Prologue

Setting the Scene

1.1. Aims and Objectives

The aims of this volume are twofold. First, it seeks to bring together and synthesize a wide range of materials about production in capitalist societies. It seeks to define production in general, to specify the key features of production that define it as specifically capitalist, and to explore the varieties of organizational forms that capitalist production and its geographies can take. It is important to emphasize from the outset that capital has always displayed considerable flexibility and ingenuity in seeking ways of organizing production profitably and places in which to do so. Second, this volume not only seeks to bring together this range of materials from a variety of social science disciplines but also to develop a particular perspective from which to understand production. This perspective is grounded and has its point of departure in Marxian political economy and recent developments therein. However, it then seeks further to elaborate how capitalist production is organized by drawing on work originating in a variety of other theoretical positions. These theoretical issues are discussed in greater detail in Chapter 2, but prior to that in the remainder of this chapter I discuss the definition of production, differing understandings of Marxian approaches, and some issues of epistemology, theory, and method in order to justify choosing one's starting point in Marxian political economy.

This emphasis upon the continuing salience of Marxian analysis may seem to some as deliberately—even unnecessarily—provocative. In an era of a "cultural turn" in human geography away from a concern with grand (and at times, any) theory and metanarrative and more generally of various "post-isms" (post-Fordism, post-structuralism, and so on) in the

social sciences, a return to Marxism may seem perverse. These various developments, after all, have at least in part been motivated by attempts to dismiss the Marxian tradition by interpreting it in a deterministic and totalizing fashion. It is for this reason that I want to make it clear at this stage why a Marxian[1] point of departure is necessary. Equally, I want to emphasize that I do not advocate deterministic and totalizing interpretations of Marx that claim to explain everything in capitalist societies from the basic concepts of capital. Indeed, there are many strands of the Marxian tradition, beginning with Marx himself, that seek explicitly to avoid such dangers, and yet this has often been willfully ignored by those who, for whatever reasons, wish to launch an assault on Marxism. But the gaps in Marxian analyses also provide reasons for exploring other approaches that can help fill in some of these lacunae, and some of the criticisms that have been made are helpful in identifying these and suggesting ways of filling them.

Marxian political economy nonetheless remains relevant, for it provides an insightful entry point and powerful analytic tools for understanding geographies of economies and production. Indeed, as capitalist social relationships have penetrated into new areas and become more firmly entrenched during the past three decades, it has become more rather than less relevant for understanding capitalist production. Thus, it is of utmost importance to stress that we live in a world in which capitalist social relations *are* dominant, the rationale for production *is* profit, class and class inequalities *do* remain, and that wealth distribution *does* matter. To make these points is not to argue that capitalism has no positive aspects or against a "cultural" inflection in political economy. Rather it is to remember that capitalism in an inherently uneven form of economic organization, marked by sharp inequalities of many sorts. Furthermore, while it can be cast in a variety of culturally and socially distinctive molds, there are definite limits that define these as varieties *of* capitalism and capitalist strategies for production and not as alternative *to* capitalism and capitalist production.

The approach that I seek to develop therefore begins with the recognition that capitalism is indeed with us and in varied forms. This approach encapsulates a particular way of understanding capitalist production and its geographies, with Marxian political economy as its point of departure. It does so on the grounds that this is essential in understanding the character of capitalist production.[2] This point of departure has three decisive advantages. First, it envisages the production process as simultaneously a labor process, a value-creating process, and a process of material transformations. Second, it facilitates the understanding of how production relations and exchange relations—in the "narrow" sense—relate to one another in the totality of the production process. Third, this point

of departure permits analysis of how the production process relates to broader processes of social reproduction. As such, it considers how capitalist production relates to various noncapitalist forms and how the social, political, and institutional framework necessary for capitalist production to be possible is created.

Such an approach therefore builds upon work by geographers and other social scientists who began to engage with Marxian political economy during the 1970s. They did so in recognition of the limitations of the then dominant explanatory accounts, as part of a search for more powerful explanations of the structures and geographies of economies. I want to preserve the strengths that the rediscovery of Marxian approaches brought while seeking to address some of the ways in which they were problematic. This will involve two strategies to elaborate a framework that locates production within the context of relationships among the social, the natural, and the spatial. First, this framework entails consideration of various refinements that have occurred within Marxian political economy over the past two or so decades. Such changes have come about for two reasons. First, analysts recognized the limitations of existing Marxian formulations. Second, since capitalism is a shifting and slippery system, theory must be refined in response to such changes. However, in using Marxian concepts—as indeed those from any other theoretical framework—it is vital to ensure that they are used appropriately, that there is no attempt to overextend their application into inappropriate domains. In certain respects the framework therefore seeks to build upon Marxian analysis but also to go beyond it because there are conceptual gaps and lacunae within Marxian political economy. Consequently, and second, it involves consideration of other theoretical traditions in the social sciences that complement Marxian approaches and that can help elucidate the ways in which capitalist production can be made possible and in which it actually occurs. These other perspectives include evolutionary and institutional approaches in economics and sociology, theories of the state, regulation, and governance, and developments in modern social theory relating to such issues as agency, knowledge, and learning. The critical issues therefore relate to the ways in which Marxian analysis can be refined and deployed alongside complementary approaches within the social sciences, with the aim of offering a fuller understanding of processes of production and their geographies.

1.2. Defining Production and the Specificities of Capitalist Production

Production can be defined as the transformation, via human labor, of elements of the natural environment into products of use to people. These

can be material products of varying complexity (a pair of shoes or a nuclear power station) or services (such as a haircut), recognizing that such services depend upon the availability of material products (for example, scissors to cut hair, a chair in which the customer can sit). Production thus involves different combinations of human labor, technologies, and tools and artifacts, as well as inputs directly from nature and the natural world. These mixes of inputs can be organized in different ways and vary among societies, times, and places.

Capitalist production is defined as a form of commodity production, with goods and services produced for the *purpose* of exchange, that is, for sale in markets. The totality of the capitalist production process extends from the appropriation of raw materials from nature to the consumption of produced commodities. For Marx, however, *the* transformative moment of crucial significance in the whole process is the moment of production itself, while recognizing that this moment is linked to all the others that constitute the totality of the process. For the moment of production is "the moment that allows capital to 'be' in the world at all" (Harvey, 1996, 94).

1.3. Five Basic Questions about Capitalist Production

Five basic questions may be asked about production: why does it take place, what is produced, how is production organized, where is production located, and how do the why, how, what, and where change over time? Within capitalist production "why" is unambiguous. The driving imperative is to create profits through producing commodities.[3] While limiting consideration to capitalist production, it is nevertheless necessary to consider the ways in which capitalist class relations of production relate to noncapitalist class relations. In addition we must inquire into the ways in which class relations relate to nonclass relations, such as those of ethnicity and gender. Not all production in capitalist societies is therefore directly shaped by the logic of production for exchange and profit. Capitalist economies thus may incorporate spaces of resistance to the logic of capital, built around a variety of social relationships.

"What" initially seems straightforward. At a given moment in time, companies produce different goods and services. The mix of products changes over time, however, reflecting product innovation and research and development (R&D) strategies, critical processes in the dynamism of production and competition between companies. As a result, understanding the "what" of production can become quite complicated. So too can understanding the "how" of production. There are different "models" of production through which the same commodity can be produced, encom-

passing different technologies and ways of organizing work. Not all commodities can be produced in all ways, however. There are both material and social limits to production. Changes in the "how" of production reflect, among other things, R&D in terms of process innovation. Changing ways of producing are not just a question of technical change in the narrow sense, however. They may also involve organizational innovation within workplaces and innovation in the institutional and regulatory forms through which production is made possible. Moreover, process innovation is often necessarily tied to product innovation, as new products require organizational and technical innovations. In both cases innovation is inextricably involved with issues of knowledge production, diffusion, and learning.

Sayer and Walker (1992, 112) give a sense of the resultant complexity of the totality of the production process:

> Production must be complemented by divisions of labour in the sphere of circulation . . . including distribution, communications and finance. Production systems in the full sense are thus much more than sequences of physical manipulation of materials; they are also sequences of research–development–manufacture, purchasing–manufacture–shipping, planning–financing–education, advertising–distribution–sales and the like, each of these involving feedback and interaction in a way that belies any simple notion of either sequential or parallel acts of labour.

"Where" production occurs seems a relatively more straightforward issue, centered on the construction of geographies of production and the ways in which companies seek to create and use spatial differentiation as part of competitive strategies. Recognizing a distinction between space and place introduces a greater complexity, however, focused on thé ways in which (re)producing places created by socialized human beings with a wider agenda than simply profitable production relate to industrial (dis)investment. Various social groups may have radically different objectives in seeking to influence the production of space and places. As such, these are contested processes.

Moreover, what, how, when, and where are related. Where cannot be understood independently of what and how. Conversely, we cannot understand what and how without taking account of where. The spatial dimension is integral to decisions about production, not something to be taken into account only after what and how have been decided, and this must be reflected in the ways in which production is analyzed and theorized. There are, however, no simple and necessary one-to-one deterministic relations between where, what, and how. Rather, there is a range of possibilities, the realization of which depends upon the interplay between

systemic processes, corporate strategies, and the specificities of places (Massey and Meegan, 1982). For example, there may be radical changes in what and how without altering where; there is no necessary change in the geography of production because of product and/or process innovation. Conversely, there may be radical changes in where without altering what or how: that is, a "spatial fix" to a new geography to preserve an "old" combination of products and methods of production. Then again, there may be radical shifts in what, how, and where simultaneously; or there may a switch to new sectors, either via organic growth or via acquisition and merger, accompanied (sunk costs permitting) by divestment from existing sectors of activity. This dynamism means that the objects of analysis are historical geographies rather than frozen geographies of production.

1.4. Some Questions of Epistemology, Theory, and Method: Making the Case for a Marxian Point of Departure in Analyzing Production and Its Geographies

The variety of possible outcomes that the organization and geographies of production can assume necessitates understanding why some possibilities are realized but not others, and why those that *are* realized exist in the particular ways that they do. Put another way, we need to comprehend the variety of possible relationships between form and process and construct an "adequate" conceptualization of the underlying social processes and of their relation to spatial differences and differences between places. What, however, defines "adequacy" in this regard? And how does the chosen point of departure—Marxian political economy—satisfy the two criteria, conceptual and explanatory "adequacy"?

Answering such questions is, admittedly, not a straightforward task. First, it is now generally accepted that we have entered an era of "epistemological relativism and methodological pluralism" (Gregory et al., 1994, 5), in which truth claims about knowledge, the validity of theories, and ways of generating valid knowledge are regarded with a degree of skepticism that was not typical of the earlier era (Clark and Wrigley, 1995, 207). Accepting the multiplicity of worlds and ways of world making does not invalidate the aim of creating theoretical frameworks, but it does indicate the need to be critically aware of the limits to theoretical claims. Methodological and conceptual pluralism is, however, "no bad thing" (Ward and Almas, 1997, 626). A continuing constructive dialogue between different perspectives, informed by a heightened sense of experimentation and critical self-appraisal, is clearly preferable to a continued search for a single new all-encompassing paradigm. While there are cer-

tainly dangers in an indiscriminate theoretical eclecticism (Fincher, 1983), a search for all-encompassing paradigms is doomed to failure. As Gregory (1994, 105) emphasizes, however, the issue is not to dispense with metanarratives (plural) but rather carefully to attend "to what it is they put in place and, equally, what it is they exclude." The point therefore is not to reject Marxism as a metanarrative but rather to be aware of the shortcomings and weaknesses within it and to seek to remedy them. Harvey (1996, 9), for instance, argues for "trying to re-build Marxian meta-theory in such as way as to incorporate an understanding of spatio-temporality (and socio-ecological issues) into its frame." There are evident dangers in seeking to read it as a totalizing system. There are, however, at least equal dangers in accepting critiques that seek to represent it in that way so as to be able to criticize and dismiss it. Since no single theoretical system can provide a complete and satisfactory set of answers, we must find ways of living—critically and creatively—with some degree of theoretical dissonance. Nevertheless, some theoretical approaches undoubtedly have greater explanatory power than others. Not all theories are equally useful. What criteria, then, should determine which theoretical perspective should be accorded priority?

Second, then, what defines an "adequate" theory? Drawing on ideas from critical realism, an adequate conceptualization needs to steer a path between the dangers of two fallacies: the ontic (the notion that the world determines our representations of it) and the epistemic (the notion that our cognitive lenses wholly determine how we see the world; Bhaskar, 1989). These fallacies specify what to avoid rather than what more positively is needed to achieve adequacy, however. In epistemological terms, critical realism argues that an adequate theory must reveal necessary causal relationships and mechanisms and recognize the existence of a variety of relatively autonomous causal structures (not just those of the social relations of capital: Sayer, 1984).[4] As such, an adequate theory cannot simply be mimetic, as these causal mechanisms and processes are real but not visible. Consequently, devising theory requires an active process of construction. By these criteria, Marxian political economy is an adequate theory for it offers a powerful description of the key causal processes and inner mechanisms of capitalist production and capital circulation, making cognitively visible the real, but otherwise invisible, social relations constituting capitalism.[5]

Within a critical realist perspective, the realization of causal powers is contingently dependent upon the ways in which these factors come together in spatially and temporally specific contexts; it thus depends upon the specific causal structures and local circumstances of each particular time-place. Such a position is broadly consistent with the conception of tendential laws within Marxian political economy, with empirically ob-

served trends reflecting the relative weights of tendencies and countertendencies (some even located in noncapitalist social structures endowed with causal powers). Whether a particular set of causal powers is realized in empirically observable form (and if it is, the extent to which it is) depends upon the balance between such tendencies and countertendencies, both in the form of competing structures of causal powers and particular local circumstances. An important corollary of such a view of an adequate conceptualization is that the explanatory power of a theory is defined in terms of a description of causal structures and mechanisms. The criterion for judging the "goodness" of a theory is therefore the extent to which it aids interpretation and understanding of *process* rather than predictive power per se.[6]

Seen through the lens of critical realism, Marxian political economy provides a powerful point of departure for analyzing production and its geographies. It cannot, however, provide answers to all questions about production. There are three possible responses to this recognition of the limits of Marxian theories. One response is informed by a poststructuralist critique that there are no coherent sovereign individuals but only a world of difference and socially constituted identities (Barnes, 1998, 96). Consequently, it seeks to reject Marxian political economy on the grounds (among other things) of "essentialism," that is, it is seen to offer a totalizing account of capitalism and its geographies. However, as Thrift (1994a, 213–214) remarks, while nowadays Marx's work sometimes seems to be dangerously close to a totalizing system, many versions of Marxism after Marx have sought "to escape any taint of totality." Marx himself was at pains to insist that no discourse can totalize history (and, one can add, historical geographies).[7] Furthermore, descending into a poststructural world of difference raises serious difficulties of both explanation and politics. For example, there are great dangers in accepting poststructural views in which "anything goes" and that are "blind to the systemic imperatives of power and money in capitalist societies" (Harvey, 1996, 357–358).

A second response to recognizing the limits of Marxian theories accepts aspects of the poststructural critique but responds to it in ways that seek to retain a role for reformulated versions of key Marxian concepts. The ways are deeply problematic, however. A prominent example of this tendency is Gibson-Graham (1996, 1997). The essence of Gibson-Graham's critique is that economic geographers analyzing capitalist economies have focused attention solely upon the key social structural relations that define them *as* capitalist.[8] However, the Marxian concept of social formation precisely allows for a multiplicity of class and other social relations, but this seems to slip by unnoticed. Nevertheless, Gibson-Graham goes on to argue for an "anti-essentialist" but nonetheless Marxian redef-

inition of these concepts. One implication of this, however, is that she thereby denies that there are *any* necessary conditions or relations defining particular types of society.[9] In her eagerness to respond to poststructuralist critics and deconstruct and complicate basic Marxian concepts, she (no doubt inadvertently) loses her specific analytic cutting edge.[10]

A more helpful perspective, drawing on critical realism, acknowledges that there are necessary causal structures that define particular types of society but that societies encompass multiple causal structures, not all of which in this sense are necessary and not all of which are equally powerful. Moreover, in any case the causal powers of such structures can only be contingently realized in specific time-space contexts. Consequently, the causal powers inherent in the social relationships of capital may be preeminent and must be present in the sense that they define capitalist societies *as* capitalist. However, it does not follow that they have a determinate (let alone deterministic) influence on each and every occasion in shaping the geographies of capitalist economies. While wishing to avoid an interpretation of capitalist social relations as totalizing, it is equally important to recognize that there are broad social structural relations (of class, gender, and ethnicity, for example) that have determinate effects. This is "most especially" the case "if at the same time their multiplicity and contingency are recognized." Recognition of such broad structures "is not the same as the commitment to, or the adoption of, a metanarrative view of history. None of the structures . . . need to be assumed to have any inexorability in their unfolding . . . outcomes are always uncertain, history and geography have to be made" (Massey, 1995a, 303–304).

A third response therefore begins with a rejection of totalizing interpretations of Marxian approaches. Marxian political economy is seen as offering a valuable window onto the worlds of production and economies and their geographies and to provide a way of constructing a structured but nondeterministic and admittedly partial account of those worlds and their geographies. It specifies defining processes and key causal mechanisms but does not claim to grasp and account for all aspects of production in capitalist societies, let alone offer an overarching general and deterministic account of everything about those societies and their varied geographies. It reveals much, but by no means all, of the explanation for such geographies of production. It recognizes the limits to (existing) Marxian approaches but seeks to build upon their strengths and address these limitations, in two ways.

The first of these relates to developments and refinements within a Marxian framework. Given the marked changes in the character of capitalism over the past 150 or so years, it would be surprising if Marx's own analyses were able to deal with all of capitalism's contemporary complex-

ities. Consequently, scholars working in and from a Marxian tradition have sought to accommodate such changes (for example, in the significance of meanings; Lash and Urry, 1994; Thrift, 1994a; Williams, 1989b). Building on this, we need to map a middle way between a too foundational and too authoritative modern Marxism and an after-Marxist critique "which, its important insights notwithstanding, has yet to create a coherent explanatory account of capitalism out of the ruins of that critique" (Castree, 1999, 154). The second strand involves gazing on production through other theoretical lenses, creating less abstract intermediate-level theoretical constructs relating to processes and mechanisms that help explain *how* production and its geographies are organized in varying ways. Such concepts need to be interposed *between* structural relations and value categories and empirically observable geographies of production. In these ways more powerful explanations of production and its varied organizational forms and geographies can be constructed.

The prioritizing of one theoretical framework over others cannot be defended simply within the terms of the theory itself or on grounds of the greater elegance or explanatory power of one theory relative to others, however. Justification of a theoretical position inevitably involves reference to the assumptions upon which the theory is founded and the values and norms in which it is grounded. Just as history and geography have to be made, so too do theories that seek to comprehend these processes have to be constructed. Theory making is a process of construction and as such is doubly contingent—both upon the predicament in which we find ourselves and upon the theoretical context in which we work. Constructing theory is a process of persuasion and argument both within and outside academia, and so one's choice of theoretical framework is to a degree always a political choice.

A theory of capitalist production that is "adequate" in relation to analytic and explanatory criteria must both reveal key causal mechanisms and processes and be sensitive to the specificities of time and space in the ways in which capitalist social relationships are constituted and reproduced. It is precisely the need to grasp this variability that necessitates going beyond a structural analysis of capital. It is necessary to understand the ways in which individual and collective agency is both enabled and constrained by structures and at the same time has the effect (sometimes intended, often not) of helping reproduce them. In this sense, this is a call for a version of "modest theory" (Thrift, 1996a, 30–47). He has called for the development of a "non-representational" version of "modest theory" that eschews claims to universal validity and that is grounded in an "ontological and epistemological stance [that] might be termed a kind of historicism, in that it stresses the historical and geographical variability of

systems of social practices" (p. 33). In this Thrift lays heavy emphasis upon the importance of agency and has little to say about structure—indeed is deeply suspicious of admitting structure. In contrast, the approach advanced here seeks to retain a sense of structural determination (though not determinism) and to understand the ways in which the social structural relations of capital are reproduced via intentional and unintentional effects of actions. Furthermore, the version of theory for which I wish to argue is also a critical theory that has specific sociopolitical aims. Such a critical theory must revive a "certain kind of Marxism, but one neither so modern nor so post-Marxist that it is non-Marxist" (Castree, 1999, 154). It is a theory that seeks to represent the world in particular ways with a view to changing it in particular ways politically. By bringing critical concepts such as exploitation or value into view theoretically, the terms of political debate and the possibilities of public discussion may (but not necessarily will) be altered for the better. So too may the possibilities for progressive change in the organization of production and the economy, for these are not simply analytic issues but also moral, political, and normative ones. As Lovibond (1989, 22)[11] puts it, "If there can be no systematic political approach to questions of power, wealth and labour, how can there be any effective challenge to a social order which distributes its benefits and burdens in a systematically uneven way?"

1.5. Summary and Conclusions

In this chapter I have specified a definition of production, indicated what is specifically capitalist about capitalist production, and set out some broad questions about production and its organization and geographies for further investigation. Furthermore, and crucially, I have sought to justify grounding an analysis of production in Marxian political economy while acknowledging the limits to such a starting point and the need to transcend them. No single (meta)theory can satisfactorily deal with the range of issues posed by seeking to understand production (let alone the totality of economic and social life). Even so, despite living in an era of "epistemological relativism and methodological pluralism," it remains the case that some theories have more explanatory power than others. The criteria for theory that is "adequate" in explanatory terms were defined by reference to critical realism. In the next chapter, different theoretical approaches to the understanding of production and its geographies are considered at greater length, to help clarify the basic analytic building blocks to be used later in analyzing the organization and geographies of production.

1.6. Notes

1. Production can be conceptualized in various ways (Ricardian, Marxian, neoclassical, evolutionary, and institutional, for example), each distinguished by the questions it asks, the issues it seeks to investigate, and the methods and concepts that it deploys to do so.

2. There are various forms of political-economic organization (feudalism, capitalism, and state socialism, for example). The rationale for production varies among them. Consequently, it is necessary to distinguish what is specific about production within capitalism.

3. The rationale for production would clearly be different under the sway of other dominant social relationships—for example, satisfying needs or maximizing output.

4. For an analysis of the relationships between critical realism and Marxism, see Roberts (1999). The point is not that Marxism and critical realism are synonymous. In some respects the epistemological and ontological claims of Marxism differ from those of critical realism. However, in certain key respects Marxian methodology resonates with critical realism, and that is the point made here.

5. Revealing such mechanisms allows other questions to be raised, for example, about more progressive forms *of* capitalist production; second, beyond that, alternatives to capitalist production may be suggested by identifying the limits to capital and the social and natural limits to capitalist production in its current forms.

6. Although a "good" theory could certainly yield predictive insights in many circumstances, these should not be the criterion on which the theory should be judged. Moreover, failure to predict would not be a criterion for abandoning the theory.

7. The implication of Thrift's comments is, of course, that Marxism can be read as a totalizing discourse by those who—for whatever reason—wish to see it as that. Equally, it is not alone in its exposure to this danger.

8. As such, their critique is a perverse one. It ignores the extent to which economic geographers of a Marxian persuasion (among others) have acknowledged the significance of noncapitalist class relations and link between class and nonclass relations (including those of ethnicity, gender, and territory) in the constitution of the geographies of capitalist societies.

