mosaic of industries and areas is a *necessary* condition for and consequence of capital accumulation. A geographic levelling of labour supplies to the same degree as has occurred among true commodity inputs will never take place. This is not simply the result of the cultural idiosyncrasies of people in different places. It is embedded in the contradictions of the employment relation under capitalism. Employers must allow for the mutual participation of classes in production while at the same time preventing workers from using their power over production and their leverage over the exchange bargain to threaten capitalist reproduction. Stable solutions to the dilemma of employment are temporarily possible, but they cannot be maintained forever; they are always in jeopardy of being upset by changes in technology,³⁸ the competitive economic status of the unit of capital or worker dissatisfaction. Conversely, stable solutions may become rigid barriers to the competitive position of capital, which must periodically introduce technical innovations or otherwise rearrange the employment relation and conditions of labour reproduction. Employment is forever in flux, given the continuing need for capital to remain competitive and for management to contain class struggle. In this context, *location is an essential means of shaping and reshaping the employment relation*. Mobility is not a luxury for capital, but a necessity. Because workers and working class communities are created that are not as plastic, or are less geographically mobile than capital, labour forces must be sought out, fought with and, on occasion, abandoned by industry in its ceaseless process of evolution and restructuring. This is illustrated in a highly schematic way in Figure 7.

Capital mobility not only promotes accumulation, it has profound political and social consequences for the working class. The distribution of labour among occupations, industries and places is a basic source of class differentiation, which prevents easy class identification and solidarity. The spatial division of labour is a spatial division *within* labour. In other words, labour market segmentation is inherently a geographic process. Moreover, with the increasing locational capability of capital today, workers in different places are being more effectively played off against one another than ever before. Lest one draw too negative a conclusion from this, capital mobility and spatial differentiation also contain certain possibilities for working class mobilization and bargaining. On the one hand, the specific

³⁸ 'Mechanization and automation are sources of irresistible change in social organization of production, rather than marginal adjustments' (Victorisz and Harrison, 1973).

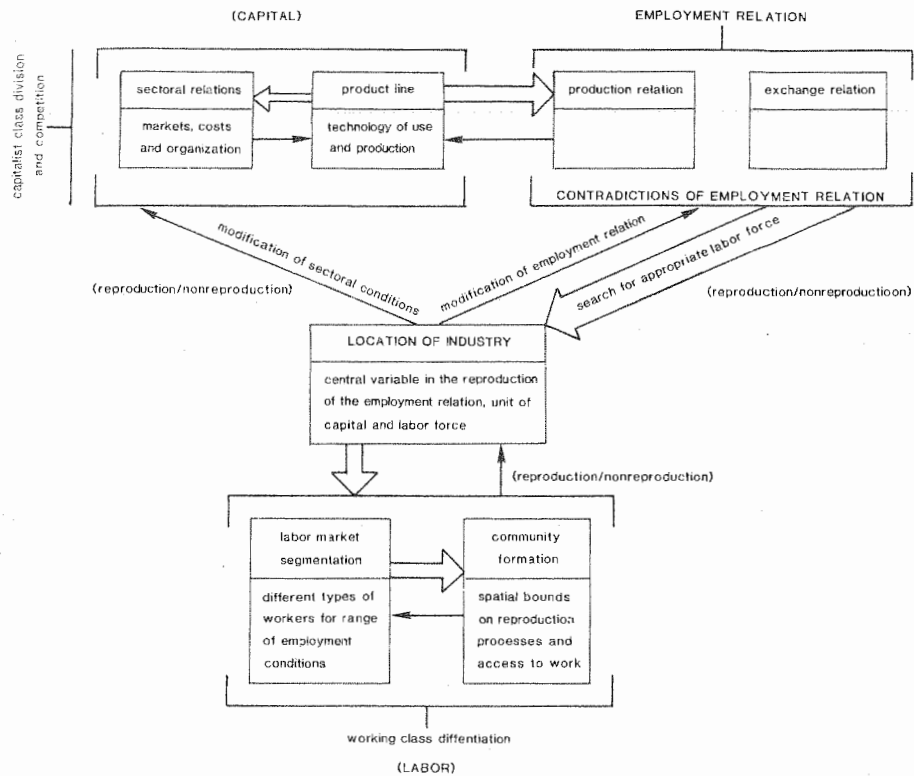


Figure 7 Location and employment.

needs and social unity of particular communities form an important basis for worker mobilization. On the other hand, the impossibility of striking stable employment bargains on which a community can build a secure life of its own is being driven home with a vengeance in the current period of plant closings and locational upheavals. Moreover, workers can see, through the global manoeuvring of capital, their common links with other working people around the world as never before.