9. If the charge leveled by Gibson-Graham is that a focus upon capitalist class relations is misplaced because they are no longer dominant and defining, then clearly the object of analysis is no longer capitalist society (although it is unclear as to what it is that has replaced it). While I agree with the commendable wish for a more humane economy guided by different social relationships, simply wishing away the realities of capitalist power, material and discursive, is not a very helpful step toward attaining such a goal.

10. Revealingly, Gibson-Graham (1996, 5) admits to "constructing . . . [a Marxian] straw man [*sic*]" as a way of clarifying the distinctiveness of her own position. While she is by no means alone in caricaturing Marxism in order to at-

tack it, such an approach is less than helpful. Her position on class is further discussed in section 2.2 and on divisions within the working class in "Industry, Occupation, and Intraclass Differentiation" (in section 7.3).

11. Lovibond was in fact arguing that feminists should be wary of postmodern approaches that limit themselves to a concern with the veracity of "local truths" in a context of a social world marked by deep gender divisions, but the point has equal validity in relation to other forms of systematic inequality within capitalist societies.

Placing Production in Its Theoretical Contexts

2.1. Introduction

The starting point for this chapter is the attempt by geographers in the 1950s and 1960s to try to explain and understand the spatial patterns of the economy, the structure of the space-economy. In so doing, they drew upon the orthodoxies of neoclassical economics. This approach was certainly an advance upon the economic geography of preceding decades, which had been preoccupied (like human geography in general) with description of spatial pattern. Nevertheless, it was based on an incomplete and unsatisfactory conception of the social processes that generated the spatial patterns of economic activities and soon led other geographers to search for more powerful explanations. This led economic geographers to explore Marxian political economy, bringing considerable advances in understanding but equally not without problems of its own. These limitations led to attempts to refine Marxian analysis to produce a more sophisticated historical-geographical materialism and also to the exploration of other, and complementary, theoretical traditions in the social sciences. These are explored in turn in this chapter.

2.2. Setting the Scene: Conceptualizing the Production Process within Capitalism via Some Basic Concepts from Marxian Political Economy

From Locational Analysis to Marxian Political Economy

After a period in which description was the primary focus of geographical scholarship, the 1950s saw a reawakening of interest in explanation and

theorization within (among other things) economic geography. The rediscovery of economic location theories in the works of von Thunen, Weber, and Lösch led to a convergence of interests between some economic geographers and emergent regional scientists. This centered on a search for general explanatory statements about the spatial structure of the economy (Chisholm, 1962; Haggett, 1965; Isard, 1956). Refocusing concerns from description of the unique to explanation of more general classes of events and spatial patterns was a very important and radical break. On the other hand, the ways in which explanation was sought soon came to be seen as deeply problematic. At one level, this involved conflating explanation with prediction, that is, predictive accuracy became the measure of explanatory power. At another level, there were profound problems associated with an approach that sought to deduce equilibrium spatial patterns on the basis of restrictive assumptions about the natural environment, human knowledge, and the character of social processes.

The point of raising questions about the lack of realism in these assumptions is not simply to criticize location theories on that score. Rather, it is to emphasize that such assumptions were both a precondition for and a symptom of an impoverished and incomplete view of the social processes of the economy, of the economy understood *as* social process. Assumptions of static equilibrium deny the fact that economic processes are chronically in a state of dynamic disequilibrium, set on open-ended and unknown trajectories of change rather than inevitably and mechanistically circling around a point of static equilibrium. As such, they neglect the social construction, reproduction, and regulation of markets as institutions. Assumptions of perfect knowledge equally deny the fact that economic decisions are always made in a condition of ignorance. Assumptions of the environment as an isotropic plane ignore the grounding of the economy in nature and the chronically uneven character of economic development. They also reduce the significance of spatial differentiation to variations in transport (and sometimes other production) costs within a prior given space. The net result is that, while such approaches placed questions of explanation firmly back on the agenda of economic geographers, they did so in a way that was based upon unhelpful abstractions. Consequently, these resulted in inadequate theory, which failed to grasp the essential character of the key processes that produced geographies of economies.[1]

One response to the perceived problems of location theories was that of behavioral geographers. They developed their critique on the grounds that the behavioral assumptions upon which such theories were based were untenable in an economy that exists in real space and time (Pred, 1967). Behavioral geographers therefore argued the need to investigate what people actually did know, how they came to acquire this knowl-

edge, and what locations they knew about, rather than assuming that they knew everything and about all locations of relevance to a particular type of behavior. Concepts such as "bounded rationality" (Simon, 1959) recognized that people could not in practice know everything while continuing to privilege individual actors and their knowledges.[2] Consequently, behavioral geographers began to conceptualize environmental knowledge in terms of "mental maps" or "cognitive maps" and, drawing on strands of psychology, to seek ways of measuring what people knew (Pocock and Hudson, 1978). Within the context of geographies of production, such approaches focused on the knowledge that key corporate decision makers possessed about alternative locations in an attempt to explain why economic activities were located in some places rather than in others. As a result, they yielded at best a partial and imperfect grasp of the relations between knowledge and production and its spatial organization. Such behavioral approaches typically amounted to little more than descriptive accounts of the locational strategies and behavior of particular firms.[3] Having set out to refine an explanatory approach, behavioral geographers unfortunately slipped into the descriptive trap that neoclassical location theories had set out to escape. As a result, the behavioral approach soon became marginalized. While often interesting in themselves, behavioral studies did little to address the explanatory weaknesses of location theories, but in abandoning them, economic geographers also pushed important questions of agency and action from the research agenda for a decade or so.[4]

The limitations of both location theories and behavioral critiques of them led economic geographers to search for more powerful conceptualizations of the processes that generated geographies of economies. In this, they established closer links with the social sciences. The social sciences themselves were undergoing significant changes in approach, however. Their established orthodoxies were increasingly seen as incapable of explaining the problematic character of capitalist development. As the long postwar boom spluttered to a halt, uneven development became more marked, and it became clear that poverty and inequality were again on the increase and that the limitations of the orthodox nostrums of the social sciences were becoming increasingly visible. Faced with this, the social sciences began to rediscover the Marxian heritage, as well as exploring other heterodox positions. In their search for more powerful explanations, economic geographers also began to engage with these strands of thought and in doing so became more involved in debates with other social scientists. Increasingly, they turned to Marxian political economy as a source of theoretical inspiration (Carney et al., 1977; Damette, 1980; Harvey, 1973, 1982; Läpple and van Hoogstraten, 1980; Smith, 1984). Marxian political economy offered powerful concepts of struc-

ture, of the social structural relations that defined particular types of societies (Harvey, 1982; Smith, 1984), and offered a powerful challenge to the spatial fetishism[5] (Carney et al., 1976) of locational analysis and spatial science. In the following sections, therefore, some basic concepts of Marxian political economy are briefly set out, as these are foundational concepts in terms of understanding capitalist production.[6]

Commodity Production, Values, and Modes of Production

In general, production involves transforming elements of the natural world into useful objects through the application of human labor. As production evolved historically, there was a gradual shift toward the creation of a social surplus beyond the needs of the immediate producers. This enabled the transition to systems of production for exchange, which provided crucial preconditions for the subsequent emergence of capitalist relations of production. First, the permanent production of a surplus and the development of a social division of labor provided the necessary economic conditions to allow (but not determine or guarantee) the emergence of social classes. Second, the development of money as a specific commodity to facilitate exchange was critical (Smith, 1984, 35–47) because the use of money as an individualized and exclusionary form of social power is a central feature of capitalism (Harvey, 1996, 236). Third, the transition to production for exchange necessarily involved the alienation of both consumer and producer from the product, and this had considerable significance in relation to the creation of markets and patterns of consumption and to the organization and control of the labor process. Not all production for exchange is capitalist, however. What then is specific about *capitalist* commodity production that distinguishes it from production in other types of society and from production for exchange in general?

One way to begin to answer this question is to draw upon a quite abstract conception of social and economic structure—the Marxian concept of mode of production. This seeks to catch the essence of particular types of economic organization, characterizing these in terms of specific combinations of forces of production (artifacts, machinery and "hard" technologies, tools—in short, the means of production) and social relations of production. In the capitalist mode of production *the* key defining social relationship is the class structural one between capital and wage labor. This is a dialectical and necessary[7] relationship because capital and labor are mutually defining; the existence of one presupposes the existence of the other. Capital needs to purchase labor-power in order to set production in motion since living labor is the only source of new value (surplus-value) created in production, while labor needs to sell its labor-power for

a wage in order to survive and reproduce itself. What therefore is specific about the capitalist mode of production and distinguishes it from other forms of economic organization is that it is structured around the wage relation, with labor-power bought and sold in a market like any other commodity. The key point, however, is that labor-power is *not* like any other commodity—and in that recognition lies the key to understanding much else about the organization of production and geographies of economies (a point developed in the next section).

Commodities simultaneously possess attributes as use values and as exchange values. As materialized human labor, they have qualities that people find useful and, as such, use values. These use value characteristics of commodities reflect the concrete aspects of labor, the fact that labor is private and specific. At the same time, labor within capitalist relations of production is also abstract labor, universal, social, and general insofar as it defines the exchange values of commodities on world markets (Postone, 1996). Abstract labor is "a remarkable thing," simultaneously a social relationship, a measure of value, a determinate magnitude (socially necessary labor time), causally efficacious and invisible yet real (Castree, 1999, 149). In the capitalist mode of production the exchange value of a commodity is defined as the quantity of socially necessary labor time[8] required to produce it. Abstract labor and socially necessary labor time are therefore central to understanding the rationale of capitalist production, for the driving rationale of a capitalist economy is production for exchange and profitable sale through markets, that is, the production of exchange values.[9] Capitalist production is thus organized with the *purpose* of sale in markets.[10] Production therefore finds its rationale in, and is socially validated ex-post facto by, market exchange and the successful sale of goods and services.[11] This raises a key question, further discussed in succeeding sections, namely, how do qualitatively different use values become exchanged as quantitatively equivalent exchange values?

Capitalist Production, Accumulation, and the Circuit of Productive Industrial Capital

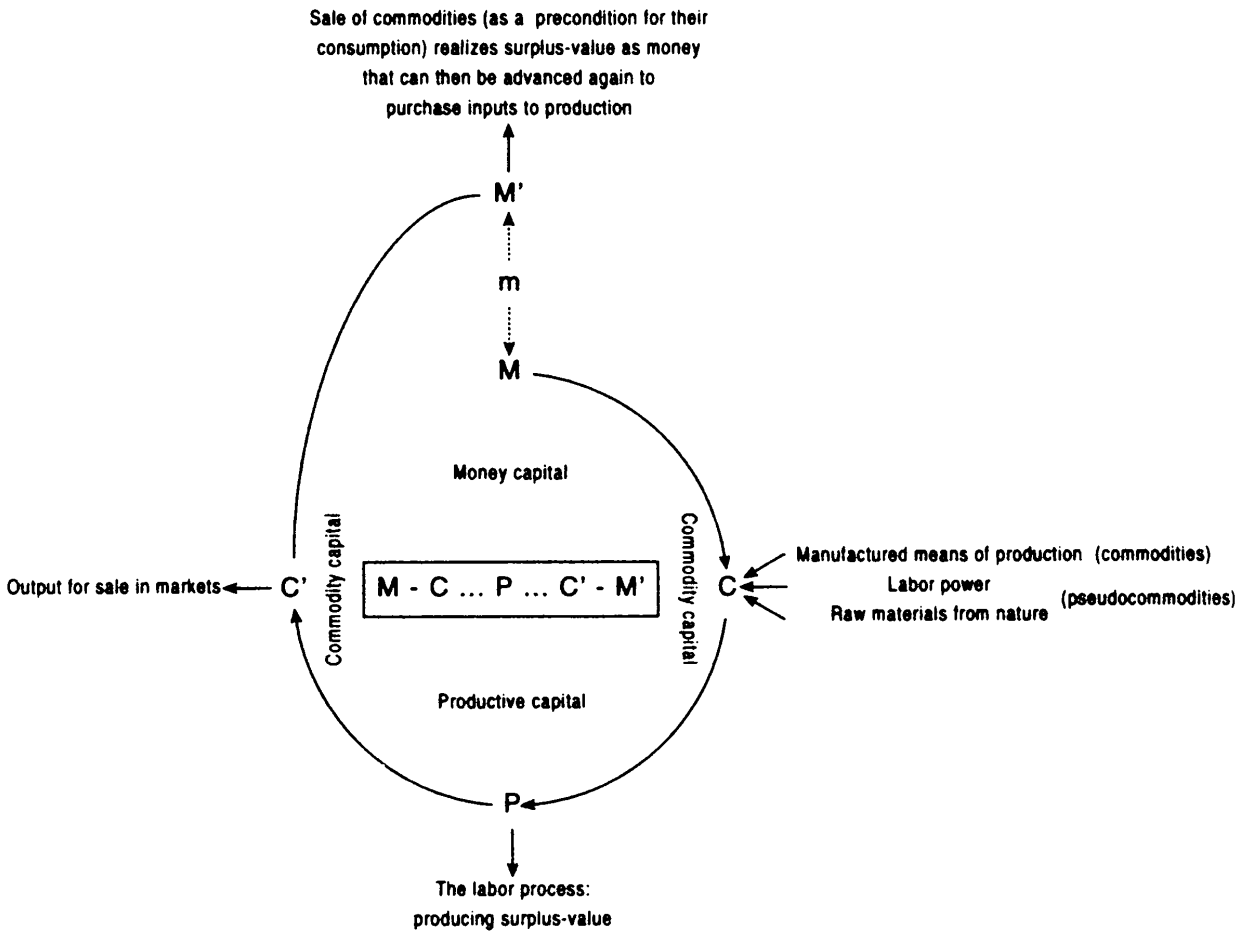
In the exchange sequence C_1–M–C_2 a given amount of money is used to purchase one commodity—for example, a pair of shoes—and the seller of the first commodity then uses that money to buy another and different commodity—say, a radio. Money therefore functions as a medium of exchange, allowing the quantitatively equal exchange of two qualitatively different commodities. Now consider a rather different sequence, M–C–M′ in which M′ > M. Clearly, in this case money is not simply functioning as a medium of exchange. In fact, in this case money capital is being advanced to make more money, to make profits. This therefore raises a sem-

inal question: where does this profit come from? It cannot, in a systematic and systemic sense, originate in the process of circulation—precisely because the exchange process involves the exchange of equivalents via market transactions carried out between formally free and equal agents. It can only originate, then, in the process of production itself and the way that this is structured within capitalist relations of production—hence Marx's emphasis on the centrality of this moment in the totality of the production process.[12]

Rather than being seen as a series a linear exchanges, however, capitalist production can more usefully be thought of as a continuous circuit, encompassing three analytically distinct yet integrally linked circuits: commodity capital, money capital, and productive industrial capital (see Figure 2.1).[13] The circuit of productive industrial capital provides key insights to understanding the creation of surplus-value, of profits, and the dynamism of geographies of capitalist production.[14] Capitalist production is simultaneously a labor process, producing material use values, and a valorization process, reproducing value and producing surplus value.

The circuit of productive industrial capital requires that capital be first laid out in money form to purchase the necessary means of production (tools, machinery, manufactured inputs, and raw materials)[15] and labor-power. Labor-power and the means of production are then brought together in the production process, under the supervision of the owners of capital or their managers and representatives. Two things happen in the moment of production. First, existing use values, in the form of raw materials, machinery, and manufactured components, suitably revalued according to their current cost of production, are transferred to new commodities. Second, surplus-value is created. This augmentation of value is possible precisely because labor-power is *the* unique commodity, for capital purchases not a fixed quantity of labor but rather the workers' capacity to work for a given period of time. During this time workers create commodities that embody more value than was contained in the money capital used to purchase their labor time. This difference in value is the surplus-value, the additional new value created in production, which is realized in money form as profits on the successful sale of the commodity, along with existing values transferred in the production process. Thus, the difference between the amount of money capital advanced at the start of the round of production and that realized at the end of it is equivalent to the difference in the value of commodities at the beginning and the end of the round. This is critical in understanding the rationale and dynamism of capitalist production. It also emphasizes that the totality of production involves more than simply the transformation of materials to produce goods or services. It also involves a myriad of other activities associated with transportation, distribution, and sale,[16] as well as the final consump-

(A)

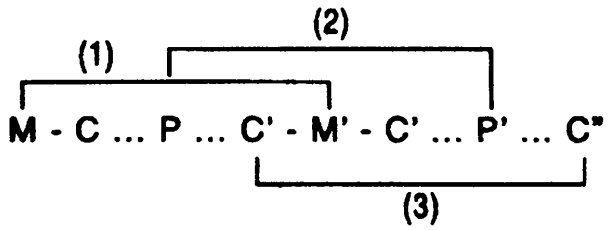


› An increase in value

... An "interruption" in the process of circulation during the process of transformation

m = M'-M Surplus-value

(B)



1 The circuit of money capital : M - C ... P ... C' - M'

2 The circuit of produce capital : P ... C' - M' - C' ... P'

3 The circuit of commodity capital : C' - M' - C' ... P' ... C'

FIGURE 2.1. Circuits of capital.

tion of goods and services and the meanings with which they are endowed, the identities that they help create and form.[17]

In summary, thinking of production in terms of the circuit of productive industrial capital foregrounds the fact that commodity production and consumption involve the creation and realization of value. Commodity production is therefore inherently geographical in a double sense. First, the material transformation of natural materials is predicated on relationships between people and nature, a social-natural dialectic. Second, commodity production and consumption involve the movement of commodities between various sites of production and consumption as they flow around the circuit of capital, a sociospatial dialectic. In this way, space and places are integral to the biography of commodities. The circuit of productive capital thus involves complex relationships between people, nature, places, and space in processes of value creation and realization.

Conceptualizing production as occurring in rounds, as successive journeys around the circuit of industrial capital, raises further interesting questions. In particular, what happens to the money equivalent of the newly produced surplus-value at the end of one journey around the circuit? This is of critical importance in understanding the processes of competitiveness, economic growth, and capital accumulation, both at the level of the individual firm and of capital in general. Two limit cases can be established. First, it could all be very conspicuously consumed on luxuries by the capitalist class. In this case the next round of production would begin with the advance of the same amount of capital as the previous one. This would define a situation of the simple reproduction of capital. Second, all of it could be used to increase the scale of production in a situation of expanded reproduction. This would correspond to the maximum possible rate of growth for that unit of capital or, if the whole of a capitalist economy were the object of analysis, then of that economy. In practice, expanded reproduction usually involves rather less than this maximum feasible amount of capital being advanced. The temporal fluctuations in this amount help define the cyclical variations of the "business cycle" around a longer-term secular growth trend of expanded accumulation.

The conditions necessary for sustainable expanded reproduction (economically as opposed to ecologically) are interesting and important. They also have different implications depending upon whether the focus is upon an individual company or capitalist production overall (Mattick, 1971). An individual company is subject to contradictory pressures. On the one hand, it wishes to minimize its own input costs. On the other hand, it wishes to maximize its sales and profits. Maximization of the latter depends, however, upon purchases by other companies (seeking to minimize their costs) and final consumers (whose wages may represent a

significant proportion of other firms' costs of production). As such, a capitalist economy is reproduced via contradictory processes; it travels along an uncertain and crisis-prone trajectory. Marx made this abundantly clear in Volume 2 of *Capital* in setting out the conditions under which smooth long-term growth would be possible. In reality these are impossible conditions to meet, even in an economy conceptualized in very abstract terms as one of Departments 1 and 2 (that is, a two-sector economy, one sector producing the means of production, the other producing consumer goods). This knife-edge movement along a crisis-prone trajectory directs attention to three things: first, to competition between companies as the motor of industrial dynamism (considered more fully in Chapters 5 and 6); second, to the role of the state in managing this crisis-prone trajectory and in ensuring that capitalist production does not collapse under the weight of its internal contradictions (discussed in Chapter 3); and third, to the varied ways in which production is made possible within the confines of the social relations of capitalism (a recurrent theme in what follows).

Making the Transition to Less Abstract Concepts: From Values to Prices, Modes of Production to Social Formations

The concept of the capitalist mode of production is a high-level abstraction designed to reveal the essential defining relationship of a capitalist economy and not to describe social reality as experienced by people living in capitalist societies. The concept of social formation moves matters one step nearer to the experienced reality, as it denotes the ways in which capitalist and noncapitalist, class and nonclass, social relationships come together in a particular time-space context.[18] This creates conceptual space for different forms of capitalism, allowing that capitalist relations of production may be socially and culturally constituted in varying ways. Structural conditions and limits defining the parameters of capitalism and of capitalist production and its geographies are not, however, pre-given, "natural," and a product of unchangeable natural processes but are socially produced by human actions, discursive and material. People are not simply passive "bearers of structures" or, indeed, "bearers of discourse,"[19] but rather pursue their own projects and courses of action within particular institutional arrangements. Such actions have both intended and unintended consequences, however, and so variable relationships to structural reproduction. The ways in which such structural limits are socially (re)produced is therefore a pivotal issue. Consequently, this led to increased attention to the role of the state in capitalist societies in ensuring the reproduction of these relationships. For some, the state nonproblematically met the "needs of capital" so as to ensure societal reproduction. Such State Monopoly Capital formulations (Baran and Sweezy, 1968) were quickly seen to be too simplistic, however. Crisis the-

ories focused upon the problems encountered by capitalist states in seeking to ensure the successful reproduction of crisis-prone capitalist economies and societies (Habermas, 1976; O'Connor, 1973; Offe, 1975a). Another strand of state theory sought to derive the existence of the state in a political sphere, formally separated from the economy, from the fundamental characteristics of the capitalist mode of production (Holloway and Picciotto, 1978). Subsequently, however, seeking to derive a theory of *the* capitalist state was revealed as a flawed project, and the focus shifted to constructing an historical geographical theory of capitalist *states*, cast at a somewhat lower level of abstraction.[20]

Another implication of shifting to a lower level of abstraction is a recognition that the two-class model of capital and labor was developed for particular purposes—specifically, to clarify the core class structural relationships that define the capitalist mode of production and the terrain on which the struggle over the future of that class structure is fought. A more differentiated conception of class is required in seeking to grapple with actual geographies of economies and production, however, one that recognizes the existence of "contradictory locations within class relations, mediated class locations, temporally structured class locations, objectively ambiguous class locations, dualistic class locations." This suggests "a picture of multiple possible coalitions of greater or lesser likelihood, stability and power contending over a variety of possible futures" (Wright, 1989, 348; see also Wright, 1978, 1985). The analytical consequence of acknowledging this variety is that concepts of class must be specified at appropriate levels of abstraction, given the task at hand. For an investigation of epochal changes in class structure the two-class model might well be ideal, but for investigating finer grained changes in géographies of production, divisions of labor, and class structures within capitalism a more nuanced conception is required. This needs to recognize (among other things) differentiation within the classes of capital (by sector, by branch of production within a sector, and by company within a branch of production) and labor (by industry and occupation, age, ethnicity, gender, and territory). At the level of abstraction of the capitalist mode of production, one can make plausible arguments that there is a certain kind of commonality of material interests, lived experiences, and capacities for collective action that are generated directly by the social relations of production as such. Such a coincidence may occur, but there is no necessary reason as to why it should—and in practice it usually will not.[21] Thus, when class is analyzed at a relatively concrete micro level, " there is no longer *necessarily* a simple coincidence of material interests, lived experience and collective capacity" (Wright, 1989, 295–296). This has implications for individual experiences, collective identities, and collective action.

In seeking to move to a lower level of abstraction in their analyses of

class, contemporary Marxist theorists have been "torn between two theoretical impulses" (Wright, 1989, 269). The first is to keep the concept of class structure as simple as possible and then remedy the resultant explanatory deficiencies by introducing into the analysis a range of other explanatory principles. The second is to increase the complexity of the class structural concept itself. These alternatives "place different bets on how much explanatory work the concept of class structure itself should do." The first strategy takes a "minimalist" position, seeing class structure as at most shaping broad constraints on action and change. In contrast, the second takes a "maximalist" position, seeing class structure as a potent and systematic determinant of individual action and social development. Neither approach is nonproblematic, however, and there is no reason why they should be mutually exclusive. There may be advantage in seeking both to develop more complex conceptions of class and to acknowledge the relationships of class to other dimensions of social division and identity such as ethnicity and gender. Harvey (1996, 359, original emphasis), for instance, defines class as "*situatedness or positionality in relation to the processes of capital accumulation.*" As these processes are often chaotic and disparate, operating at various spatio-temporal scales, individual positionality in relation to them can also be complicated and confused.

Others seek to accept aspects of poststructural critique and respond to it in ways that reformulate the concept of class but do so in deeply problematic ways (Gibson-Graham, 1996, 1997). Gibson-Graham (1997, 149) claims that economic geographers of a Marxian persuasion focus only on landscapes of capitalist class relations, blind to the multiplicity of other possible class relations.[22] In recognition of this "essentialist" view, she argues for an "anti-essentialist" but nonetheless Marxian definition of class as a social process involving the production, appropriation, and distribution of surplus labor "*in whatever form*" (1997, 91, emphasis added). As a result, for example, the household "is involved not only in capitalist reproduction but in the reproduction of non-capitalist class processes" involving household members so that "[women's] class struggles often take place in the household" (Gibson-Graham, 1996, 120–122). Gibson-Graham concedes, however, that "to empty class of much of its structural baggage [*sic*] and prune it down to one rather abstract process concerning labour flows might seem rather reductive." While rejecting the pejorative concept of "structural baggage," this is indeed "reductive," as defining class in this way robs the concept of analytic specificity. She argues that her position allows the conditions of existence of *any* class process to assume specific importance in the formation of class societies and subjectivities without presuming their presence or role. In her eagerness to deconstruct and complicate Marx's two-class model, she (no

doubt inadvertently) loses sight of its specific analytic purpose and, more damagingly, the specificity of capitalist class relations. This is a clear case of throwing out the baby with the bath water.

Moving to a lower level of abstraction also involves recognizing that the routine performance of the social relationships of production and consumption and the day-to-day conduct and market transactions of a capitalist economy (such as declaring profits or paying wages) are conducted in prices, not values. Economic agents freely enter into market relations mediated by monetary prices. Money thus serves as both a medium of exchange and a measure of value, though one that does not equate to values defined in terms of socially necessary labour time. In much of *Capital* Marx proceeds for expository purposes as if money prices are perfectly correlated with the amounts of socially necessary labor time embodied in commodities. Given this (heroic) assumption, monetary exchange is equivalent to value exchange. In fact, this *never is* nor *can it be* the case, for while money is a representation of socially necessary labor time, money prices are always a slippery and unreliable representation of value (Harvey, 1996, 152). The discrepancies between supply and demand in markets result in commodities being exchanged at prices that diverge from their values. As production conditions diverge from the social and technical averages, the amounts of labor time embodied in commodities deviate from the socially necessary amount that defines the value of a commodity. Commodities thus contain varying amounts of labor time but are sold at the same market price, while money prices typically diverge from exchange values. As a result, there is a redistribution of value between sectors and companies via the processes of competition. This is also important in relation to the systemic dynamism of capitalist economies and their historical geographies of production and uneven development, and to processes of "creative destruction" as firms seek competitive advantage via innovation and revolutionizing the what and how of production.[23]

Marx gave no definitive solutions as to how value and price analyses should be related. Consequently, there has been much subsequent debate as to the "correct" way to connect these two levels of analysis. For some, the issue is how quantitatively to transform values to prices, reflected in the history of the "transformation problem" and more generally the issue of the validity of value analysis (Rankin, 1987; Roberts, 1987; Sheppard and Barnes, 1990; Steedman, 1977). Rather than seeking quantitatively to equate values to prices, a more constructive approach is to recognize the qualitative differences between them and that these are concepts of different theoretical status. Values and prices are indicative of the way in which capitalist social relationships unite a wide range of qualitatively different types of labor in the totality of the production process. Massey

(1995a, 307) trenchantly argues that the law of value is useful for thinking through the broad structures of the economy and for forming the "absolutely essential basis for some central concepts—exploitation for instance." Thus, value theory describes a specific set of social relationships in which exploitation is a process of extracting surplus labor that can only be understood in the context of the wider social forms constitutive of capitalism as a system of commodity production. Value theory therefore helps elucidate the social relationships specific to capitalism. However, attempts to use it as a basis for empirical economic calculation are misconceived and doomed to failure. Indeed, "the byzantine entanglements into which the 'law of value' has fallen make it . . . unusable in any empirical economic calculus" (Massey, 1995a, 307). It is therefore important not to confuse values and prices conceptually or seek to equate empirical data measured in prices with theoretical constructs defined in terms of values. The significance of value analysis lies in the way in which it focuses attention upon class relationships and the social structures that they help to define.[24]

2.3. Varieties of Marxism and the Engagement between Economic Geography and Marxian Political Economy

The Marxian tradition is rich and varied, encompassing a variety of approaches with different emphases and aspirations. As geographers began to discover this tradition,[25] they engaged selectively with its various strands. David Harvey was central to this voyage of discovery. His work and exploration of classical Marxian political economy was seminal in shaping the terms and terrain of engagement between Marxism and geography.[26] Indeed, part of the difficulties encountered in the subsequent engagement between economic geography and Marxian political economy during the 1970s can be traced to two issues that followed from this. First, Marxian political economy was more concerned with the temporalities rather than the spatialities of capitalism (though there were important exceptions, such as Mandel, 1963). Second, Harvey was primarily concerned with the relationships between the structural relationships of capital and geographies of capitalism. Harvey retained (and retains) a strong commitment to a scientific geography[27] and to constructing more powerful explanations of the structure of the space economy of capitalism than those offered by neoclassical location theories and spatial science (Harvey, 1973). Paradoxically, the combination of these two features led initially to limited and one-sided considerations of the links between social process and spatial form.

Some sought directly to deduce trends in the organization and geographies of production from the deep inner structural relationships of the capitalist mode of production (Läpple and van Hoogstraten, 1980).[28] Others went even further and sought to deduce forms of political action from the structures of capitalist relations of production (Carney, 1980). Such approaches thus echoed deterministic capital-logic and structuralist approaches that assumed people to be mere "bearers of structures," with no scope for human agency to alter trajectories of development that were to be revealed by the inexorable unraveling of structural relationships.[29] More sophisticated approaches recognized that structural analyses could define the limits to and constraints upon production organization and its geographies. Harvey (1982) remains the most elegant and thorough analytic statement of such an approach via his reworking of Marx's historical materialism into an historical-geographical materialism that sets out the necessity for territorially uneven development in relation to the structural limits to capital. Such approaches could not, however, specify how particular industrial trajectories or patterns of spatially uneven development would evolve within these limits, or indeed explain how (as opposed to why) these structural limits were reproduced. For example, while some cities and regions grow and others decline, explaining which grow and which decline is a matter for empirical investigation rather than deduction from immanent structural tendencies.[30] Moreover, structural conditions and limits are not pre-given and natural but are socially produced by human actions, intended and unintended. Consequently, the ways in which such structural limits are socially (re)produced within particular institutional arrangements have become focal issues. These processes of structural (re)production thus need to be problematized rather than taken for granted, especially as capital accumulation is an inherently crisis-prone process. This was recognized within Marxian political economy by the increasing attention given to the role of the state in keeping these crisis tendencies within "acceptable" limits.[31]

However, to begin to understand such issues more fully requires rather different and complementary approaches and levels of theoretical analysis to that of the law of value and the definition of class structural relations within the capitalist mode of production. In some ways, the "Afterword" to Harvey (1982) represents a critical acknowledgment of the limits to analyzing historical geographies of capitalism within such a framework. At the same time, it forms a bridge to other approaches that sought to explore more fully issues of the state and, more particularly, civil society and their links to trajectories of capitalist development and the mechanisms through which such geographies are produced by human action.

2.4. Further Refining the Conception of Production as a Social Process

One implication of recognizing the "limits to capital" is that theoretical concepts of more local relevance need to be developed at a less abstract level than that of the space of the capitalist mode of production as defined via value analysis. Such concepts must perforce have more limited and modest explanatory ambition and a more restricted domain of applicability. They must be interposed between the more abstract conceptions of value categories and structures and the empirically observable forms of production organization and its geographies. Such concepts focus upon individual and collective behaviors and their links to structures of social relationships within capitalism, recognizing that the latter permit a variety of developmental possibilities and trajectories, and bring the diversity of forms of capitalism and its institutions to center stage. Seeking to link the structural relations of capitalism with uneven development and geographies of economies also requires a more sophisticated and nuanced view of the relationships among society, space, and nature, for these are central to understanding the variety of forms that capitalism can take. These intermediate level concepts thus allow an explication of *how* the processes of capital accumulation proceed and of *how* capitalist social relationships are reproduced in spatially and temporally variable ways in order to make production possible. This in turn implies a greater concern for the meanings that various facets of social life have for people.[32]

Middle-level theoretical bridges can be built by drawing on concepts from modern social theory (Giddens, 1981, 1984) and from evolutionary and institutional approaches in the social sciences, especially economics and sociology (Hodgson, 1988; Metcalfe, 1998a), as well as from parts of anthropology and cognitive psychology (for example, see Amin, 1998). An evolutionary approach, for example, stresses the path dependent character of development and centers on two themes: how firms behave differently in similar contexts and how firms adapt to environmental change (Metcalfe and Calderini, 1997). Metcalfe (1998b, 2), in arguing against a view of evolutionary economics as grounded in biological analogy, emphasizes the links between evolutionary and institutional approaches and the institutional grounding and guiding of evolutionary market processes. He suggests that "patterns and rates of economic evolution are deeply conditioned by market institutions and the wider context in which these market institutions are embedded." While understanding of capitalist production can be enhanced by exploring the conceptual space between abstract conceptions of structures and empirically observable forms of behavior, understanding of institutional forms can equally be enhanced

by relating them to the structural constraints that flow from their being embedded in capitalist forms of production.

This exploration of evolutionary and institutional approaches resonates with a strong theme in the ongoing debate about the emergence of a "new economic geography"—that there is a (re)recognition that the "economic" is culturally and socially grounded and embedded (Crang, 1997; Thrift, 1994b; Thrift and Olds, 1996). What we understand by "the economy" is culturally constituted (Albert, 1993). Thus, economic rationalities are culturally created, take diverse forms, and are territorially embedded, with distinctive geographies (Peet, 1997b). Culture has penetrated the economy with symbolic processes, including an important aesthetic component, permeating both consumption and production (Lash and Urry, 1994, 61). Culture must be seen as a product of social interaction rather than as some pre-given way of seeing the world. If economic practices are culturally embedded, this reflects ongoing and active social processes. It therefore is important to examine the processes by which cultures are actively produced and reproduced by social practices and institutions (Gertler, 1997, 51). As such, culturally embedded economic action should be seen as dependent upon collective understandings that shape economic strategies and goals.[33] Cultural embeddedness denotes the role of shared collective understandings in shaping economic strategies and goals, with culture providing scripts for applying different strategies to different classes of exchange (Zukin and di Maggio, 1990, 17).

There is much of value in seeking to problematize the economic in these ways. It is also important to emphasize, strongly, that a lot of what is claimed to be novel actually is not so new. Although the "cultural turn" in economics and economic geography may seem to some to be a radical shift, cultural analysis and an emphasis upon cultural specificity in economic and social relationships has a long history in Marxian political economy and strands of classical sociology. It can be traced back to Marx's analysis of commodity fetishism and reification and Durkheim's comments on the noncontractual elements of contracts (McDowell, 1994, 1997). The "cultural turn" can be seen as opening up conceptual space to recognize and accommodate different types of capitalism and capitalist production. It can also be seen as doing little more than to restate the point made by Marxian analysts in emphasizing that different social formations may exist within the structural limits of a given dominant mode of production or that they are the product of the articulations of different modes of production. Marxian analyses of capitalism precisely challenge competing representations that seek to deny this. Indeed, this is so central to Marxian political economy and its understanding of the historical ge-

ographies of capitalism that it is difficult to understand why it is seen as insensitive to cultural difference in this way (Lipietz, 1998). This is an important corrective to those views that seek competitively to counterpose political economy to cultural perspectives.

Agency, Structures, and Power Relationships

While agency, individual and collective, is important, individuals must be placed in their social context, avoiding both reducing them to mere "bearers of structures" and privileging the methodological individualism of neoclassical economics and behavioral geography. Structure is equally important, but it also has to be recognized that structures are socially (re)produced and that it is an illegitimate move to seek to read off or mechanistically deduce everything, including individual and collective actions and the geographies of economies, from such structures. The aim is to avoid collapsing agency into structure or structure into agency, in the process producing pale shadows of each.

Structures are both enabling and constraining as regards action and agency. As such, they influence human behavior while people reproduce structural limits and constraints via their behavior, albeit often unintentionally. For example, radical communist trade unionists may oppose the class relations of capitalism yet nevertheless help reproduce them via their everyday behavior of going to work, even if at the workplace they seek to disrupt production as a perceived way of furthering the immediate interests of those working there. Marx was very aware of the significance of human agency but insisted that people made their histories (and geographies) in circumstances not of their own choosing. As Anderson (1984, 34) notes, within Marxism there has been a "permanent oscillation" between those emphasizing the structural logic of the mode of production and those emphasizing the collective agency of human subjects as the main motors and explanatory principles of history (and, one might add, geography). A concern for the relationships between structures and agents was revived in geography following the discovery of Giddens's (1979, 1981, 1984) "theory of structuration." Structuration emphasizes the reciprocal relations between agency and structures—the "duality of structures." Giddens lays considerable stress upon individuals as agents but also recognizes institutions and other forms of social collectivities as possessing powers of agency.[34] He offers valuable insights in recognizing that agents are both shaped by and help shape structures, although the way in which he conceptualizes these links is problematic (Gregson, 1986; Thrift, 1996a). While seeking to reconnect agency and structure, Giddens does so in a way that problematizes both. As a result he has been criticized both for weakening the concept of structure and obfuscating

that of agency. Rather than take the concepts of structures and agents and the links between them seriously, he tends to blur and weaken the distinction.

Others, working from feminist and poststructuralist perspectives, have emphasized the complexity and significance of agency vis-à-vis structure, deepening and transforming the concept of agency through notions of multiple identities. However, this is limited to concern with "the complexity of agency" or "the multiplicity of identity." As a result, the problem of adequately relating agency and structure remains since rationalized actions create through repetition the systemic logics of economic forms (Peet, 1997b, 37–38). Nonetheless, acknowledging the complexity of agency is important in helping bring recognition of dimensions of identity—and social division—such as ethnicity and gender.[35] This recognition of such nonclass dimensions emphasizes that the economy and processes of production involve more than simply the activities of white males and that this is central to comprehending their respective geographies.

In a further twist to this theme, other scholars claim that the problem of the structure–agency distinction has been abolished by the way that work in certain service occupations has been redefined to make the service or product indistinguishable from the person providing it. McDowell (1997, 121) argues:

> Workers with specific social attributes . . . are disciplined to produce an embodied performance that conforms to idealised notions of the appropriate "servicer." In this normalisation, the culture of organisations, in the sense of the explicit and implicit rules of conduct, has become increasingly important in inculcating the desirable embodied attributes of workers, as well as establishing the values and norms of organisational practices. . . . Here in the coincidence of embeddedness and embodiment the separation of structures from agents is overcome.

Much of what McDowell argues is valuable and helpful. What is problematic is her suggestion that the separation of agents and structures is a problem to be overcome by dissolving the one into the other, based on a weak sense of structure and a strong sense of agency. This circumvents the problem of specifying the ways in which agency and structure are dialectically related in such forms of work and represented in specific ways in certain circumstances to legitimate these new forms of heightened exploitation in the workplace. More positively, however, this emphasis upon embodied work can be seen as indicative of the way in which economic activities—of workers, managers, company directors and so on—are performed; of the economy as performative, constructed through and from these activities and performances (Thrift, 2000).

The concept of agency poses other problems, especially in terms of relationships between individuals and collectivities of various sorts. There are certainly dangers of reifying organizations, suggesting that they have powers independent of the people who constitute organizational activity. Organizational change is animated, resisted, or modified by the actions of organizational members. This again points to the performative character of production and other economic activities. Consequently, organizations must be seen as a terrain on which their members can mobilize. Corporate change therefore is interpreted, sometimes fought over and resisted, both by individuals and by groups of people who may have very different assumptions and agendas about what changes should take place and how they should occur and differential powers to pursue their aims (Halford and Savage, 1997, 110–111). Corporate strategy is often the strategy of an individual adopted collectively via negotiation, persuasion, or coercion (McGrath-Champ, 1999, 341). There is clearly a case, then, for not reifying companies, governments, and other organizations and arguing that organizations per se do not make decisions but that decisions are made by people who are their members. Such a position is reasonable to a point. Arguments to the effect that all that matters are individuals can, however, easily slide from a concern with individual psychology into a reductionist physiological argument that in the final analysis all behavior is to be explained via electrical brain activity. It is, therefore, important to remember that individuals exist as social beings whose patterns of thought and action are conditioned by the social relationships in which they are enmeshed.

There are, therefore, also dangers in ignoring or underestimating the influence of organizations over the behavior of their members. Organizational action is more than simply the sum of the actions of its members. Furthermore, the actions of these individuals cannot be understood outside of the organizational context and culture in which they occur. Firms, governments, and other organizations have a collective memory *beyond* that of any given individual or group of individuals. As such, organizations can be said to have cultures and histories that both shape and are shaped by the actions and understandings of their members, but the precise forms of these relationships are contingent and indeterminate.

However, this in turn raises the issue of how these relationships in practice hold together to create organizations that successfully reproduce themselves. Actor-network theorists argue their approach speaks to this question, offering a nondualistic perspective that focuses on how things are "stitched together" across divisions and distinctions. Actor-network theory seeks to connect the social and the material, in contrast to structuration theory, which neglects the material components of both action and structure and is seen by actor-network theorists to be overly de-

pendent upon social interaction. Indeed, "activating networks of actors, and therefore agency, requires the mobilisation of all manner of things and this is probably where actor-network theory makes its most original contribution" (Thrift, 1996a, 26). Actor-network theory thus opens up but seeks to bridge a fresh divide between the social and the material[36] while seeking to bridge the divide between action and structure (Bosch and Juska, 1997). Consequently, actor-network theorists investigate the means by which associations come into existence and how the roles and functions of subjects and objects, human and nonhuman, are attributed and stabilized. Moreover, they acknowledge that there are distinct asymmetries in power between actors within networks. Actors organize associations or networks while intermediates are organized (Murdoch, 1997, 331). However, this distinction between the organizers and the organized is seen as coming at the end of the network construction process, which is shaped by the actors. The same person can, however, be an actor in one network, an intermediate in another. The "radical symmetry" that lies at the heart of actor-network theory thus stems from the belief that power and size are not immutable. Actor-network theorists seek to uncover how associations and networks are built and maintained. Thus, there is much that is attractive in actor-network theorizations.

There are also some major problems, however. Actor-network theory seems strangely indifferent to the differences among and between people and things. As Bassett (1999, 35) puts it, "can non-human entities be actors if they lack goals and intentions?" Despite its name, it in fact has little to say about why agency is exercised in the ways that it is or why structural limits exist in the forms that they do. Furthermore, while recognition of power inequalities is vital, these are seen as only arising *within* the structure of a given network. In actor-network theory, power is conceptualized as the outcome of the strength of associations between actors within a network; "understanding what sociologists generally call power means describing the ways in which actors are defined, associated and simultaneously obliged to remain faithful to their alliances" (Callon, 1986, 224, cited in Thrift, 1996a, 25). Power in this sense is always—and *only*—a shared capacity, a relational achievement, internal to the network. Murdoch (1995, 748, emphasis added) puts it like this:

> Those who are powerful are not those who "hold" power over others but those who are able to enrol, convince and enlist others into networks on terms which allow the initial actors to "represent" others. . . . The controlling actor grows by borrowing the force of others; it can inflate to a larger size. . . . *Power is, therefore, the composition of the network: if it lies anywhere it is the resources used to strengthen the bonds.*

There is thus no concept or theory of power outside the network, which raises problems in seeking to deal with the social sources of power and with the ability of some to control the position of others within a network.[37] Indeed, actor-network theory is characterised by a methodological agnosticism and as such slips from detailed descriptions of particular actor networks to quite abstract prescriptive methodological statements about how to analyze networks. It limits its ambition to providing a set of generalized tools for network analysis and eschews more robust "theoretical" prognoses. While helpful in describing relations *within* networks, it tends to fluctuate between minute description of the particular and rather abstract generalizations about the characteristics of all networks.

In particular, it has little to say about what forms of "stitching together" of networks are more probable than others, why this should be the case, and why those networks that do exist do so in the forms that they do. Indeed, it would seem to assume a priori that every network is unique and qualitatively distinctive. As such there is a danger of becoming obsessed with describing the unique at the expense of more general explanatory claims and statements.[38] Actor-network analysts therefore may simply describe networks of inequality and gloss over the reasons for inequality. In capitalist societies, for instance, agents (human and nonhuman) possess differential capacities to shape relationships. Moreover this differential power is systemically linked to their capacity to accumulate money (capital) and then use this as a source of power to force others to act as subordinate intermediaries.[39] Consequently actor-network theory may ignore the capacity of some actors to deploy the power of others, and in doing so limit their agency, and fail to seek the reasons for this. As a result, Murdoch and colleagues (1998, 15) conclude that it is "probably erroneous" to refer to it as a theory, as it is "somewhat under-theorised and, as a result, problematic as an approach for understanding agency-structure relationships."

Rediscovering the Significance of Motives, Knowledge, and Learning

Acknowledging that people are active and thinking subjects, but are not endowed with perfect knowledge, led to revived interest in knowledge and learning and uncovering the rationalities and motives that actually underlie and inform behavior. The basis of the behavioral geography critique of neoclassical location theories was recognition that people had imperfect knowledge and varying motivations, but this made little progress beyond descriptive studies of particular cases. More recent research in the cognitive and behavioral sciences emphasizes the ways in which different actor rationalities generate different forms of economic behav-

ior. For example, substantive or scientific rationality leads to rule-bound behavior, procedural rationality favors behavior that seeks to adjust to the constraints imposed by the environment in which people operate, while recursive or reflexive rationality is linked to strategic behavior that seeks to shape that environment (Amin, 1998). The actions of economic actors depend, in part, upon the knowledge (both practical and theoretical) that they have acquired about the economy, how it operates, and about the anticipated effects of their actions. This in turn raises questions as to the ways in which "the economy" is discursively created and understood and the extent to which it is "knowable," both to such agents and to social scientists seeking to understand their behavior and the stories that they tell about it (Thrift, 1996b).