In sum, the geography of industrial production lies at the very centre of the processes that are the motors of our society.

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Un nouvel examen de la nature de la main-d'oeuvre elle-même amène à refondre la théorie de la localisation industrielle. L'importance diminuante des facteurs de localisation non associés à la main-d'oeuvre du fait de la globalisation de la production capitaliste a mis l'accent sur les différences existant quant aux forces ouvrières. L'offre de main-d'oeuvre reste plus hétérogène que l'offre de marchandises proprement dites parce que la main-d'oeuvre comporte quatre facettes: conditions d'achat, capacité de performance, performance réelle et conditions de reproduction. La demande de main-d'oeuvre reste elle aussi hautement différenciée. Les raisons de cette situation sont partiellement révélées par la littérature existante concernant le capital humain, les marchés du travail, la sociologie industrielle et les cycles de produits. On propose trois modèles révisés: l'échange de main-d'oeuvre, les relations de production bilatérales et le développement sectoriel divergent. Ceux-ci sont associés et formulés à nouveau dans une théorie unifiée de l'emploi. Les relations en matière d'emploi sont structurées mais ne sont pas déterminées par la technologie de production des marchandises, le conflit des classes ou la reproduction des branches du capital. L'offre de main-d'oeuvre est aussi prise dans l'engrenage des relations de l'emploi dans des industries spécifiques qui sont en évolution constante. La diversité persistante de la classe ouvrière et de la localisation d'une industrie à l'autre dérive fondamentalement de l'emploi et de la reproduction de la main-d'oeuvre dans des communautés solidement ancrées dans leurs sites géographiques. Cette division spatiale de la main-d'oeuvre est nécessaire pour l'accumulation du capital, compte tenu de la diversité technique des marchandises et des contradictions de la relation d'emploi. Il faut non seulement que le capital répartisse correctement la production relativement aux forces ouvrières, mais aussi qu'il assure sa migration continue, celle-ci étant indispensable pour former et reformer la relation d'emploi.

Die Theorie des industriellen Standorts erhält ein anderes Gepräge, wenn man sich die Natur der Arbeit selbst von neuem überlegt. Die mit der Globalisierung der kapitalistischen Produktion nachlassende Bedeutung der nichtarbeitsbezogenen Standortfaktoren hebt Arbeitskraftdifferenzen besonders hervor. Das Arbeitskräfteangebot bleibt heterogener als das eigentliche Warenangebot, weil die Arbeit vier Seiten hat: Kaufbedingungen, Leistungskapazität, effektive Leistung und Reproduktionsbedingungen. Auch die Nachfrage nach Arbeitskräften ist weiterhin sehr unterschiedlich. Die Gründe dafür werden in der vorhandenen Literatur über das menschliche Kapital, die Arbeitsmärkte, industrielle Soziologie und Produktzyklen nur teilweise aufgedeckt. Es werden drei revidierte Modelle vorgeschlagen: Austausch von Arbeitskräften, bilaterale Produktionsverhältnisse und divergierende Bereichsentwicklung. Die Arbeitsverhältnisse werden von der Technologie der Warenproduktion, vom Klassenkonflikt und von der Reproduktion von Kapitalzweigen zwar strukturiert, aber nicht bestimmt. Das Arbeitskräfteangebot verfängt sich ebenfalls in den in speziellen Industriezweigen herrschenden Arbeitsverhältnissen. Die beharrliche Divergenz zwischen der Arbeiterklasse und dem Standort quer durch die Industrie geht im wesentlichen auf die Beschäftigungs- und Arbeitskräfteproduktion in ortsgebundenen Gemeinschaften zurück. Diese räumliche Arbeitsteilung ist angesichts der technischen Warenvielfalt und der Widersprüche im Arbeitsverhältnis für die Kapitalansammlung notwendig. Das Kapital muß die Produktion richtig den Arbeitskräften zuteilen, aber darüber hinaus ist für die Formung und Umformung des Arbeitsverhältnisses auch eine ständige Kapitalabwanderung erforderlich.