The rediscovery of the significance of what people actually know has focused attention on the links between knowledge and production, on learning firms and learning regions (Maskell et al., 1998). Learning and knowledge are also foregrounded via the recognition that organizations develop a "collective memory" and their own cultures of production, linked to an acknowledgment of the importance of modes of internal organization, competencies, and capabilities of firms (Foss, 1996; Richardson, 1972). Competencies express what a firm can do, core competencies what it can do more effectively than other firms (Prahalad and Hamal, 1990). Such core competencies and the knowledge and learning processes that underlie them define differences between firms. The development of unique firm-specific capabilities and competencies provides the grounding for corporate competitive strategies based upon dimensions such as quality, product differentiation, and product development rather than simply price and more effective forms of corporate organization. The firm can thus be thought of as an entity seeking to create and sustain competitive advantage via the cumulative development of a distinctive set of organizational (core) competencies (Liedtka, 1999). Such approaches emphasize the centrality of certain types of knowledge and competencies to competitive success and of the economy as dependent upon knowledge, learning (in various ways, such as by doing, by interacting, by imitating, and so on), adaptation, and evolution.

The emphasis upon learning within such approaches reflects the strong links that exist between them and strands of evolutionary economics and a view that economic development trajectories (corporate and territorial) may be strongly path-dependent (Nelson and Winter, 1982). There is no doubt that in one sense all production depends upon knowledge of various sorts; the more interesting questions concern the links between particular sorts of production and particular sorts of knowledge and learning process (Hudson, 1999a). Equally there are important limitations to the ways in which these questions have been framed and an-

swered (Odgaard and Hudson, 1998). One way to begin to address some of these limitations is to recognize that learning is an interactive process (Lundvall, 1995). The emphasis upon interactive learning directs attention to the way in which production of new knowledge and learning necessarily involves action. The development of firm-specific competencies thus depends not just on knowledge but also the activities through which knowledge is produced and transmitted and more generally upon action by people involved in production. Firm-specific competencies are thus (re)produced through communities of practice within (but also to a degree beyond) the boundaries of the firm (Lave and Wenger, 1990). Within such communities people share tacit knowledge and through dialogue bring this to the surface and exchange ideas—that is, learn—about work practices and experiment with new ideas and practices (Hendry, 1996). Organizations can thus be conceptualized as hybrid groups of multiple and overlapping communities of practice (Brown and Duguid, 1998) in which learning is a matter of new meanings and emergent structures arising from common enterprise, experience, and sociability (Wenger, 1998). In short, communities of practice are grounded in learning-by-interacting.

Institutions, Instituted Behavior, and Social Regulation of the Economy

Conceptualizing the economy as culturally constituted foregrounds the importance of institutions, envisioning the economy as constituted via "instituted" processes.[40] As institutions are typically place-specific, this also involves taking seriously the territoriality of the economy, the organization of production, and the production of spatial scales. This institutional perspective draws heavily on the legacy of Polyani and the "old" institutional economists and upon economic sociology (Mulberg, 1995; Rutherford, 1994).[41] For Polyani (1957, 243–245) all economic processes are instituted processes. As a result, all economic structures are socially embedded in networks of interpersonal relations and so heavily influenced by the presence or absence of mutuality, cooperation, and trust (Dore, 1983; Granovetter, 1985). Embeddedness thereby denotes the contingent character of economic action with respect to cognition, culture, social structure, and political institutions (Zukin and di Maggio, 1990, 15). Thus, capitalism may be constituted in differing ways, and economic relationships may be grounded in, and dependent upon, a variety of noneconomic ones. "Traded inter-dependencies" may depend upon "untraded inter-dependencies," as relationships based upon particular conceptions of trust assume a critical importance in some types of economic transactions (Storper, 1995, 1997).

Conceptualizing economic processes as embedded in institutions leads, logically and historically, to recognition that the economy is regu-

lated and governed in particular ways. There is a range of institutional forms, from formal institutions such as those of the state to the informal and tacit institutions of norms, habits, and routines, that shape the way in which production takes place and the economy is organized. Such varied institutions cohere to become appropriate institutional formations that provide a degree of stability in the face of uncertainty as well as constraints upon, or templates for, future economic developments (Hodgson, 1988, 1993). This resonates with the notion of the creation of distinctive "worlds of production" associated with particular ways of organizing the production process, a position that draws upon conventions theory (Salais and Storper, 1992). In a way reminiscent of Polyani's (1957) notion of instituted behavior, Storper (1997) defines conventions as practices, routines, agreements, and their associated informal and institutional forms that bind acts together through coherent and taken-for-granted mutual expectations. Conventions are sometimes manifested as formal institutions and rules, but often are not. As such, most conventions are a kind of halfway house between fully personalized and idiosyncratic relations and fully depersonalized easy-to-imitate relations (Storper, 1997, 38). Worlds of production are distinctive sets of practices that come together in particular ways as "bundles" or "packages," bound together via the glue of conventions and the mutual expectations and shared ways of understanding that they entail.[42] In some circumstances conventions can be economically advantageous, in others less so, producing a form of "conventional lock-in" that undermines competitive success. For example, Schoenberger (1994) explains the failure of U.S. companies to adapt particular restructuring strategies in terms of the ways in which managers' own interests and identities, and *their* sense of the corporation's interests and identities, were embedded in established institutionalized forms of organization. These acted as cognitive filters, effectively locking in companies to established ways of doing things and foreclosing options as to other ways of operating.[43]

Renewed recognition of the significance of institutions focused attention upon the regulatory role of the state (at the national but also the supranational and subnational scales: Jessop, 1994), but in a rather different way than in earlier Marxist perspectives.[44] Regulationist approaches seek to explain how the tensions inherent to capitalist production and capital accumulation can be held within tolerable limits as a result of state actions and policies. In particular, they focus upon how state policies can ensure a degree of correspondence between changes in production and consumption.[45] Beyond that, however, they have also highlighted the significance of mechanisms and institutions in civil society, as governance has increasingly replaced government as the focal point of analytic interest (Goodwin and Painter, 1996; Painter and Goodwin, 1995). Further-

more, different forms of regulatory and governance régimes may result in relations between structures and agents, and between the varying agents in the production process, being stitched together in different ways, taking varying forms as cultures of economies vary. Echoing the strands of the agency-structure debate, Gertler (1997, 57) stresses that the relationship between institutions and practices is "fundamentally dialectical" in nature, with practices having the potential to shape institutions over time. Taken-for-granted ways of thinking and behaving—which may variously be described as informal institutions or as conventions—can be a critical factor in establishing ideas and ways of doing things as unquestioned, unquestionable, and so hegemonic in the Gramscian sense. They may, however, be less a product of timeless cultural traits than of particular regulatory régimes and institutional forms. Gertler (55) suggests that traits and attitudes commonly understood as being part and parcel of inherited cultures of individual firms are produced and reproduced by day-to-day practices that are strongly conditioned by surrounding social institutions and regulatory régimes. Consequently, the very practices taken as signifiers of distinctive cultures are themselves influenced by institutions constituted outside the individual firm.

Reciprocal Relations between the Natural, the Social, and the Spatial

One of the problems of location theories is that they adopt a one-sided conception of relationships between social process and spatial pattern, deducing the latter from (an impoverished conception of) the former. While drawing upon more powerful conceptions of social process, some initial explorations of Marxian political economy in geography fell into the same trap in adopting a one-sided view of the links between spatial pattern and social process (as noted above). There was no recognition that spatial pattern not only could influence the ways in which those processes operate but also could have a formative role in the ways in which they were constituted in the first place. Relationships between the social and the spatial are reciprocal but indeterminate, however. Analysts place different emphases upon the strength and nature of these relationships. For Sayer (1984) they are limited to spatial form influencing how causal powers are realized. For Peck (1996) spatial difference plays a rather more active, though vaguely specified, role in shaping social relationships. For Massey (1995a) and Urry (1985) the character of social processes may itself be shaped by the way that they operate through time and space. Spatial forms are a product of social processes, while those forms in turn shape the ways in which processes are constituted and evolve. These latter stronger views as to the character of social-spatial relationships emphasize that space is socially produced, and so dynamic, rather

than being a static container into which social relationships, including those of production, are poured. Indeed, social space is produced by the distanciated stretching of social relationships. Consequently, while the spatial patterning of the economy is an outcome of the social relationships of production, spatially uneven development and the characteristics of specific places help shape the particular form that these relationships take.

One consequence of seeing relationships between the social and spatial as reciprocal is that production, its organization and its geographies, must be viewed as contingent and, as such, contested. Particular forms and geographies of production organization result from struggles between capital and labor, between companies, and between groups of workers, with states implicated in such struggles both via their regulatory role and, on occasion, as participants. Different social classes and groups seek to shape the anatomy of production and the spaces and spatiality of capitalism to further their own interests. While this is a determinate set of struggles, it is not (pre)determined, as agency and structure combine in and through place to generate contingent outcomes. There is a considerable range of concrete socio-spatial practices and strategies through which the social relations of production can be realized and reproduced. Consequently, there is always a variety of potential resultant geographies (Cox, 1997, 183). The strategies of capital are undoubtedly of great significance in shaping the landscapes of capitalism, although the ways that they do so can vary greatly. Due weight must also be given to the significance of firms as organizational entities in the organization of production, rather than the latter being regarded as simply a response to the general requirements of capital. Production is organized by business enterprises operating within extremely complex dynamic networks of internalized and externalized transactional relationships of power and influence (Dicken and Thrift, 1992, 287). While there is considerable force to this argument, national states, trade unions and other labor organizations, and a variety of groups in civil societies may also influence the organization and geographies of production. While companies seek to shape space to meet their requirements for profitable production, other social forces seek to shape space in relation to differing and varying criteria, seeking to stretch other social relationships over space and form it in different ways. Organized labor can influence these landscapes in a variety of ways via its sociospatial practices, for example (Herod, 1995, 1997; Martin et al., 1994; Sadler and Thompson, 1999; Wills, 1998b).

Furthermore, people seek to create and reproduce meaningful places—understood as complex condensations of overlapping social relations in a particular envelope of time-space (Hudson, 1990)—in which to live and learn as well as work (Beynon and Hudson, 1993). The density,

variety, and types of social relations that intersect there help define different types of place (village, town, city, and so on). The way in which place is conceptualized has also been problematized. The work of Massey in the 1970s and 1980s was seminal in convincing geographers of the need to conceptualize relations between social process and spatial forms as reciprocal and mutually constitutive. More recently, she and others have begun to develop more sophisticated conceptualizations of place. Places are seen as possibly discontinuous—open and with permeable boundaries—rather than as necessarily continuous—closed and with impermeable boundaries—although in practice it is unlikely that any place was ever completely closed. Places are seen to be complex, endowed with multiple and contested identities and meanings. As a result there are typically struggles to resolve which of these identities and meanings will or should become dominant. The extent to which places are spatially continuous or discontinuous, have permeable or impermeable boundaries, and have singular or multiple meanings and identities are recognized as issues for empirical investigation rather than a priori assumption (Allen et al., 1998).

In addition to recognizing reciprocal links between the social and the spatial, it is important to take account of relationships between the social and the natural (Smith, 1984). Some comments have already been made on these issues in the context of actor-network theory, but it is worth recalling Williams's (1983, 29) observation that nature is perhaps "the most complex word in the language," a consequence of the close involvement of people in nature. Paralleling the increased cross-disciplinary recognition given to the significance of spatial difference, relationships between people and their natural environments, the other prime historical concern of geographers, have also come to fore in a variety of other disciplines. Consequently, geography "has been displaced from its self-appointed position as guardian of the interdisciplinary frontier between the natural and the social sciences" (Bayliss-Smith and Owens, 1994, 139). Yet, in the same way as broader cross-disciplinary concern with the significance of spatial difference enriched understanding of links between society and space, so too has the broadened concern with connections between people and the natural environment enhanced understanding of those natural-social links. Within geography, this has helped rescue concerns for such relationships from "a somewhat disreputable past, tainted with the excesses of environmental determinism" (Bayliss-Smith and Owens, 1994, 113). One consequence of this cross-disciplinary reappraisal of social-natural relationships is that, from one of point of view, the natural is seen as socially constructed, and this can set limits upon forms of production organization and geographies.

In addition, however, production is acknowledged as unavoidably materially grounded in the natural world (the natural world is a source of

raw materials and a repository for wastes, for example). The laws of thermodynamics, of the conservation of energy and matter, which govern chemical and physical transformations of materials, set definite limits on the production process. These laws also make it clear that production has unavoidable impacts upon nature and the natural world (Jackson, 1995). Production can therefore be thought of as encompassing both socioeconomically *and* socioecologically instituted processes. The precise ways in which this mediation between nature and society takes place are influenced by technological possibilities and structured by the dominant social relations of production. Relationships between the economy and the environment are thus shaped by the specific requirements of capitalist production for profits. This has myriad implications for the organization and geographies of production as well as, in the final analysis, the sustainability of the production process (M. J. Taylor, 1995). While knowledge of natural processes is itself socially constructed, there are natural limits to production that cannot be overcome.

There is, however, some ambiguity within Marx's views on the relationships between nature and production. At times, he showed an acute awareness of the adverse environmental consequences of production (Merchant, 1983). At other times, he tended to see the labor process as producing only its intended effects in transforming elements of nature into use values, with little recognition of its unintended side effects and by-products (M. O'Connor, 1994b, 57–58). Altvater (1993), however, argues that all of Marx's categories are of a "double-form," relating to both environmental and social process, although Marxists (Marx included) have routinely neglected the former. Consequently, Deléage (1994, 48) has suggested that capitalism ought to be thought of as a doubly exploitative system of production, with a parallel drawn between the hidden mechanisms by which surplus-value is formed and the hidden cost of things purloined from ecological systems. Consequently, he asks, "should the theoretical status of the concept of ecological cost not be ranked on a par with that of surplus-value?" Such issues are explored further in Chapter 9.

2.5. Concluding Comments: A Framework for Understanding Production and the Structure of the Reminder of This Volume

In this chapter several theoretical perspectives have been explored in terms of their utility in helping to understand the organization and geographies of capitalist production. While different perspectives are of varying value in this regard, none of them in and of itself can deal with the full range of issues to be explained. But, while acknowledging multiple possible methodologies and epistemologies, one must conclude that some the-

oretical positions have greater explanatory power and value than others (see section 1.4). For example, some are much more powerful in explaining why capitalist production is organized as it is while others have much more to say about how production is made possible and occurs in specific ways, times, and places. Consequently, various theoretical positions are of greater or lesser usefulness, depending upon the character of the issues to be explained and the types of questions to be answered. Understanding production and its geographies therefore requires developing an approach that combines different theoretical positions, taking advantage of their particular strengths while avoiding or at least minimizing their weaknesses.

How then should we think about the organization of production and its geographies within capitalist societies? How does this influence the structure of the remainder of this volume? The argument herein is that production can be analyzed from four interrelated perspectives that weave in and out of succeeding chapters, with greater prominence in some than in others. The first perspective emphasizes the ways in which production and processes related to it are governed and regulated as a necessary condition of their existence. It emphasizes that the conditions under which commodity production take place do not occur naturally. If they are not (re)produced socially, commodity production is impossible. For this reason they underpin the totality of the production process. These issues are discussed at length in Chapter 3. This discussion entails consideration of national (and supra- and subnational) states and of nonstate regulatory and governance mechanisms. It touches upon debates about globalization and the "hollowing out" of national states as well as specific policies relating to production.

The second perspective focuses on the ways in which companies, workers, and communities struggle to organize production and make its organizational models and geographies in ways that reflect their respective (often competing) aims, aspirations, and interests. In this way the social spaces in which economies and societies are constituted are produced as an integral part of the process of commodity production. While companies use space and spatial differentiation as part of their competitive strategies, workers and the residents of places affected by these corporate strategies seek to shape geographies of production to produce landscapes that favor their interests rather than those of capital. This second perspective thus sees production as a contested process, encompassing both competition between companies and between capital and labor.

These concerns are explored in Chapters 4 to 7. Chapter 4 deals with competition and cooperation between capital and labor. It focuses upon the ways in which labor markets are shaped so that labor is bought and sold in particular ways and upon the organization of the labor process

once companies purchase labor-power. It thus views production as both a labor process and a value-creating process. There is a long tradition in political economy from Marx to Schumpeter and their respective followers of seeing competition between companies as central to the developmental dynamic of capitalism. Accordingly, Chapters 5 and 6 explore forms of corporate competition and cooperation between companies seeking to produce profitably, considering different dimensions and forms of competition, product, process, and organizational innovations, and the role of knowledge in competition. These chapters also explore markets, hierarchies, and networks as organizational forms and governance mechanisms. While the structural class of capital is divided, so too is that of labor. Thus, Chapter 7 analyzes divisions of labor and competition and cooperation between workers over the number and location of jobs and the terms and conditions of employment. It examines processes of labor market segmentation and divisions among workers along the cleavage planes of industry and occupation, types of jobs, gender, ethnicity, and the location of work, as well as the ways in which these are linked to forms of working class organization and trade union practices. It also considers the relationships between waged and unwaged work, especially in relation to the reproduction of labor-power.

The third perspective addresses the issue of how places are created, reproduced and, on occasion, destroyed as a necessary corollary of commodity production and the restructuring of production. Nonetheless, places have an existence beyond the social relations of capitalist production, grounded in local institutions, cultures, and life beyond the workplace. As such, there is a focus upon producing places in two senses. First, upon the places in which production occurs and the ways in which differences between places are deployed in strategies for and struggles over production. The emphasis thus is upon *producing* places, upon those diverse places in which goods and services in both commodified and noncommodified forms are produced. Second, there is an emphasis upon producing *places*, upon the production of places that are meaningful in various ways to people. It thus draws a distinction between capital's one-dimensional concern with profitable production spaces and peoples' concerns with meaningful places in which to live. While these concerns run through the preceding chapters in varying degrees, in Chapter 8 they become the prime focus of attention. Chapter 8 discusses the production of space and places, materially and discursively, recognizing that these are contested processes. It examines the role of the state in seeking to balance competing and contradictory claims. It also considers some aspects of consumption and identity formation related to people's senses of place. It emphasizes that class and other social struggles do not simply take place *in* and *over* space but actively shape that very space.

The final perspective centers on the ways in which the process of production is grounded in the natural environment, both drawing resources from it and discharging pollutants into it, and the fact that as a result there are natural limits to production. Put in slightly different terms, it explores how capitalist production is not but might be made sustainable economically, socially, and ecologically. Much of recent economic geography has paid but scant attention to the relationship between production and nature, so Chapter 9 focuses upon production as a process of materials transformation and upon relations between production, people, and the environment. It examines the social process of the transformation of elements of nature into socially useful products, grounded in the natural environment and having unintentional impacts on it (both as a result of production activities per se and through the impacts of consumption). It concludes by raising some normative and political questions about sustainable forms of production.

The final chapter reflects upon what has gone before and is organized around two sets of questions. The first is, What sort of capitalist economy and production system currently is dominant—for example, how accurate are claims that capitalism has become simply a post-industrial service economy? What does it mean to speak of a global economy? Second, how can the regulatory dilemmas posed by capitalist social relationships be tackled and the multiple contradictions of capitalist development be kept within tolerable limits?

2.6. Notes

1. It therefore follows that neoclassical accounts, predicated upon assumptions of certainty and static equilibrium, fall at the first hurdle in the theoretical stakes. They manifestly fail to meet the criteria of theoretical "adequacy" as set out in section 1.4. For discussion of the limits of neoclassical and technicist views of the economy based on analogies with the behavior of physical systems, see Barnes (1995).

2. Seeking to finesse the problems of assuming perfect knowledge via assumptions of bounded rationality thus fails adequately to address the problems of the undersocialized conception of the economy that is inherent to neoclassical approaches.

3. In the context of geographies of consumption and studies of consumer behavior, behavioral approaches typically sought to discover the knowledge that consumers possessed about the retailing environment and how they came to acquire such knowledge (Hudson, 1974).

4. Others sought to get around the problems of ignorance about individual knowledge and motives in a very different way. This involved adopting probabilistic macro-scale modeling procedures, which in due course became more rigor-

ously theorized via entropy-maximizing approaches that sought to predict the most probable distribution of activities and behaviors in space, subject to any known constraints (Wilson, 1970). These resulted in some circumstances in more accurate predictive models, but they pushed questions of explanation and understanding of social processes still further down the research agenda.

5. The analogy with the classical Marxian concept of commodity fetishism is deliberate.

6. Consequently, those familiar with the Marxian tradition may wish to pass directly to section 2.4. For those unfamiliar with Marxian ideas who wish to investigate them in more depth than they are presented here, Harvey (1982) remains an unrivaled account, although there is no substitute for Marx's own writings.

7. In a critical realist sense; see section 1.4.

8. That is, the amount of undifferentiated abstract labor needed under average social and technical conditions of production.

9. In contrast to—say—self-sufficiency, with each person or household producing all that (s)he or it needs, or to the maximization of physical output per se.

10. As opposed to the sale of some fortuitously produced surplus in an economy essentially devoted to subsistence production.

11. Rather than ex ante by state production planning or some other criterion.

12. See section 1.2.

13. Clearly such circuits have definite geographies, with different locations forming sites of production and exchange, linked by flows of capital in the form of money, commodities, and labor-power. Over time, the spatial reach of such circuits has increased, with the circuits of commodities, money, and productive capital successively becoming internationalized (Palloix, 1975, 1977).

14. Other approaches to understanding commodity production and circulation, such as commodity chain analysis (Gereffi, 1994, 1995), conceptualize flows as linear. In contrast, conceptualizing commodity production in terms of a circuit of value as well as in terms of the physical movement of commodities allows scope for nonlinearities and feedback mechanisms and a more complex and dynamic conceptualization of the total production process (see also Hartwick, 1998; Leslie and Reimer, 1999).

15. The appropriation of raw materials involves a different type of labor process to that of transformative industrial production; see below.

16. Harvey (1985) points out that the determination of socially necessary labor time is contingent upon the speed with which commodities can be distributed through time and across space, which is captured in the concept of "socially necessary turnover time."

17. Clearly a full analysis of the totality of the production process must encompass consumption. Production and consumption are linked rather than wholly separate categories (McDowell, 1994, 160). Companies consume commodities to produce other commodities; people as final consumers purchase commodities in the belief that they will be useful to them, materially and symbolically. Little attention is given here to the symbolic connotations of consumption and links between consumption and identity formation. This does not imply that they

are unimportant, simply that a line had to be drawn somewhere in terms of coverage (see Lee and Wills, 1997; Wrigley and Lowe, 1995).

18. Recognizing this, the concept of sociospatial formation perhaps better captures what is at issue here (cf. Thrift, 1996a).

19. Structuralist readings of Marx saw no scope for individual agency. People had no role beyond passively reproducing structures via their actions (Gregory, 1978). As the focus of attention in the social sciences switched from structures to discourses, it seemed at times as if people now had no role beyond the passive reproduction of discourses. Both significantly play down the role of human agency (see "Agency, Structures, and Power Relationships" in section 2.4).

20. These issues are more fully pursued in Chapter 3.

21. This is precisely the root of difficulties for trade unions seeking to organize workers collectively, issues discussed in Chapters 4 and 7.

22. The limitations of her views on this point are also discussed in section 1.4.

23. See Chapters 5 and 6.

24. It is also worth pointing out that as a consequence there are things that it cannot deal with: for example, many aspects of use values cannot be captured in value categories (see also Chapter 9).

25. I am conscious that this discussion focuses upon Anglo–North American geography. Within the discipline in other countries and cultures, rather different paths were followed (for example, see Carney *et al.*, 1980). Equally, the terms of engagement varied among social science disciplines (Blackburn, 1972).

26. Had the initial point of contact been more with—say—Althusserian Marxism, with its emphasis upon the existence of contradictory structures within capitalism (Althusser, 1977), the subsequent trajectory of development might have been different. But it was not—which emphasizes the significance of human agency and contingency within as well as outside the academy. Subsequently, geographers (including Harvey himself) explored other strands within the Marxist tradition (Castree, 1999; Harvey, 1996).

27. Harvey (1969) was the key text that sought to provide an epistemological underpinning to geography as spatial science. It was also the pivotal moment in Harvey's turn to Marxism in recognition of the limits to orthodox positivist science.

28. Such approaches bore more than a passing resemblance to the deductive strategies of neoclassically inspired location theorists.

29. For a polemical critique of such positions, see Thompson (1978).

30. This is indicative of the limits to theory in this regard. Theoretical analysis can help define and explain the extent to which varied relationships between social processes and spatial forms are possible but revealing the extent to which they actually materialize is necessarily a question for empirical investigation.

31. See "Institutions, Instituted Behavior, and Social Regulation of the Economy" (section 2.4) and Chapter 3.

32. The production, circulation, and consumption of meanings within a circuit of symbolic exchanges has assumed an unprecedented significance within the contemporary capitalist economy (Thrift, 1994a, 215).

33. More radically, it can be claimed that no purely economic, social, or cultural relations are distinguishable. In contrast, each is already embedded within

the other (Halford and Savage, 1997, 109). This latter claim raises an awkward question, however, for if each is already embedded within the other, it may be difficult to distinguish them from one another—in which case, it is not at all clear what the cultural, economic, and social would denote.

34. He rejects the notion that classes can act as "collective agents," however. It is certainly possible, but not very helpful, to claim this. While capital and labor may not act for themselves as unified classes (bourgeoisie and working class) in pursuit of common interests, based on a shared understanding of their class interests and class structural position, this is no more than a recognition that the class structures of actually existing capitalist societies are much more complicated than the two-class abstraction that Marx used in unraveling the fundamental inner structural core relationships of capitalism (see section 2.3).

35. These are *relatively* neglected within historical materialism as a consequence of its insistent concern with the centrality of class relations.

36. Indeed it can be argued that in so doing actor-network theory challenges the established dichotomy of society–nature and seeks to replace this by new hybrid representations; the more limited issue of links between nature and production are considered in Chapter 9.

37. While all forms of social relations can be defined as actor networks, this still leaves unanswered the question of why some actor networks dominate over others.

38. Analogies with an earlier era in the history of geographical thought spring to mind here as geography sought to throw off its legacy of regional exceptionalism.

39. For example, capital can exert a structural power over labor, while some companies can exercise power over others by virtue of the resources they command (Allen, 1997).

40. Conversely, it explicitly denies the validity of conceptions of the economy and markets as naturally occurring, governed by natural processes.

41. "Old" institutional economics draws on two main strands of thought. One derives from Veblen and sees social norms, habits, and conventions as shaped by technology. The other derives from Commoner and sees conventions and norms as the outcome of a struggle. Rather than a coherent set of substantive theories, "old" institutionalism comprises diverse strands of thought united in opposition to neoclassical approaches.

42. While the fourfold typology of ideal-typical worlds of production advanced by Salais and Storper is useful for expository purposes, it fails to capture the nuances of production organization in its practical complexity. Nonetheless, the concept of worlds of production remains a valuable way of thinking about the organization of production.

43. Reciprocal links between human behavior and institutional forms are discussed in "Agency, Structures, and Power Relationships" in section 2.4.

44. There is debate as to the extent to which regulationist positions derive from Marxian ones; for example, see Boyer (1990).

45. See "Capitalist Production, Accumulation, and the Circuit of Productive Industrial Capital" and "Making the Transition to Less Abstract Concepts" (both in section 2.2).

Recruiting Workers, Organizing Work

4.1. Introduction

This chapter explores relations between capital and labor in the labor market and at the point of production and the ways in which they are governed and regulated. Capital needs "free labor" available to sell its labor-power, labor needs capital to purchase that labor-power so that it can live and reproduce itself, physiologically and socially. Relationships between employers and employees are complex, simultaneously involving competition and cooperation. Given the structural asymmetry in the capital-versus-labor relation, in the power possessed by these structurally defined classes of economic agent in the production process, the underlying relationship is antagonistic. However, the relational definition of capital and labor presupposes a degree of necessary cooperation between them, however grudgingly this is given in particular times and places by either or both of them. Just *how* competition and cooperation are socially constructed in historically-geographically variable forms is a critical issue. The institutional forms and processes through which the interests of employers and employees are constructed and represented are of central importance to the constitution of these relationships. Labor markets are a fortiori not naturally markets but must be socially produced as such.[1] The idea of a self-regulating labor market is a fiction because labor itself is a "fictitious" commodity: it is not produced for sale, it cannot be stored, it cannot be separated from its owner, "it is only another name for human activity which goes with life itself" (Peck, 1994, 149). The production and reproduction of labor are intrinsically social processes. It follows that the labor market must be socially regulated.

Recognition of the necessarily social constitution of labor markets foregrounds the significance of institutional forms of collective organization of both capital and labor in regulating competition and cooperation

between them.[2] Such institutional forms are required to ensure their reproduction and to counter or contain the potentially self-destructive dynamic of market systems (Polyani, 1957, 243–250). Equally, the reproduction of labor markets and availability of labor-power on them necessarily involve unwaged work in households and processes of governance in civil society detached from the immediate labor market concerns.[3] This results in a degree of institutional indeterminacy and spatiotemporal variations in the ways in which labor markets become regulated and governed. Spatial scale and differentiation are central to processes of labor market regulation. These processes vary between national states, regions, localities, and workplaces, but local institutions—broadly defined—play a key role in labor market reproduction within a complex array of regulatory processes and mechanisms. Furthermore, firms must choose what and how to produce and where to locate production. This choice is reciprocally related to labor market conditions and to policies such as to "hire and fire," recruitment and retention, the capacity to control the labor process and the organization of labor at the point of production and in the workplace.

The remainder of this chapter therefore examines the implications of simultaneously competitive and cooperative relationships between capital and labor via three broad themes: first, the processes of regulation and governance through which the interests of capital and labor are represented and that make production possible; second, the sale and purchase of labor-power by formally free and equal agents in the labor market; and third, the subsequent deployment of labor-power in the act and process of production.

4.2. Regulating Relationships between Capital and Labor: Collective Representation of the Interests of Capital and Labor "for Themselves"

Employers and employees deploy a variety of strategies and tactics in organizing and representing their collective interests in a dialectic of competition and cooperation between capital and labor. Capital routinely seeks to organize to articulate its interests, both "in general"[4] and in relation to particular sectoral or corporate interests. There is a long history of organizations that represent particular fractions of capital on different territorial bases. For example, in the United Kingdom the Confederation of British Industry represents the interests of "big" capital, Chambers of Commerce those of smaller and more locally based companies. There are also sectorally specific institutions (for example, the Engineering Employers Federation or the Chemical Industries Association). These organi-

zations can themselves often be in competition—for example, in seeking to influence state policy agendas to favor the particular interests of their members. Such organizations often seek to negotiate over wages and working conditions with workers or their representative organizations such as trade unions in particular sectors or industries to reach sectoral and national agreements on wages and working conditions linked to nationally defined regulatory frameworks and limits. Indeed, while there has been considerable emphasis in recent years upon individualization of labor contracts, companies need to be able to deal with workers on a collective basis.

Capital can be thought of as trying to "disorganize" labor. One way of doing this is by segmenting the labor market, dividing workers from one another on a variety of dimensions (including industry, occupation, age, ethnicity, gender, and location) to create optimal conditions for profitable production. Rather than seeking simply to "disorganize," however, capital may instead seek to organize it in particular ways. So, for example, companies may encourage "sweetheart" unions or sanitized and compliant company unions or nonunion company councils—there are a variety of options available to them. Often these involve the selective cooperation of sections of labor. The point at issue is not a binary choice between accepting or rejecting collective organization but rather the ways in which varying forms of such organization facilitate different methods of control of work and the labor process. The ways in which companies seek to (dis)organize labor depend on their choice of production strategy. Conversely, labor seeks to "organize" (usually but not exclusively by forming trade unions) to improve the terms and conditions on which labor-power is bought and sold on the market—for example, by securing better wages, better and safer working conditions, and shorter working hours. However, labor organizing in these ways simultaneously involves groups of workers distancing themselves from, and often directly competing with, other groups of workers.[5] Competition between capital and labor, and labor's stance within this competitive struggle, is shaped by expectations and norms relating to prevailing forms of work organization.

The organization of labor, and the representation of labor interests by trade unions, is thus critically important in the labor market. Martin and colleagues (1994, 70–71) suggest that in order to understand the formation of collective labor identities it is necessary to address three sets of issues: the fundamental significance of the economic context; the importance of tradition and culture; and the activities of formal institutions and political parties. In addition, there is a fourth set of issues: the informal institutions grounded in the routines of everyday life in the *work*place and work*place*. Trade unions must be conceptualized in terms of cultural and political as well as economic relations. They are perhaps the key formal

institution through which the interests of labor are promoted in the labor market, although at the same time they often become involved in controlling and disciplining workers within the workplace. This paradoxical position reflects the inherent ambiguity of their relationships to capital. Trade unions accept the legitimacy of unequal power relations between capital and labor while simultaneously seeking to maximize the benefits to workers within this constraint via challenging the rights of capital to purchase and deploy labor-power on its own terms. They are ambiguous organizations and unavoidably so, with these ambiguities integral in their "very nature" (Moody, 1997, 54). On the one hand, they are poised to fight capital in defense of labor. On the other hand, at the top level, they attempt to hold the lines of defense through long-term stable bargaining arrangements, a rudimentary type of social partnership. In addition, trade unions often seek to forge alliances with capital at a variety of spatial scales. Such alliances further add to the ambivalence of their position.

There are various forms of trade union organization, related to the types of work and working conditions experienced by workers in different industries, companies, times, and places and to their members' identities *as* workers (Hyman, 1998). The trade unionism of skilled workers is typically different from that of unskilled workers, for example. Craft and skilled workers have more control over their pace of work and the ways in which work is controlled and organized. Consequently, their trade unions have more room for maneuver in negotiations and are able to deploy a range of often quite subtle negotiating arguments. Trade unions representing unskilled workers—for example, assembly workers in car factories—have much less room for maneuver in negotiation since their members either do or do not do the job, with minimal control over the pace and organization of their work. Consequently, such unions are more likely to resort to industrial action, strikes, and the picket line in an attempt to further their interests (Beynon, 1984, 187–188). The character of trade unions and the tactics that they deploy may also reflect the type of work that their members perform. For example, public sector hospital workers involved in "caring" occupations may be unwilling to engage in strike action because of the impact that this would have on those in their care. The attitude of employers toward trade unions and regulation of the labor process can also significantly shape the form and content of trade unions' strategies. For example, in the 1920s and 1930s companies such as Ford and General Motors were implacably opposed to trade unions whereas a company such as Imperial Chemicals Industries (ICI) deliberately constructed cooperative and compliant forms of company unionism. The aim was to avoid damaging industrial disputes and incorporate trade unions into day-to-day regulation of the labor process and production (Beynon et al., 1994, 40–49).

The formation of trade unions and their geographies of organizational and representational spaces was and is the result of struggle, often bitter and bloody, on the part of workers to improve their lot and defend the gains they made. This began in the historical heartlands of industrial capitalism in the United Kingdom and subsequently spread to countries in continental Europe such as France and Germany and to the United States. Prior to, and then subsequently alongside, the formal constitution of trade unions, workers used a variety of informal means of collective action to further their interests (Thompson, 1969). Employers typically sought to oppose the creation of trade unions, via both state legislation and seeking to coerce and intimidate workers in a variety of ways. In this they were often helped by their control over workers' access to housing and local shops, especially in monoindustrial places (Beynon and Austrin, 1993; Corbin, 1981; Hudson, 1993). Often they imported nonunion labor to break strikes (and in many parts of the world still do). Some employers such as the Ford Motor Company took their opposition to trade unions to considerable and institutionalized lengths, creating private police forces to suppress trade unions, for example.

Establishing trade unions was therefore an historical struggle with a definite geography, in terms both of the places in which it occurred and the geographical scales at which unions were seeking to represent workers' interests. The subsequent growth of trade unionism has been a very uneven process, varying with types of worker, companies, types of industry, and locationally (Jonas, 1996). The struggle to establish trade unions, and union rights, continues in much of the Third World and, in at least some senses, remains ongoing in the First World. The recent imposition of legislative restrictions on the scope of trade union activities in countries such as the United Kingdom and declines in trade union membership throughout much of the advanced capitalist world demonstrate this. For example, trade union membership fell between 1985 and 1995 in seventy-two countries, especially the former state socialist countries, as membership ceased to be compulsory. At the same time, membership rose in twenty other countries, including Chile, the Philippines, South Africa, South Korea, Spain, and Thailand. For a variety of reasons political and economic changes there created spaces for trade union growth. In only fourteen of these ninety-two countries did union density exceed 50%, however (International Labour Organisation, 1997).

The construction of trade unions and representation of workers' interests are uneven processes, at once uniting some workers while simultaneously dividing them from others. The historical geography of trade unionism has had a critical formative effect upon unions' tactics and strategies, the legacies of which in many ways are still present. Trade unions typically developed from a plant or local level to a national basis; in

some instances industry-specific unions developed, in others more "general" unions. Over time, the national level increasingly became the territorial basis on which trade union institutions were built, especially in the corporatist "Fordist" era of national regulation in which unions played an important role in national wage bargaining. In effect, in the countries of advanced capitalism they struck a deal that enabled them to wield considerable bargaining power over wages, terms and conditions of employment, and "grievances" in exchange for ceding control of the labor process to management. Trade union influence was most pronounced in large industrial companies and plants. In contrast, many small firms and much of the services sector remained largely nonunionized.

However, there were national variations around the canonical Fordist model, with different national models of industrial relations and institutional practice within the framework of Fordism in the advanced capitalist states (Boyer, 1990; Burawoy, 1985; Esping Anderson, 1990; Lash and Urry, 1987). This both allowed for and reflected national differences in the regulatory involvement of trade unions. In the Federal Republic of Germany, for instance, they had a more prominent role in shaping policies for education and technological change than they did in the United Kingdom or the United States. This was a legacy of the "guild ethos" of German production (Lash and Urry, 1994, 82) and the importance attached to apprenticeships and practical training there.[6] Furthermore, there were very different sets of relationships in more peripheral capitalist countries, often linked to the presence there of dictatorial and nondemocratic political régimes. Consequently, the position of organized labor was (and often still is) much weaker and the terms and conditions of work much worse from the point of view of workers.

The "Fordist" era nonetheless marked the high point of national trade union influence in the territories of advanced capitalism. The growing strength of the trades union movement, and increasing shop-floor militancy in periods of intensified industrial unrest such as the "hot autumns" of the late 1960s in turn helped precipitate a series of changes in the technical-spatial organization of production. These undermined the bases of trade union power at the shop-floor level and influence in national regulation; for the 1960s saw the archetypally mass collective worker in big factories in tight urban labor markets challenging managers' "right to manage" and control over the labor process and to increase line speeds unilaterally. Increasingly Taylorist mass production was threatened by a militant mass collective worker, with "wildcat" strikes disrupting profitable production. Such challenges to trades union officials from militant shop-floor workers further emphasize the contradictory position of unions as convenors sought to maintain order and discipline in production in the face of "unofficial" strike action (Beynon, 1984). As a

result, there were pressing imperatives on trade unions to reorganize their structures and practices as well as upon the managers of capital to reorganize work and production to restore control and profitability.[7]

The growing power of the militant mass collective worker led companies to reassess their production strategies—initially via a series of spatial fixes—to try to preserve Taylorist mass production by outflanking militant workers. This served to divide workers within companies and sectors on a territorial basis, first intranationally, then internationally. The emergence of a new international division of labor is often interpreted as a response to massive labor cost differentials (Fröbel et al., 1980). However, it is important not to overestimate the significance of labor cost differentials, as the involvement of national states in creating stable conditions for profitable production was of much greater significance (Gordon, 1988).[8] Whatever the precise proximate causes, the resultant changes in turn allowed companies more room to maneuver in imposing in situ restructuring strategies in their remaining plants in the industrial heartlands, further reducing employment and union membership and influence. Trade unions' attempts to restore unity via "combines" and international agreements met with little success in the face of companies' ability to divide and rule via relocation and capital flight. The position of unions was further challenged by a growing tendency toward globalization, casting further doubt upon the salience of "the national" as a basis for effective trade union organization (Cox, 1997).

Even so, there are limits to companies' ability to undermine trade unions by restructuring the how and where of production. Production relocation does not automatically translate into the erosion of trade unions' capacities. The international expansion and integration of capitalist social relations "does not necessarily undermine working class political organization. The political effects of economic changes cannot be so easily determined" (Wills, 1997, 6). Globalization processes may have made workers' organization and resistance more difficult and problematic, but the nature and character of their resistance to corporate attempts to change ways of working and labor market conditions continues to influence the unfolding of political-economic processes and outcomes. For example, workers may build up community support in localities in which they retain influence over production strategies. This can restrict companies' capacity to play one plant off against another, despite moves to plant-level bargaining (Jonas, 1997). In cases in which resistance is ineffective, it may *seem* that global forces are irresistible, but other trade union strategies *might* have been successful (Vanderbush, 1997). "Traditional" trade union strategies and forms of organization were further called into question by the increasing adoption of new production concepts such as those of high-volume production and the growing decentral-

ization of production to both small firms and smaller workplaces. Increasing reliance on outsourcing and subcontracting as a systemic element of production strategies further divided workers from one another. Sectoral changes in the economy—especially the growing importance of traditionally little-unionized service sectors[9]—posed further growing challenges to established forms of trade union organization and representation.

In summary, with the triumph of the global market and hypermobile capital scouring the globe in search of cheap labor and other factors of production, a consensus of sorts has emerged according to which workers are scripted as powerless, unable to defend their jobs, communities, and localities. Wills (1997, 5) strongly contests this view that such changes automatically weaken organized labor, arguing that with respect to Europe "it is not clear that capital is as footloose as some pundits suggest. . . . The majority of investment is still attracted to locations where social costs are relatively high." For example, semiconductor production was relocated in response to low wages in parts of the Third World for only a short time in the 1960s and early 1970s. Moreover, this locational strategy was only adopted by merchant (that is, mass) integrated circuit producers in the United States. Since then the dominant pattern of investment has been via interpenetration of the United States, European Union, and Japanese economies in the form of factories incorporating increasingly capital-intensive, often automated, production processes. Moreover, there are considerable sunk costs associated with major fixed capital investments. This may mean that companies are limited in their spatial restructuring strategies because of spatially specific sunk costs and the "embeddedness" of local production systems (de Lamarlière, 1991).

Even accepting these qualifications, however, many trade unions have clearly been weakened by changes in corporate policy and production approaches. Many workers are worse off because of the resultant labor market changes, stranded in marginal, precarious jobs (and with many in no job at all). Equally, however, as part of the same processes of change, other workers seemed to be more secure and to be better-off. Thus, the new labor recruitment, retention and work organization, and remuneration practices—such as performance-related pay or individually tailored contracts for some within internal company labor markets—have led to "winners" as well as "losers." Key "core workers," for example, are frequently materially better-off. Trade unions have often been involved in establishing such new employment régimes. In agreeing to one-union deals—since the alternative is often a no-union deal, with works councils (works councils are discussion forums within a company involving managers and workers, but the latter take part as individuals and not trade union representatives)—trade unions have acknowledged the weak-

ness of their position and the extent to which they have been outflanked by labor market and organizational change. Companies have actively sought to undermine the solidarity of workers at the plant and industry level that characterized mass production. They have done so via innovations in management techniques (notably those associated with human resource management) that seek to forge company-based identities and that pinpoint workers who fail to conform to the performance standards specified by the company (Yates, 1998, 139). Consequently, the only realistic position in the "after-Fordist" economy is seen to be for trade unions to work collaboratively with companies and not in antagonism to them. Workers and their employers have shared interests in this world of "new realism" in trade unions' attitudes and neopaternalism in employment practices. Thus, growing and deepening labor market segmentation and divisions within workforces are in part a product of some trade unions seeking to (re)gain members by participating in the introduction of new forms of work and production.

While the shift to new forms of "flexible" production has certainly challenged established modes of trade union operation, it has also—so some argue—opened up fresh possibilities for unions in three respects. First, it offers opportunities to challenge the imperatives of capital in novel ways and to shift the focus of trade union activities beyond the immediate concerns of the workplace to those of the surrounding locality and community. For example, new flexibly networked just-in-time production models are very vulnerable to any stoppage in production and therefore offer considerable potential bargaining power to workers. The possibilities for realizing this potential depend heavily upon broader labor market conditions and coexisting national and local variations in modes of labor market regulation and union organization, however. For this reason companies introducing such approaches to production carefully select labor markets in which there is "green labor"[10] and/or high unemployment. There are, then, both possibilities for labor and the problems of organizing effectively to realize them (Cox, 1997, 180–181):

> The way in which many firms . . . are, in effect, locked into . . . locations by the difficulties of re-constituting their web of exchange relations and their other forms of transaction elsewhere suggests that workers may enjoy some leverage over wage and work conditions. This does not mean to say that this will be exercised collectively. Rather it may be through more individualised forms, as in the case of internal labour markets. But even less skilled workers can share in the flow of value through the social relations of a local economy, to the extent, that is, that they organise. . . . The difficulties . . . may be less the invulnerability of employers to workers claims and more the problems that unions have in organising . . . dispersed workforces.

Cox goes on to add that these difficulties are not necessarily insuperable. However, while the contours and vulnerabilities of international production chains may be well enough known in labor circles, very few unions actually act on this basis (Moody, 1997, 57)

Second, others see new opportunities for transnational trade union organization as the scale of regulation and representation of workers' interests shifts upward. Corporate acquisition and merger activities create fresh possibilities for closer transnational union links (Wills, 1998a, 3–8). Organizations such as the International Confederation of Free Trades Unions (ICFTU) and the International Trade Secretariats (ITS) have become more effective in recent years. There is a movement toward superconcentration and/or "translocalisation" of some elements of labor relations (Herod, 1997, 186). There is, therefore, growing evidence of cross-border worker organization and cooperation and implementation of cross-border internationally imposed labor and workplace standards, although such global regulation remains embryonic. For example, while implementation of ILO Code of Labor standards prevents the most extreme forms of exploitation and cutthroat competition and establishes a process by which wages and working conditions could gradually be improved (Jordan, 1997), there continue to be very considerable differences in labor market conditions between countries. With the creation of the EU's Social Chapter and European Works Councils initiatives, developments in the EU have received particular attention. There is some evidence of growing collaboration between trade unions across national boundaries within the EU. For example, the General, Municipal and Boilermakers Union (GMB) in the United Kingdom and IG Chemie in Germany have concluded an agreement to give joint membership to their two million members. This can be seen as an important step toward developing a transnational labor movement, although "the hopes of some trades unionists for the development of pan-European collective bargaining are surely premature" (Hodge and Howe, 1999, 182). Even so, there are different views as to the potential of new institutions such as European Works Councils: some see them as potentially progressive (Rogers and Streeck, 1995), others see them as a little more than an empty token gesture toward labor (Amin and Tomaney, 1995a, 31). Moreover, it is recognized that such a development may simply shift the spatial scales of division up a level, with the danger of a trade union "Fortress Europe," perhaps buttressing the privileged position of a European labor aristocracy and dividing it from workers elsewhere as a result.

In one sense, such international organizations can be thought of as "imagined communities" of trade unionists, extending the imagined community from the national to the international level (cf. Anderson, 1982), although there are real barriers to the realization of this imagination and its translation into practice. Not least, this is because people who become

wage workers enter that relationship with a myriad of preexisting differences and identities, linked to ethnicity and gender for example, that they continue to keep. Consequently, while they share a commonality of interest as wage workers, they do so bearing a variety of other identities that potentially divide them.[11] These differences pose real barriers to unity. Wills (1997, 12) is under no illusions about the significance of these barriers. She stresses that the history of efforts to foster labor internationalism indicates that solidarity between workers is difficult to achieve. The fortunes of the First, Second, and Third Internationals, the ITS, the ICFTU, and the World Federation of Trades Unions (WFTU) highlight the difficulties of overcoming national political and economic differences. Trade unions remain national organizations, and "they think and act nationally, despite acknowledging the importance of the international scale" (Wills, 1998a, 3). Insofar as workers do struggle against the worst impacts of globalization, that struggle is largely conducted on and through a *national* terrain (Moody, 1997, 57):

> Most of the struggle against the structure and effects of globalisation necessarily occurs on a national plane. That is, after all, where workers live, work, and fight. That is also the lesson of the first round of mass strikes [in the 1990s] and even more the localised struggles against the global régime of capital. The most basic feature of an effective internationalisation of capital of this period is the ability of the working class to mount opposition to the entire agenda of transnational capital and its politicians in their own "back yard." For this agenda too is ultimately carried out at the national level.

Third, there are those who see scope for trade unions to take on a broader role than simply employment issues and plant and industrial politics. This can also be seen as recognition of the point that workers as class individuals or collectivities in capitalism are also always individuals or groups with other nonclass attributes and identities. Social movement unionism envisages a labor movement with constituencies spreading far beyond the workplace and with demands that include broad social and economic change. Trade unions are no longer seen as "an aristocracy of labour, but as a social movement fighting to preserve communities" (Moody, 1997, 60; cf. Beynon, 1985). Social movement unionism implies (Moody, 1997, 58–59)

> an active strategic orientation that uses the strongest of society's oppressed and exploited, generally organised workers to mobilise those who are less able to sustain self-mobilisation: the poor, the unemployed, the casualised workers, the neighbourhood organisations. Social movement unionism means transforming the union into a vehicle

> through which its members can not only address their bargaining demands but actively lead the fight for everything that affects working people in their communities and in the country.

Social movement unionism of this type thus presumes the acceptance of commonality-in-difference rather than a subordination of differences to one privileged domain of commonality—wage labor. Such unionism would have its own distinctive geographies that sought progressively to relate struggles at the national and community levels (though it is less clear what this might mean internationally). Trade unions can in any case provide wider range of services to members, and many are already doing so. They can seek to combat falling membership by greater community involvement in issues such as training and employment provision (as for example the Iron and Steel Trades Confederation sought to do in the United Kingdom from 1997 on). In some places trade unions have long had such an embedded role in the local society and community—in Emilia Romagna or Piemonte, Italy (Locke, 1990), for example, where this involvement has been seen as a crucial condition of regional economic success.[12]

4.3. Competition in the Labor Market: Recruitment, Retention, and Resistance

The Price of Labor-Power and Methods of Wage Determination

Given that labor markets have come into existence, competition between capital and labor is essentially a struggle over the terms and conditions on which labor-power is bought and sold. There is an ongoing struggle over the price of labor-power and the terms and conditions of wage determination and work. There is a broad distinction between work organized on a piecework basis, on a measured-time basis, usually by the hour or day, and on the basis of remuneration involving some combination of measured time and productivity. There are broad variations among industries and places in the balance of these approaches to wage determination. In countries on the periphery of global capitalism and in urban areas within more central parts of the capitalist world, homeworking is typically associated with piecework in a range of consumer goods industries (Leontidou, 1993; Portes et al., 1988). Furthermore, within industries such as clothing in which production occurs within factories, piecework remains a common method of wage determination in the core areas as well as in the peripheries of the capitalist economy (Greco, 2000). In contrast, work in other industries in specifically designated workplaces such as factories and offices is typically remunerated on a measured-time basis, albeit often

with a productivity element of wage determination. The forms of such productivity payments can vary, however. For example, in the nineteenth century in northeast England and similar regions, labor relations in industries such as chemicals, coal, and steel were constructed around paternalist principles, and wage determination was based on a system of sliding scales. As such, wages varied with the strength of demand for companies' products (Hudson, 1989a).

Moreover, within a given sector a range of methods of wage determination can coexist at a particular point in time. For example, while most auto producers in the United States paid by the piece in the early twentieth century, Ford from the outset introduced measured-day work at its Highland Park factory with the $5 day. Ford set out its opposition to piecework as follows (cited in Beynon, 1984, 26):

> We do not have piece work. Some of the men are paid by the day and some are paid by the hour, but in practically every case there is a required standard output below which a man is not expected to fall. Were it otherwise, neither the workman nor ourselves would know whether or not wages were being earned. There must be a fixed day's work before a real wage can be paid. Watchmen are paid for presence. Workmen are paid for work.

Some fifty years later in the U.K. auto industry there was an equally complicated mixture of methods of wage determination, a complex variety of piecework, hourly, and daily wage rates that varied both by plant and company (Beynon, 1984, 46–47). More recently there has been a tendency to introduce a greater element of performance-related pay alongside basic hourly or daily rates in a wide range of industries in both manufacturing and services in the advanced capitalist world, linked to new and more individualized ways of organizing work and assessing performance. Increasingly, wage levels have become linked to either collective (via team working) or individual worker's productivity. Thus, the determination of the wage entails a basic element related to time and a productivity-based element related to output, performance, and/or corporate profitability, defined at the individual, workplace, or company level. Thus, while the long-term historical trend has perhaps been for measured-time work to become more prevalent, piecework and its legacies have by no means disappeared.

There are enormous differences in the price at which labor is available in spatially distinct labor markets. In clothing and textiles, for example, wage costs vary from around 50 cents (U.S.) per hour in China to $25 (U.S.) in Germany (Townsend, 1997, 48). While capital may seek the sort of labor-power that it wants at the lowest possible price, this does

not necessarily mean the cheapest labor in terms of absolute levels of wages. Not all companies want only—or indeed any—of the absolutely cheapest labor; not least, it will usually be the least skilled and of no use for many sorts of work. Wage cost differentials are chiefly of significance insofar as companies are pursuing strategies of weak competition based around minimization of wage costs. Strong competitive strategies of necessity are based upon upgrading product quality and the sophistication of production technologies, and so they require different types of labor, more skilled and nominally more expensive to hire, often found within labor markets structured and regulated in particular ways. In circumstances in which wages are removed from competition, unions are strong, centralized bargaining systems ensure a high prevailing wage rate, and layoffs are discouraged by labor market institutions, "firms naturally turn to others means of competition—especially the technological capabilities or qualitative aspects of their products" (Gertler, 1997, 54). Even so, such companies are not insensitive to labor costs. In the final analysis, however, companies are concerned about unit production costs, not nominal wages per se, and in maximizing labor productivity in relation to wages—though labor productivity is only one measure of efficiency in production.[13]

Ensuring the Recruitment of Workers with the Desired and Required Characteristics

Whatever their competitive strategy[14] companies never want just one type of labor; production is too complex a process, even in the smallest firm, to make this a feasible strategy. Rather, they want various types of workers and so seek to recruit a workforce with a mix of skills and qualification levels, performance qualities and capacities. The precise mix that companies seek varies with production processes, and so they typically develop specific recruitment strategies for different segments of the labor market.

Activities requiring highly skilled labor typically exhibit little spatial mobility, tied to labor markets that can reproduce the skilled labor (whether managerial or technical) that they need. Indeed, if there are labor shortages, these are addressed via migration and the mobility of appropriately qualified labor in spatially extensive labor markets. Often companies have considerable "sunk costs" as a consequence of developing labor markets in particular ways and embedding themselves in them. This acts as a strong deterrent to relocation. For example, Dicken and colleagues (1994, 40) emphasize that high-level functions (headquarters offices, R&D) of transnational corporations "remain strongly concentrated geographically, primarily in the firm's home country or region, precisely because they are so deeply embedded locally." The availability of

particular types of skilled labor-power, typically in complex metropolitan labor markets within these countries and regions, is a critical element in this deep local embedding.

In contrast, other activities, in which labor costs form a large share of total production costs, are much less tied to particular labor markets. Wages account on average for some 25% of production costs in clothing and textiles, for example, so that the location of production is sensitive to variations in the availability of cheap labor (Burt, 1995). Activities and functions simply requiring large masses of labor that is (socially defined) as unskilled and therefore cheap may be able to switch locations in search of it with little penalty. Geographies of production thus become spatially recast at varying scales (intraurban, intranational, international) as companies seek out locations in which such labor can be found in abundance. However, while some activities that are very sensitive to labor costs can be readily relocated to facilitate the recruitment of cheap labor, others cannot, and the extent to which they can vary location in response to labor cost variations is circumscribed. In these instances companies must find other ways of cutting labor costs. For example, despite high levels of capital investment, labor costs remain very significant in retailing in the advanced capitalist world, but the extent to which companies can relocate in search of cheaper labor is severely circumscribed because they need to be near to customers. In these circumstances, they seek other routes to cut labor costs, although the range of options open to them depends upon labor market conditions and regulatory régimes.

Second, therefore, companies may seek to substitute part-time for full-time workers. For example, following labor market deregulation in the 1980s, multiple retailing chains in the United Kingdom increasingly employed part-time workers as companies sought to match employee levels over the day and week to fluctuations in consumer demand and thereby to control labor costs. This was a response to intensive competition and pressure on margins, particularly in food stores that were part of national or international chains. This has also been associated with changes in the character of work. The expansion of part-time work "is closely associated with the charge of de-skilling; self-service retailing has reduced the specialisation required previously in a shop assistant's job and has reduced the bulk of tasks within larger stores to shelf-filling or till operation" (Townsend, 1997, 165). The growth of part-time work is not simply or solely a tactic to control labor costs in de-skilled and low-wage service sector activities, however. There is, for example, evidence from North America and the United Kingdom of major corporations agreeing to senior management staff and highly skilled workers, predominantly married women with children aged under ten years, shifting to part-time contracts and working from home. This is seen as a way of retaining key

staff, in whom companies have made considerable investments in training and who have company-specific competencies and knowledge in occupations such as software development, human resources management, and finance, in which such qualified labor is scarce (Cane, 1999).

Third, companies can vary the proportion of permanent, temporary, and casual workers. Subject to regulatory limitations, they may replace permanent with temporary or casual workers as a further tactic to control or cut labor costs. This has occurred in a variety of service sector activities in which the level of labor demand fluctuates markedly over time and in which there is considerable demand for large amounts of unskilled labor (such as contract cleaning or simple office work, as well as retailing). Halford and Savage (1997, 112) point to the increased use of casual and part-time female clerical staff in the banking sector in the United Kingdom, both in regional service centers and in High Street branches. In these circumstances, employers seek to cut labor costs via new forms of functional and numerical flexibility to match labor supply more closely to demand. Moreover, they may not simply exploit the existent marginalized workers, but in some cases, as with temporary recruitment agencies, they actively and deliberately help to create labor market conditions that make such recruitment strategies possible (Peck and Theodore, 1997). In similar fashion, companies may use homeworking to restructure local labor markets and open up a new source of labor supply in relatively underutilized market segments, typically involving female labor, as well as homeworking constituting a strategy for enhanced labor control (Peck, 1989).

Moreover, employers are often concerned with more than simply technical skills. Across a whole range of activities companies are increasingly interested in the personal appearance, attitudes, and social attributes and skills, such as flexibility and malleability, of workers, in their commitment to the company and (non)involvement in trade union activities. The extent to which, and ways in which, this is significant again vary with the choice of the production model, both in manufacturing and services. In many financial and technical service sector occupations know-how and "knowing how to go on" are critical. The key to success is combining "soft skills" with "hard technologies" to deliver a particular service. As such, the location of employees with the requisite technical and social skills and personal attributes can be an important determinant of the location of such activities. Much of the recent emphasis upon personal attributes and characteristics of employees has been in relation to work in other parts of the service sector and in occupations in which there is also a strong emphasis on "knowing how to go on," appearance, and performance. For example, they are of increasing significance in personal service industries and in a variety of "front desk" operations. A concern with personal attributes is now far more general, however, as

dealing face-to-face with people becomes a part of a greater range of jobs Allen and colleagues (1998, 103–104) report the views of a male personnel director recruiting security guards in the City of London: "We recruit specifically for whatever assignment it is, and the calibre of the person has to reflect that, so they sometimes have to be personable and able to reflect that, and stand at reception and be well dressed, well presented."

More generally within the service sector, McDowell (1997, 121, emphasis added) argues that in many occupations in service-based economies, from fast food to fast money:

> the service or product has become inseparable from the process of providing it. *Workers with specific social attributes, from class and gender to weight and demeanour, are disciplined to produce an embodied performance that conforms to idealised notions of the appropriate service.* In this normalisation, the culture of organisations, in the sense of the explicit and implicit rules of conduct, has become increasingly important in inculcating the desirable embodied attributes of workers as well as establishing the values and norms of organisational practices.

Thus, in the service sector, the product—that is, the service that depends upon the copresence of its producer and consumer since it is simultaneously consumed and produced (Walker, 1985)—is often intimately connected to the identity and performance of the person providing the service. Although this has recently been emphasized in relation to some services, it has long been the case in relation to others. For example, in the United Kingdom, the organization and practice of banking have "always been tied into the embodied characteristics of gender, class, age and race, and to the notions of appropriate behaviour and style" (Halford and Savage, 1997, 116). As the nature of the product and service have changed, however, so too have the required and desired embodied characteristics. Thus, redefinition of products or product innovation unavoidably implies redefinition of the workforce, with consequent changes to workers' identities. Referring to the U.K. banking sector in the 1980s and 1990s, Halford and Savage (1997, 114) discuss the strategies of "Sellbank" and suggest that one of the goals of restructuring was to make bank branches less intimidating places. Furthermore:

> This cultural shift has clearly gendered concomitants, highlighting the "feminine" qualities of accessibility in place of the distant authoritarian image associated with the male bank manager. Sellbank has tried to put women in the bank in order to encourage people into the banking hall and increased sales of new services.

In fact, this recomposition of the workforce is not only strongly and selectively gendered but has strong ageist and ethnic dimensions. It is predom-

inantly physically attractive young white women that Sellbank (a pseudonym for a major High Street bank in the United Kingdom) seeks to employ in its banking halls.[15]

Gender also features prominently among the desired criteria of employees in the "new" City of London, although the gendering of work is here very different to that in the front offices of High Street banks. The sorts of employees who are recruited by merchant banks (McDowell, 1997, 127, emphasis added)

> are distinguished *not only by the combination of class and gender characteristics but also by a further set of attributes that partly shape and partly are shaped by everyday performance in the workplace.* . . . Physical appearance, weight and bodily hygiene, dress and style [are all seen as] a crucial part of an acceptable workplace persona.

The perception of desired gender characteristics was altered in the 1990s, however, at least in part in response to changing market conditions. As the "carnival atmosphere" of the 1980s gave way to a new austerity in the 1990s (McDowell, 1997, 127, emphasis added),

> women began to report what might be termed a more feminised way of interacting, and certainly a style that women found more congenial, became more highly valued. Careful attention to the needs of the individual client accounts and careful monitoring of them *brought women growing recognition and financial rewards.*

Workers must also increasingly conform to the highly prescribed, almost theatrical, requirements of working in other service sector activities such as fast food outlets, restaurants, or tourist and entertainment facilities. This powerfully shapes recruitment and retention criteria and practices (Crang, 1994; Marshall and Wood, 1995, 168; Urry, 1990). Typically workers in such activities are chosen on the basis of their possessing appropriate sorts of cultural capital in terms of age, gender, bodily appearance, and interpersonal skills in interacting with customers. To a considerable extent, workers performatively interacting with customers *become* the product. Examples such as these demonstrate clear relationships between changes in labor markets, recruitment criteria, and changes in product markets for services.

Manufacturing companies can be equally selective about the characteristics of workers that they wish to employ, though often emphasizing rather different personal attributes to those prioritized by service sector companies in their recruitment criteria. Such selectivity of recruitment is well established. The employment manager of the Ford Motor Company in Detroit remarked in 1929 that "men of between thirty and fifty years

of age are best for automobile work. . . . After fifty most of them can't stand the pace" (Beynon, 1984, 28). Moreover, Ford wanted to recruit responsible married men with families, on the grounds that they would be less willing to risk loss of wages through strikes and other forms of industrial action. Beynon goes on (1984, 65) to describe the way in which Ford set about recruiting labor for its new car assembly plant at Halewood on Merseyside some thirty years later. Many managers and supervisors at Halewood had previously worked at Dagenham, a plant with a history of labor relations problems. Managers wanted "a good plant; one with good industrial relations" and so sought to avoid recruiting workers with experience in car production: "most of the labour was 'green' and recruited locally." As it turned out, managers failed to achieve their objectives: "We wanted to get a trouble-free plant, to get away from Dagenham and Dagenham ways. It didn't turn out like that though." While it may "not have turned out like that," the point to emphasize here is that managers had a deliberate recruitment strategy that was intended to produce the managerially desired results. In a way that revealed striking parallels with its recruitment strategies in Detroit three decades earlier, Ford sought to avoid union activists and to recruit young married men with mortgages and families.

With the introduction of variants of high-volume "lean" production, incorporating notions of "just-in-time," the imperatives for careful selection of workforces in the car plants of the 1980s and 1990s became even more powerful. While the criteria remained much the same, the selection procedures and screening processes became both more intense and more sophisticated. Manufacturing companies employ such procedures in selecting shop-floor production workers to try to ensure recruiting employees with the desired commitment to the company. As well as manual and dexterity tests, they have increasingly deployed a range of psychological and psychometric techniques and interviews involving existing workers and on occasion trade union officials to seek to identify potentially good "team workers" committed to the company, in recruiting production line workers. And, like Ford half a century earlier in Detroit, they often seek married men with young children and financial commitments, reasoning similarly to Ford that they would be less likely to chance losing wages through strikes and industrial action. For instance, at its automobile plant at Washington in northeast England Nissan has been extremely careful in selecting its workforce. It has predominantly recruited physically fit young married men, many already working for other companies, with no history of trade union activism and shown to have appropriate attitudes and commitment to the company through a series of in-depth psychological screening processes and tests (Hudson, 1995a). Others are equally selective about the type of women employees they seek to recruit. For ex-

ample, clothing companies in northeast England prefer to recruit older married women with children and mortgages and no history of trade union activism (Greco, 2000). Companies thus often go to great lengths to ensure that "troublesome" trade union activists are kept from their workforces, especially in the wake of industrial disputes.

Such processes of "cleansing" workforces of active trade unionists are common in many parts of the world. Vanderbush (1997, 72, emphasis added) describes the outcome of a protracted dispute in Mexico between Volkswagen, aided and abetted by the Mexican state, and employees at its Pueblo factory. Following the labor board's finding that the strike was illegal and the union therefore nonexistent, VW fired all 1,420 of its workforce. "In the next couple of weeks, it rehired approximately 905 of the old workforce, *minus any known troublemakers.*" More generally, companies may use redundancies as a way of selectively recomposing their workforces, getting rid not only of trade union activists but also of other workers who in various ways are classified as undesirable. For example, redundancies may be used to shed workers whose performance and productivity levels fall below the average for a workplace, company, or industry. Such approaches can, however, often cause difficulties and be contested by workers precisely because they are selective and discriminatory, but whether they do so depends in part on local labor market conditions. On the other hand, the deployment of "last-in, first-out" approaches to retention, while administratively easier to operate since the criteria are publicly known, may lead to companies jettisoning more productive workers while retaining less productive ones (Greco, 2000).

Recruitment Mechanisms

Clearly, companies seek to recruit labor in different ways, varying recruitment strategies in the light of labor market conditions and their choice of "production model." In broad terms we can distinguish between two types of recruitment strategies. First, there is recruitment via personal ties and family-and-friends networks: essentially on the basis of "who you know" as well as "what you know" or what you can do. These informal interpersonal networks operate in a wide range of circumstances. Granovetter (1974) demonstrates the importance of the "weak ties" of personal contact networks to blue-collar manual workers in finding out about jobs in the United States; this was the most effective source of information for them. Hanson and Pratt (1992, 163–173) show how word-of-mouth communication was central to the labor recruitment practices of a range of companies in Worcester, Massachusetts, with almost 95% of companies using it. Leontidou (1993, 63) shows how extended families

create intricate self-help networks that enable people to find employment in Greece, and similar networks are common over much of Mediterranean Europe, in places with a strong culture of clientilism. Companies such as Imperial Chemicals Industries on Teesside developed strategies based upon the recruitment of successive generations from the same families (Beynon et al., 1994). Similar approaches were developed by other companies in varied industries, especially where they dominated a particular spatially demarcated labor market. In coal mining villages and textile and steel towns, children often followed their parents into the same workplace. Recruitment via family networks can be a very effective means for employers to link external and internal labor markets in a way that ensures a relatively compliant workforce. In such cases, employment of additional family members depends upon *all* of them behaving appropriately.

Consequently, "know who" has often been—and currently remains—of critical importance in spatially isolated labor markets dominated by a single employer. Equally, it can be critical in complex urban labor markets in industries in which the "normal" form of employment is a sequence of contracts for different employers, for skilled and unskilled workers alike. In northeast England, craft workers in industries such as engineering and shipbuilding moved routinely between jobs and firms on a more or less uninterrupted series of contracts, with jobs allocated via informal contact networks based in working men's clubs, pubs, and trade union offices (Hudson, 1989b). More recently such practices have become transposed into newer industries such as offshore construction (Cumbers, 1991). In these cases being seen as a "good" worker is a critical precondition for recruitment.

Such recruitment criteria and practices are also decisive in very different segments of the labor market, such as banking. In the "old" ascriptive culture of banking "organisational positions were based on explicitly classed and gendered criteria [and] succession within the banking hierarchy was heavily managed by senior management. *Jobs were not advertised and promotions were not applied for*" (Halford and Savage, 1997, 112, emphasis added). Similarly, in high-level financial services in the "elitist and masculinist" environment of the "old" City of London, professionals were recruited "through personal networks, school and family ties, and an extreme gendered division of labor separated women from men." In the "new City" of the 1990s, there is less reliance upon the "traditional" recruitment criteria, but recruitment processes remain highly selective and dependent upon particular network relations (for example, recruiting from a small number of universities). As a result, there has been little evidence of significant eth-

ic or gender change, while "class composition remains solidly bourgeois" (McDowell, 1997, 123–128).

Despite the increasing availability of information through a variety of media, information derived from personal contact therefore remains of considerable significance in many contrasting segments of labor markets. In cultural industries recruitment is often through highly personalized contact networks. In the film industry, for example, information and personal contacts "are at a premium." Recruitment relations "are almost quasi-subcontracting relations in the labor market, as an art director will have one or two assistant art directors and production designers whom he/she likes to work with. Those in turn will have their networks of wardrobe and costume designers" (Lash and Urry, 1994, 115). Thus "know who" and the resultant interpersonal network relationships are critical to the way in which project teams are recruited and assembled. This is both a transaction-rich network of firms (Storper and Christopherson, 1987) and a transaction-rich network of individuals since many firms are self-employed people. In emergent "high-tech" sectors, characterized by burgeoning labor demand and considerable interfirm contacts because of networked production strategies, "know who" can also be critical in recruitment. In the 1980s in Silicon Valley, for example, almost 80% of engineers leaving companies there took their new job with another Silicon Valley company (Angel, 1989). While this had certain advantages for companies in diffusing knowledge and skills, it also posed problems of retaining key employees and safeguarding repositories of sensitive embodied knowledge. Such contact networks are, however, both inclusive and exclusive and as such can be advantageous to some workers but disadvantageous to others. For example, in Germany, German youths were able to utilize information and contact networks to secure access to apprenticeships and training places whereas Turkish youths, excluded from these networks, were consequently denied similar access (Lash and Urry, 1994, 189).

The second main recruitment strategy is via "impersonal" market mechanisms and public and private sector institutions. These can take many forms. At one extreme there were (and in some places still are) the casual recruitment practices of industries such as dock work, with men turning up at the gates to see if they could be taken on for the day. These are forms of recruitment strategies being reinvented in parts of the unskilled and de-skilled service sector of contemporary capitalism, often mediated by private sector employment and recruitment agencies. For example, recruitment practices have changed in the U.K. banking sector as work has been reorganized, internal labor markets have become more deeply segmented, and the composition and demand for labor has under-

gone alteration. Thus, "workforces have been segmented, especially by using tiered recruitment to allow specialisation of services and products, and there has been an increased use of casual and part-time female clerical staff" (Halford and Savage, 1997, 112).

The state has often become involved in facilitating recruitment via a range of organizations—featuring, for example, in the United Kingdom various parts of the Department of Employment and associated agencies such as the Training and Enterprise Councils. However, it is estimated that only around one third of all vacancies in the United Kingdom are registered with such state agencies. In the United States almost 45% of employers in Worcester, Massachusetts, reportedly used state employment agencies as a means of recruiting employees (Hanson and Pratt, 1992, 168). Employers also use a variety of other media (such as newspapers, television, specialist trade journals, or the Internet) to advertise jobs and recruit workers, putting potential workers in touch with potential employers. In Worcester, for example, over 90% of employers used newspaper advertisements, and almost 45% used private sector employment agencies as methods of recruitment. For many companies, however, such practices may be inappropriate or may simply constitute the first stage in the recruitment process, as they require more skilled workers and/or workers with particular personal and social characteristics, as well as technical skills. Recruiting these workers requires more targeted, selective, and company-specific approaches that in turn may depend upon particular and spatially specific labor market conditions (as discussed above).

Spatial Variations in Labor Market Conditions and Recruitment and Retention Strategies

Companies often adjust existing recruitment practices, working practices, and shift systems to reflect local labor market conditions, both favorable and unfavorable in terms of their concerns. They may alter working patterns to facilitate recruitment in tight labor markets and to ensure continuing production; conversely, in labor markets characterized by supply exceeding demand they may take the opportunity to restructure, shed labor, and alter working patterns to increase productivity and profitability. For example, companies may alter shift systems, introducing "twilight shifts" or shift systems synchronized with school hours to enable women with child-care responsibilities to work part-time in "tight" labor market conditions (Hudson, 1980). During the 1990s banks in the United Kingdom began to adjust their recruitment and retention strategies in the face of growing skill shortages in key "high-tech" areas, introducing new systems of homeworking to allow women with children to combine child care with paid work (Summers, 1998). There is also evidence of extensive

homeworking in more mature, low-technology, and labor-intensive industries such as clothing, as companies respond to tight labor market conditions and/or exploit the existence of reserves of female labor available for work in but not outside the home residence (Hadjimichalis and Vaiou, 1990a, 1990b; Peck, 1996). As well as easing recruitment problems and lowering fixed capital investment costs, homeworking can increase capital's control over the labor process, but it can also exacerbate problems of control precisely because of the spatial separation of workers and managers.

Another response to difficulties of recruitment is to shift to more mechanized or automated production methods. During the 1980s, automobile and integrated circuit producers in Japan experimented with heavily automated methods of production in response to labor shortages in "full employment" labor markets (Hudson, 1994a; de Lamarlière, 1991). Fiat followed a similar strategy in the Mezzogiorno, not so much because of absolute labor shortages but rather because of the problems of recruiting workers who could be socialized into the disciplines of high-volume automobile production. It subsequently reverted to less automated strategies as labor market conditions became more favorable, problems of recruitment eased, and levels of demand for automobiles declined (Conti and Enrietti, 1995). A further option for employers is to alter recruitment practices so as to substitute part-time for full-time jobs, or temporary for permanent contracts in labor markets characterized by high unemployment, or alternatively increasingly casualize work and "Taylorize" contracts. In labor markets characterized by high unemployment companies may use initial temporary employment to "screen" workers prior to offering more permanent contracts (Beynon et al., 1994, 146–148).

Recruitment and (non)retention strategies may also to a degree be linked to firm size as well as local labor market conditions. Many small firms, especially those employing skilled artisanal workers and/or in which the owner actively works in the company, often pursue spatially specific and linked recruitment, retention, and labor control strategies. These form one element in their "traditional," or (neo)paternalistic, welfare approaches to labor that seek to connect workplace regulation with life outside the workplace. Recruitment and hiring practices of companies engendered a close network of ties between workplaces and residential areas within Worcester, Massachusetts, especially for routine production workers and for women. Intergenerational recruitment practices remained common even until the late 1980s, with companies often focusing their campaigns on specific neighborhoods within the metropolitan area. These practices have both shaped patterns of strong gender and occupational segregation within the workforce and have enhanced the depend-

ence of local companies on the local labor market so that they are unwilling to relocate from it. This in turn reproduces the significance of "traditional" recruitment practices, which in turn were integral to reproduction of welfarist labor control strategies (Hanson and Pratt, 1992, 163–173). Such forms of paternalism are by no means confined to "traditional" industries or small firms. When Henry Ford established his revolutionary "Five Dollar Day" at his Highland Park factory in Detroit, greatly increasing wage rates for automobile production workers, the Ford Motor Company not only introduced stringent recruitment criteria but also an intrusive paternalism that reached far beyond the factory. The company[16] disapproved of the lifestyle of most of the immigrant families that settled in Detroit in search of work at Highland Park. A prerequisite for their becoming Ford workers was that they recognize "the folly of their ways." Some of the company's efforts to bring about this change of perspective were valuable (for example, in helping immigrants to learn English and become aware of the dangers of life in Detroit). However, "the paternalism which the whole programme expressed often degenerated into petty and heavy-handed interference into the private lives of vulnerable people" (Beynon, 1984, 22).

The recruitment practices of paternalism have become rather more subtle and sophisticated in the years since Ford was active in this way in Detroit. Firms in new high-tech sectors characterized by labor shortages may practice neopaternalist recruitment and retention strategies as a way of securing the labor-power they need in tight labor market conditions (Angel, 1994; Saxenian, 1984). In order to help secure the reproduction of conditions conducive to innovative production in labor markets with low unemployment rates and labor shortages in key occupations and skills, companies seek to minimize competition for such labor. As a corollary, they seek to retain key core employees, in part by emphasizing corporate commitment to place, with Silicon Valley as the command-and-control, research-and-development (R&D), and prototype production center within corporate global geographies of production. Companies have adopted neopaternalist labor practices, which encompass attempts to rebuild a sense of community and belonging among employees, despite evident and growing social polarization, not least because of the presence of substantial immigrant communities. Thus reconstituting a "sense of place" both at the level of companies and individual employees has become central to strategies for labor recruitment and retention, again emphasizing the importance of links beyond the immediate workplace.

Other companies basing their production strategies on unskilled or semiskilled labor can have different recruitment and retention policies since such workers require little training. Even so, there is no simple link between recruitment, retention, and production strategy. Ford used the

ircumstance of large numbers of people seeking employment as the basis or a selective and paternalist recruitment strategy. Other companies responded very differently. Ford's policies stood in stark contrast to those of ther automobile producers in Detroit (and beyond) that were recruiting irge number of laborers for routine Taylorist mass production. Detroit in he early years of the twentieth century had a reputation as a city of abundant and docile labor, a characteristic closely related to the concerted ntiunion open shop policy of the Employers' Association of Detroit. Companies pursued aggressive "hire-and-fire" policies, often with rapid abor turnover, and paid low wages, confident in the knowledge that here was an abundance of laborers in search of work. Such policies in nany ways came to be seen as generally representative of mass production industries in labor markets characterized by high unemployment.

The ability of employers to pursue such hire-and-fire policies, or alernatively to be very selective about whom to employ, was predicated ipon high unemployment. In tighter labor markets, recruitment strategies ind criteria were of necessity relaxed or else production was relocated to nore favorable labor markets—as was increasingly the case from the 1960s onward. Having sought to continue pursuing rigorously selective recruitment policies even some fifty years after their origination, within a few years after the opening of its new Halewood factory on Merseyside in 1958, Ford was forced to relax substantially its stance on recruitment as the only way of securing labor. Some twenty years later still, electronics companies in the United States switched routine production to locations in southeast Asia such as the Export Processing Zones of Malaysia in search of largely female workers from rural areas to undertake Taylorized production tasks (Ong, 1987). Companies were able to ensure a rapid turnover of workforces composed of inexperienced workers because of the interplay of state regulation, local culture, and large reserves of female labor. Consequently, they were able to minimize (though not wholly eliminate) opposition and resistance to intensifying work practices that often led to deterioration in women's eyesight—in turn creating pressures to increase labor turnover.

Companies—both small firms deploying "flexible specialization" approaches and large ones using high-volume flexible production strategies—necessarily pursue selective recruitment and retention policies. Because forms of "lean" high-volume production typically incorporate principles of "just-in-time" production, predicated on minimal inventory levels, companies must carefully select workers to ensure smooth, trouble-free, and error-free production. Companies using competitive strategies based upon flexibility of production or quality of product seek to recruit workers on a longer-term basis, since the practical knowledge and skills that they acquire in the process of work become a key competitive

asset to the company. Such strategies rely more heavily upon skilled labor, flatter and less hierarchical management structures, and relations of trust between managers and workers that are not easily or quickly produced. Consequently, in such cases there is more care in selection and more concern with retention of workers. Also, in such cases, companies cannot buy the company-specific skills they often want in the labor market but rather they must recruit workers who then must learn these skills and be socialized into the company's practices (Penrose, 1959). Equally important, companies ideally seek workers that are sufficiently committed to them that they are not prepared to engage in industrial action or disrupt production. In the "full employment" labor markets of postwar Japan, this degree of certainty was achieved via policies of "jobs for life" for core workers in the major companies. In return for their loyalty, workers were guaranteed security of employment—at worst, redeployment within the firm or the wider keiretsu of which it was a part if for some reason their jobs were made obsolescent. As competitive pressures have intensified, such a strategy has become increasingly difficult to pursue.[17]

In other labor markets, characterized by high levels of unemployment, companies (often the same companies) have been able to be much more selective in their recruitment policies. For example, in the 1980s PMA (which stands for positive mental attitude) established a carpet weaving factory at Hartlepool, a town in northeast England devastated by successive rounds of industrial closures in the engineering, shipbuilding, and steel industries (Beynon et al., 1994; Hudson, 1989a). It received 2,500 applications for just 24 advertised jobs (Boulding, 1988). A few miles further north, Nissan received over 10,000 applications in the mid-1980s when it advertised for an initial 240 production workers for its new factory on the fringes of Sunderland and Washington New Town. A few years later it advertised for a further 600 workers there and within six weeks had 33,000 applications in hand (Hudson, 1995c). Mazda had over 96,000 applications for 3,500 jobs when it opened its first plant in the United States (Fucini and Fucini, 1990). Under such labor market conditions, companies can indeed be very selective in their recruitment criteria and strategies.

Three further points need to be made about relationships between spatial variations in labor market conditions, strategies for recruitment and retention, and managerial control of the labor process and workers' resistance to this. The first is that capital is generally more mobile than labor. Because of the social nature of its production and reproduction, labor is the most "place-bound" of the factors of production (Beynon and Hudson, 1993). This is all the more true for women and others with family commitments that confine them to the home as the location of waged as well as unwaged domestic work (Peck, 1996). The production and re-

production of labor-power is dependent upon the supportive effects of social institutions (family structures, schools, recreational organizations, and the like) and, as a consequence, requires a substantial degree of stability. This results in a "fabric of 'communities' and 'cultures' woven into the landscape of labour" (Storper and Walker, 1983, 7).[18] People thus become committed to places. In contrast, if a company finds that labor market conditions in a particular location become disadvantageous and recruitment and retention problematic, it has the option of relocation to secure more favorable conditions (assuming for the moment that "other things are equal" so that, for instance, the existence of various sorts of "sunk costs" do not rule out this option). Conversely, it may in some circumstances be possible to re-create favorable recruitment conditions in situ via population immigration, or temporary labor migration (as, for example in Detroit during the early years of the twentieth century, the Federal Republic of Germany during the 1960s, and California during the 1980s and 1990s; King, 1993, 1995). A variant on this theme is "body shopping," the recruitment of specialized employees from other places on terms and conditions advantageous to the recruiting company. For example, information technology companies in the United States recruited Indian consultants to work in the United States at Indian wage rates plus a subsistence allowance (Mitter and Rowbotham, 1995).

The second point is that capital has come to exploit spatially differentiated labor markets in another sense, as labor market conditions may influence corporate choices as to the location of production. The growing size of corporations[19] has enabled companies to split up production processes, both functionally and spatially, while technological changes have allowed certain sorts of jobs to be de-skilled. As a result, companies can locate particular parts of the overall production process in locations that have "appropriate" labor market conditions, and in particular shift de-skilled work to areas characterized by large masses of people prepared to undertake such work, usually for lower wages. This is true of a wide range of activities, spanning the whole spectrum of manufacturing and services. This development is reflected in the extensive literature on spatial divisions of labor at various scales. Geographies of Taylorist mass production were thus recast over an increasingly extensive spatial reach, stretching the social relations of production over successively greater distances (Fröbel et al., 1980; Lipietz, 1987; Massey, 1995). Such spatial decentralization of production in search of appropriate labor market conditions can also be characteristic of newer high-volume production approaches (Hudson, 1994b; 1997) and form a central element of the "glocalisation" strategies of firms (van Tulder and Ruigrok, 1993, 24).

The third point that needs to be made, however, is that "things aren't always equal," and companies do encounter barriers to mobility because

of considerable sunk costs. Sunk costs refer to those costs of a firm that are irrevocably committed to a particular use and so are not recoverable in the case of exit (Mata, 1991, 52). They can be categorized in a variety of ways (Clark and Wrigley, 1995, 1997). As sunk costs increase, barriers to exit in the form of tangible and intangible sunk costs make exit unattractive and costly, even when profits fall and, possibly, losses accrue (Chesnais, 1993, 180). Such costs also may be a significant barrier to entry. Sunk costs often relate to the embeddedness of production in place-specific labor market conditions. In these places particular sorts of labor are routinely reproduced and made available for recruitment via a range of customs, habits, and institutions (both formal and informal). Educational and training provision is acutely tuned to the needs of particular types of production. Such cultural-institutional environments characterize many of the most successful regional economies of the past two decades (Storper, 1997).

4.4. Organizing Work and the Labor Process

Spatial variations in labor market conditions, regulatory régimes, and governance mechanisms, and in the extent to which firms, factories, and other workplaces are embedded in the social relations of particular places are crucial determinants of geographies of production. Not least, they have an important influence on how workers practice "the politics of production" and "politics in production." It clearly is not enough for capital simply to recruit workers and purchase labor-power. It then has to deploy it in production to produce surplus-value. The ways in which it seeks to do so depend upon both choice of production strategy and labor market conditions. It is pointless for a capitalist enterprise to produce, say, shoes unless it can produce them *profitably*. Producing profits requires that work be organized in ways that vary depending on the goods or services being produced and the choice of techniques for producing these commodities. The collective and social character of production necessitates bringing workers together in specific time-places in order that production can be carried out. Such "coupling constraints" (Hagerstrand, 1975) are reflected in commuting flows, the time-space distanciation of relations between home and workplace. While there is scope for flexibility in the working day (for example in terms of its length and hours of starting and finishing) and for outsourcing of work (although this requires coordination of work between different workplaces), managerial control of the labor process necessitates bringing workers together in the workplace. As Sayer and Walker (1992, 120) put it: "The basic organising principle of the workplace is containment within a limited area. . . .

The workplace is a system of labour control." Time discipline crucially depends upon the creation of distinctive spaces of surveillance and control, but these may well be contested by workers. As a result, running through the workplace is a "frontier of control" around which managers and workers negotiate and struggle, sometimes violently, sometimes more subtly, for control over the labor process and work. In seeking to understand how companies attempt to organize work in ways that suit their purposes, a useful distinction can be drawn between the ways in which management itself is organized and the ways in which relations between managers and workers shape the organization of work at the point of production.[20]

Structures of Managerial Organization within Companies

Managerial strategies depend in part upon firm size, workplace size, and form of ownership. In small, one workplace companies, the owner is typically the manager and involved in the day-to-day production activities. Consequently, (s)he typically lacks time to attend to strategic managerial tasks. Often relationships between the owner/manager and workers are structured around paternalistic principles. The situation in the large workplace and firm is very different, however. Here there is a necessary division of labor between managers and managerial structures of varying degrees of complexity, designed, among other things, to facilitate the tasks of those seeking to organize work at the direct point of production and in general to ensure the successful reproduction of the firm. As large companies became increasingly large—but especially with the emergence of the mass-production manufacturing company during the early years of the twentieth century—the need for new forms of managerial structure and mechanisms of management and control became a pressing issue.

This became apparent with the emergence of the American system of manufacture in the mid-nineteenth century. This system was based upon new ways of organizing work at the point of production, shifting control of the factory from the craftsman to the manager. This in turn required the creation of impersonal bureaucratic management control methods, encompassing new middle management tasks and managerial structures. With the emergence of industrial corporations in the United States by the first two decades of the twentieth century, the dominant managerial form became a single managerial hierarchy. Coordination by such a hierarchy replaced coordination by the market as the means of seeking to manage a geographically scattered and diverse range of business and production activities within a single corporation (Best, 1990, 35–46). These vertically integrated systems were, however, unwieldy. The paradigmatic response to this challenge of devising new and more effective managerial structures

was that of General Motors, under the influence of Alfred P. Sloan (Ghosal and Bartlett, 1997). This new multidivisional structure was based around two central guiding principles: first, decentralization within managerial structures to increase the number of employees who could exercise entrepreneurial judgment; second, new cost accounting systems to coordinate entrepreneurial initiatives and maintain overall corporate coherence. Best (1990, 67, emphasis added) summarizes the key features of this new managerial system:

> The system of financial control at GM [included] overhead and fixed costs in the calculation but *divisional managers were not held responsible for items they could not control.* At the same time, GM was a decentralised system in that responsibility and authority for operations were lodged with the divisional managers. *Thus the co-ordinated control of decentralised operations underlay an organisational form that could expand without loss of efficiency beyond anything imagined before. It also allowed for planned contraction in output.*

General Motors was transformed from near-bankruptcy in 1919 and within two years had developed enormously successful coordinated control of decentralized operations. This model was adopted in varying ways by other major multiproduct, multidivisional companies such as du Pont, International Business Machines (IBM), and Philips as they sought to discover a viable balance between centralization and decentralization of control, but the principles of vertical hierarchical management structures of control within the company remained dominant.

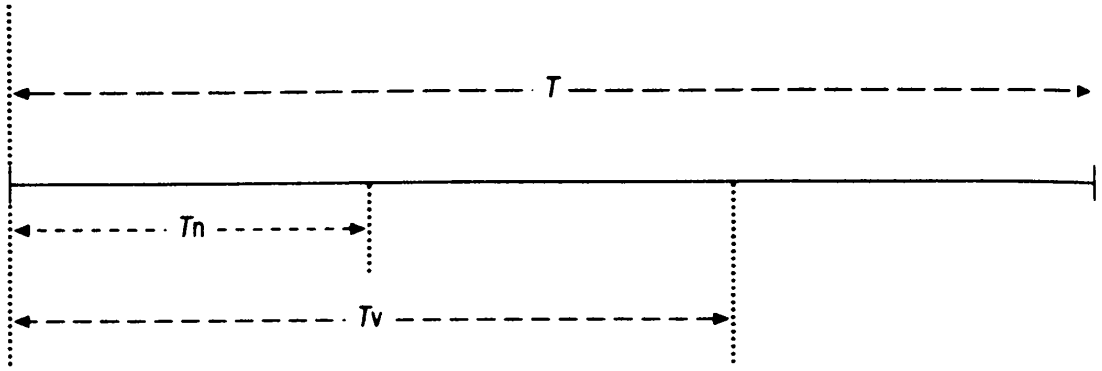
Faced with an increasingly uncertain economic environment from the early 1970s onward, companies began to seek new managerial structures better suited to the new environment. New production and communication technologies offered fresh possibilities for organizing production in ways that were more attuned to increasingly volatile market conditions and an enhanced emphasis upon product differentiation and market segmentation as competitive strategies.[21] The multidivisional model increasingly reached the limits of its capacity to deal with the complications and complexity of organizing production posed by technological progress and market instability. The "command and control" model that in one form or another had been dominant for most of the last century seemingly became obsolete, unable to respond rapidly enough to changes in market conditions (Pasternak and Viscio, 1998). More decentralized management structures appropriate to "flexible production" emerged to fill the resultant void. They emphasize that corporate success depends upon people, their collective and combined knowledge within a company, and the coherence with which different parts of the company are combined with-

looser, more decentralized, and fluid horizontal network structures of anagement. This in turn is creating demands for new managerial skills nd "fast subjects" (Thrift, 2000), a qualitatively different type of manger.

This alternative conception is particularly associated with the approach developed by Percy Barnevik at Asea Brown Boveri (ABB). Whereas Alfred Sloan at General Motors emphasized strategy, structure, nd systems, Barnevik emphasizes purpose, people, and processes. Dicken nd colleagues (1994, 30) identify the "newly emerging organisational orm" as "the complex global firm" that has as its "key diagnostic feaure" an integrated network configuration and capacity to develop flexible coordinating processes both inside and outside the firm. As of yet, uch models of corporate organization remain more an aspiration (for ome) than a reality. There is ongoing debate about the extent to which uch new managerial structures are being created and over the extent to vhich they are decentralized and radically different from those preceding hem. Nonetheless, the canonical ABB model has been modified in various ways by other companies, but with an emphasis on decentralization nd loose horizontal relationships rather than rigid vertically hierarchical ones within intracompany management structures. Ultimately, such "deep ntegration" models of corporate organization would involve completely cloned organizational structures in affiliated and subsidiary companies, with the entire functional range of corporate activities present in each company, subsidiary, and territory (United Nations, 1993).

Organizing and Controlling Work at the Point of Production

The ways in which owners and/or managers of capital may seek to organize work so as to ensure profitable production can initially be considered at quite a high level of abstraction in terms of labor time and value via the organization of the working day (see Figure 4.1). The focus here is upon the "classic" Marxian transformative labor process of capitalist manufacturing (Braverman, 1974), other forms of the labor process being considered briefly below. Assuming that the level of the wage is constant in real terms, *analytically* separate ways of increasing the rate of surplus-value within such a labor process can be identified (Aglietta, 1979, 49–52; Palloix, 1976, 49–51). These imply different forms of conflict and cooperation between capital and labor, or, less abstractly, workers and managers. They therefore also imply different choices for companies as to methods of production and organization of the labor process in different times and places. Whatever the choice, however, it has been argued that the extent to which the material nature of both instruments of labor and raw materials impose limits on transformative processes is not acknowl-



T = apparent duration of the working day

Tn = value of labor power

Tv = time in which new value is actually produced

Tv - Tn = time in which surplus value is actually produced

FIGURE 4.1. The organization of the working day.

edged sufficiently within accounts of the labor process (Benton, 1989, 71).

Increasing the rate of surplus-value creation requires increasing the difference between T_v (the time in which new value is produced) and T_n (the socially necessary time needed to reproduce labor). This can be achieved in one of three analytically distinct ways (Dunford, 1988, 20–22). The first involves increasing the production of absolute surplus-value, holding the value of labor-power, T_n, constant and increasing the length of the working day, T. This may be on a permanent and secular basis or on a temporary and cyclical basis—via overtime, for example. This is certainly an "old" strategy but one that remains commonplace in the contemporary world of capitalist production. Second, it may be achieved by increasing the production of absolute surplus-value through intensification of the labor process to reduce the time that the worker is "idle" and so increase the time in which new value is actually produced, T_v. The "porosity" of the production process arises for two reasons. On the one hand, it arises because of insufficient coordination and control of operations (for example, reflecting the time lost in setting up production runs or moving materials and parts around the factory). On the other hand, it arises because workers need periods of rest, as they cannot sustain the pace of work continuously. Seeking to reduce "porosity" involves a reorganization of methods of work to reduce "idle time" and/or intensified surveillance and supervision of existing working methods so that less time is spent "unproductively." For example, managers may change work or-

ganization to enable workers to operate a number of machines simultaneously. This clearly implies a greater degree of direct control over the work process by capital and its managers. At the start of the "industrial revolution" this was initially achieved by bringing workers together in factories, establishing a collective work rhythm. Later, with an increasing technical division of labor fragmenting work into specialized and predefined limited tasks, it was achieved by growing mechanization and then automation so that the pace of work became increasingly determined by machines *for* workers rather than *by* workers. More recently, there has been an emphasis on redesigning production processes so that workers become less "machine minders" and more "problem solvers," supervising a number of machines and ensuring that they function smoothly. This allows a discrete increase in labor productivity that is not necessarily or simply based on speeding up the pace of work or upon organizational innovation.

The third strategy involves increasing the production of relative surplus-value, that is, holding T_v constant while reducing T_n. The shift from strategies of absolute to relative surplus-value production has typically been a consequence of state regulation. In the United Kingdom, for example, during the nineteenth century factory hours legislation was crucial in preventing continuous extensions of the working day and in shifting the emphasis to the production of relative surplus-value. At a systemic level, and still assuming constant real wages, reducing the value of labor-power requires increases in labor productivity in the wage goods sector (Marx's Department 2 of production) or in those parts of Department 1 that produce the means of production for Department 2. While no new value is produced, rising labor productivity leads to increased output and reduces the unit value of wage goods. Consequently, the value of labor-power is reduced, and the rate of surplus-value creation is increased. For individual firms, increases in the rate of surplus-value creation may be achieved fortuitously via temporarily discovering new and cheaper sources of supply of goods and services. For individual firms, however, the most important systematic way of pursuing the goal of enhanced production of relative surplus-value is via the introduction of new methods of production and/or principles of work organization. This seeks to increase labor productivity and the value of output produced by a worker in a given period of time. This often involves restructuring the skill composition of the workforce, reducing both the average skill and wage levels. Increasing productivity in these ways is also central to the process of competition between companies.[22] This approach to the organization of the working day—and more generally of the labor process—is a general one. The three strategies are analytically distinct ones, and in practice companies will use more than one of them simultaneously, though in varying combi-

nations at different times and places. Attempts to introduce such changes and reorganize the labor process are not unproblematic, however; they are often contested by labor. In response, companies may search for a "spatial fix" via relocation to find more favorable labor market conditions for pursuing a particular approach to production.

There are also different "production models" between which companies can and must choose, although such choices are the outcome of complex and not always well-understood processes.[23] The choice of the production model has implications for the organization of work and control of the labor process, for the balance between competition and cooperation between employer and employee in the regulation of the labor process, and for the way in which the "frontier of control" is constructed and regulated. These implications are reflected in, but go beyond, the immediate issue of organizing the working day and social relations within the workplace, however. Leborgne and Lipietz (1991) identify neo-Taylorist, Californian, and Kalmarian (referring to work practices at Volvo's automobile plant at Kalmar, Sweden) forms of work organization and labor contracts in a way that points strongly to the territoriality of particular bargains between capital and labor. This resonates with concepts of "cultures of production" or "factory régimes" (Burawoy, 1979, 1985; Warde, 1989), as managers seek not only to organize work in workplaces but to construct relations between those *work*places and the surrounding work*places* (Peck, 1996) in varying ways in different time-places.

One such model of production is based around craftwork, typically in small firms, requiring specific forms of work organization and labor control. A distinguishing feature of craftwork is that the worker necessarily has a high degree of control over the labor process and pace of work while worktime cycles are relatively long, perhaps several hours or even days. There has been a long-term tendency for capital to seek to replace skilled craft workers with less skilled labor, for reasons that are clearly identified by Best (1990, 42, emphasis added) in describing metal products manufacture in Birmingham, England, during the middle of the nineteenth century:

> Birmingham arms manufacturers were organised by handicraft methods utilising highly skilled labor. Firms could produce hundreds of product types and shift product lines altogether. Catalogues with over 500 different types and sizes of steam engines, for example, were common. . . . When the demand for guns declined, such firms could shift to shoe buckles or brass buttons. Thus these firms were extremely flexible *but within the limits of handicraft manufacturing methods.*

Despite strong tendencies to restructure work so as to replace skilled craft workers with unskilled workers, craftwork remains of critical importance in some activities and sectors. Within the Parisian haute couture industry, for instance, the more highly skilled workers, such as cutters, are "gens de métier (craftspersons with a strong craft identity): their work rules are their own." As such, "their labour processes are not be rationalised or codified by any outside force, *including their employers*" (Storper, 1993, 443, emphasis added). Employers recognize that they necessarily depend upon the knowledge and skills of craft workers—knowledge and skills that cannot be disembodied and transferred to machines. Consequently, they cannot control craft workers in the same way that they seek to control and discipline unskilled workers. The labor process must be controlled in ways that rely more upon cooperation (or responsible autonomy; Friedman, 1977) than coercion. As a result, craft trade unions typically operate in a very different way than those of unskilled workers, for example (as noted above).

Moreover, recently there has been a resurgent emphasis upon the knowledge and skills of craft workers as a key determinant of the success of some industrial districts and of new models of corporate competitiveness. Workers in the knowledge-intensive activities of high-tech industries such as electronics carry out their tasks at speeds determined more by their own inclinations and motivation, a consequence of flatter managerial hierarchies and control strategies based upon "responsible autonomy" rather than close supervision. This can, however, be a route to very high levels of exploitation, as workers work very long hours (far beyond those to which they are formally contracted). They are driven to do so by a mixture of commitment to the company and personal pride in and satisfaction from performing their job as well as they can (Massey et al., 1992). Furthermore, as knowledge more generally has come to be of growing importance to the economy, there has been an expansion of "creative" occupations involved with producing and transmitting knowledge in its various forms. Perhaps prototypically, some 75% of the labor force in software companies is composed of professional-managerial and technical staff, and this level is now being reached in new semiconductor firms in the United States.[24] Consequently, there has been an expansion of "reflexive" jobs characterized by long job cycles, ranging from days to weeks in the case of engineers and technicians, to months or years in the case of advertising executives (Lash and Urry, 1994, 57, 99). This expansion of occupations concerned with producing and disseminating knowledge is closely linked to the increasing significance of product differentiation, product innovation, and product quality in corporate competitive strategies. When competition is based less on price than on the technical

and qualitative aspects of products, worker involvement becomes a key factor in the firm's success (Gertler, 1997, 54).

There has often been a link between such "responsible autonomy" strategies and paternalism as a process of governance within firms. Paternalistic approaches seek to develop alliances between companies and their workers so that workers identify their interests with those of their company. While many small firms, both in manufacturing and services, deploy deeply paternalistic practices in managing work and the labor process, paternalism is by no means confined to small firms. Hanson and Pratt (1992), for example, reveal the origins and legacies of paternalism and welfarist labor control strategies in Worcester, Massachusetts. Large manufacturing companies such as Ford (see above) and Imperial Chemicals Industries (Beynon et al., 1994; Nichols and Beynon, 1977) have developed paternalistic approaches to labor relations at different times and places, often deeply tinged with authoritarianism. Paternalism has also been prominent in banking and financial services (Halford and Savage, 1997). Such paternalistic practices were perhaps most prominently visible in the financial service nexus of the City of London, controlled by a tight group defined by education (and socialization) at particular public schools and Oxbridge, and appropriate accents and tailors (McDowell, 1997). There is, however, evidence that even these are changing because of the demands of new methods of working and the social relationships of production (Allen et al., 1998, 92).

Taylorist mass production constitutes another model of production, requiring a very different approach to disciplining workers and organizing work and the labor process. Although the archetypical Taylorist workplace has come to be seen as the mass production automobile plant, it is important not to equate Taylorism with either big firms or manufacturing. The origins of Taylorism and mass production lie in the emergence of the American system of manufacture specifically as a way of wresting control over the production process from craft workers. The defining feature of the American system was the use of specialist machines to produce interchangeable parts. The idea of interchangeability meant breaking down products into their simplest parts, designing a specialist machine capable of producing each piece, and inspecting each part with a custom-designed set of gauges. Consequently, "interchangeability meant that parts could be machine processed and assembled *by workers who had not been apprenticed in the craft tradition*" (Best, 1990, 32, emphasis added). This was a key development in manufacturing, with profound implications for workers and the organization of work. It clearly prefigured Taylorism, but the full implications of this development for deepening the technical division of labor and the organization of the labor process were not developed until Taylor's work on scientific management and Ford's

revolutionary mass production automobile plant with its mechanized assembly lines.

Mass production is based around selling low-cost standardized products in large homogeneous markets. When initially introduced into automobile production by Ford, it led to dramatic increases in labor productivity. The labor time needed to produce a model-T Ford fell from 12 hours and 8 minutes in October 1913 to 1 hour and 30 minutes six months later (Pine, 1993, 16). Mass production thus conferred great competitive advantage but required workers to be organized and to work in specific ways, based on a separation of mental from manual work, extreme specialization of tasks, and a deep technical division of labor within the workplace. Workers typically perform simple, repetitive de-skilled tasks with very short job-task cycles (often defined in seconds) on the production line. The moving line delivers materials to them at speeds determined by management. Increases in labor productivity were achieved via increasing the line speed in accordance with managerial decisions. As such, workers (who were sometimes increasingly alienated) perform repetitive routine tasks on an uninterrupted basis at a pace dictated by the speed of the line. Shift systems allow for the maximum utilization of machines. There are well-known problems associated with Taylorist mass production that are a consequence of both labor and product market changes (Sayer and Walker, 1992, 167–169). The initial challenges to Taylorism arose due to increasing resistance by workers in the "full employment" conditions of the core urban and regional labor markets that emerged in the advanced capitalist countries during the 1960s. There was increasing resistance to the speed-up and intensification of work, which erupted in a range of industrial disputes and official and unofficial "wildcat" strikes that disrupted production. Later, more fundamental challenges were posed by the emergence of more volatile market conditions.

Some commentators have proclaimed the demise of mass production in many branches of manufacturing, but Taylorism is far from dead. Indeed, there has been an expansion of both "downgraded manufacturing" and "downgraded services" (Sassen, 1991) as the principles of Taylorism have been extended to encompass more occupations and locations. On the one hand, Taylorist manufacturing has been preserved by switching production to locations with labor market conditions that allow its defining practices to be introduced and re-produced as parts of new intranational and international divisions of labor. Many of the new maquiladora factories on the Mexican side of the U.S.–Mexican border have been relocated from the United States precisely because they involve labor-intensive assembly operations. Relocation provides labor market conditions that enable companies to continue to use mass production methods and despotic employment practices akin to "bloody Taylor-

isation" (Lipietz, 1986). On the other hand, Taylorist principles have increasingly been introduced into large swathes of routine service sector activities. For example, the McDonalds chain of restaurants and drive-ins epitomizes a trend in the fast-food sector toward mass production of standardized meals and for carefully scripting standardized forms of work that prescribe precisely what employees are to do and say. The aim is to make the production and delivery of a given meal identical in all McDonalds restaurants (Leidner, 1993). Such a process of Taylorization is also marked in service sector activities that involve processing large amounts of data and/or paper or dealing with customer inquiries (McCrae, 1997), leading some commentators to refer to the "industrialisation of whitecollar work" (Taylor, 1995). Indeed, in white-collar industries such as advertising the labor process was "regularised and Taylorized" from the early part of the twentieth century (Lash and Urry, 1994, 139). Increasingly, however, more skilled white-collar professions, such as computer programming, are being relocated to countries with abundant low-wage skilled labor, such as India (Lakka, 1994).

Such forms of work organization in parts of the service sector often also involve reworking and extending Taylorist principles. A prominent feature of work organization in the service sector in recent years has been an increased "contractualization" of employment, with people employed on different contractual terms in respect to hours, benefits, and entitlements. The generalization of employment insecurity thus becomes a regularized feature of working life. While often described as "flexibility it is therefore perhaps more accurate to refer to this 'individualisation' of employment relations as a form of Taylorism" (Allen and Henry, 1997, 185). This new Taylorization of employment relations reflects the temporal limitation, legal (non)protection, and contractual pluralization of the employment of labor (Beck, 1992, 147). Thus, the growth of contingent and (sub)contract employment represents the further widening and deepening of the social and technical divisions of labor as specialization secures, for employers, more efficient and possibly cheaper ways of doing things.

Another model of production centers around new forms of high-volume "lean" production, which seek to combine the positive aspects of both mass and craft production and so require rather different approaches to the organization of work. In contrast to the command-and-control culture of Taylorism, such forms of production seek to manage the labor process via employee commitment to and involvement in the job each one does via a range of human resource management practices (Wills, 1998a, 15–16).[25] This can be illustrated by reference to just-in-time production strategies. Strictly speaking, "just-in-time" refers to a way of organizing the immediate manufacturing process and buyer-supplier relations between firms (Sayer, 1986; Sayer and Walker, 1992,

130), but these principles have become incorporated into a variety of approaches to high-volume (but not mass) production. Just-in-time is predicated upon a particular pattern of capital-versus-labor relations, and it crucially depends upon guaranteed smooth and trouble-free production along the entire supply chain. Sayer and Walker (1992, 176, emphasis added), in a way that emphasizes its lineage as a system of mass production, describe just-in-time as

> *a system of mass production* consisting of a highly integrated series of small-lot production processes. Further, JIT is a learning system which generates economies by . . . reducing the amounts of machinery, materials or labour which are at any time inactive. . . . Economies do not follow simply from major technological developments, nor from the simple speed-up of individual tasks, *but from a different way of organising the labour process*, coupled with piecemeal changes to machinery.

Companies pursue greater flexibility in the allocation of workers' time on the line, the scheduling of overtime, and reorganization of shifts to ensure that factories and machines produce goods for as many hours of each day and week as is possible within regulatory limits. In this sense it represents a more profound realization of the principles of mass production. Often this has been associated with reductions in workforces. Moreover, the pursuit of such flexibility is by no means confined to manufacturing industry. For instance, Lash and Urry (1994, 124) argue that in the television industry in the United Kingdom flexibility "has been in large part an exercise in multi-tasking, labour shedding and general cost cutting." Detailed information on the performance of individual workers is central to this "different" way of organizing production. Combined with management innovations, it enhances managerial control over the labor process and over individual workers. In this way, companies seek to intensify the labor process and pace of work and to cut the turnover time of fixed capital.

The introduction of just-in-time as a "different way of organising the labour process" cannot, however, be understood outside of the context of the emergence of just-in-time in Japan in the 1950s, for the "Japanese" model of industrial relations is not some timeless cultural characteristic of Japanese society. On the contrary, it emerged from bitter class struggle, a series of strikes culminating in the 1953 lockout at Nissan, which resulted in the defeat of vigorously militant left-wing trade unions. In the aftermath of this, it proved relatively easy to socialize workers within company unions into the emergent dominant managerial conception of production, aided by promises of employment for life in deeply segmented labor markets characterized by underemployment or unemployment for many. One result of this was a sharp contrast in the employment condi-

tions of the relatively privileged workers of "big" companies and those of workers in smaller companies situated further down the production chain. The former, a sort of labor aristocracy, obtained relatively secure employment in exchange for an intensification of the labor process and functional flexibility, while many of the latter were often seasonally or temporarily employed on a casual basis.

Consequently, companies in the United States or Europe seeking to introduce just-in-time into existing factories, or moving factories to other locations in areas with a long industrial history, have typically encountered problems. Companies seeking to introduce just-in-time practices there have typically sought out locations with "green labor"—relative to the particular industry in which they are operating, with either no trade union representation or single union deals with compliant and non-adversarial unions. Consider the locational strategies of the Japanese car companies in the United Kingdom. Honda, Nissan, and Toyota have established assembly plants in different English regions, but always in locations without a previous history of making automobiles (Hudson, 1995a). Clearly, just-in-time requires a very specific sort of micro-regulatory régime within workplaces in order for it to function as a profitable form of production organization. This in turn requires a particular type of macroeconomic environment to encourage the emergence of labor market conditions within which such workplace régimes can be constructed. Macroscale changes can therefore undermine the stability of the microscale regulatory régimes within the company and the workplace. This was graphically illustrated during the 1990s by companies in Japan being, first, forced to trim the notion of "a job for life," then to actually make workers redundant. Under these circumstances, even against a background of high unemployment, it may be increasingly difficult to guarantee the smooth pattern of industrial relations upon which just-in-time depends.

The introduction of just-in-time principles also has implications for the organization of work beyond the immediate point of production, in retailing establishments and distribution points. Adjusting production schedules to short-term fluctuations in consumer demand—in clothing and food factories, for example—depended upon the introduction of real-time electronic links from the point of sale to the factory. This required a restructuring of employment—already under way as part of a broader cost-cutting strategy in retailing—which involved the increasing conversion of skilled sales staff to de-skilled checkout operators. This in turn was linked to the growing predominance of part-time employment in retailing. Thus, the introduction of just-in-time has employment implications throughout the production filière, but this involves combining "new" and "old" ways of organizing work rather than the former systematically replacing the latter.

Supporters of just-in-time argue that—in contrast to Taylorist mass production—it provides a working environment that empowers workers and engages them creatively in the process of production. It does so via more varied and skilled work with longer job-task cycle times, built around themes such as flexibility, responsibility, teamwork, and quality. This in turn requires a constant restructuring of workplace spatial layouts, as well as workplace time schedules, as shop-floor workers adjust the microgeography of production to create a more personalized workplace in response to the changing flow of just-in-time orders (Lash and Urry, 1994, 56). Similar claims are made more generally by advocates of new methods of human resource management and "high-performance" manufacturing. Systems of "high-performance" work organization in manufacturing, based upon the generalized introduction of new computing and IT technologies, are seen to mobilize all workers in problem-solving and quality improvement teams, requiring them to gather, process, and act upon information. This has led to a renewed emphasis upon training, security of employment, and the introduction of incentive pay schemes to improve the commitment and trust of a more valued workforce. It both produces better quality and more highly remunerated and satisfying jobs for workers and enhanced competitiveness and profits for companies. The effectiveness of individual employees is enhanced by giving them more discretion in carrying out their jobs, and collective effectiveness is enhanced by creating new opportunities for organizational learning through employee participation. It is claimed that there is little evidence of any "dark side" to these systems of work organization (Economic Policy Institute, 2000).[26]

Critics suggest that—both in Japan and as exported and implemented elsewhere—just-in-time is a disempowering régime that intensifies the pace of work and is characterized by new and more subtle methods of control, exploitation, and surveillance, intensification of the labor process, and increased stress on workers (Okamura and Kawahito, 1990). New methods of production and human resource management associated with "high-performance" manufacturing elsewhere share similar characteristics. A supervisor at Nissan's factory near Sunderland in northeast England commented that in interviewing potential shop-floor workers: "We lay it on the line that it's hard work, that they probably haven't ever worked as hard before" (reported in Tighe, 1998). The reorganization of work into teams and the ergonomic reorganization of workplaces to encourage the smoother flow of production provide the physical basis for companies to encourage a set of internal workplace social relations defined around notions of customer and supplier (Yates, 1998, 127–137). Consequently, workers relate to one another as "suppliers" further up the line or as "customers" further down the line. No longer is it a question of "them" and "us" inasmuch as "we" are also part of "them," with conse-

quent implications for workers' identities and sense of solidarity (Hudson, 1997). Cloaked in an ideology of teamwork and collective effort, it represents a system of labor control that individualizes work norms and remuneration systems while legitimating this in terms of group work and collective effort. The culture of teamwork and competitiveness replaces direct supervision with peer pressure to ensure that workers continue to work as required. By the 1990s "it had become impossible to believe the promises of the human resource management, team concept, total quality, or whatever name the new ways of working were known by. The new workplace, whether in the private or public sector, was worse, not better, in most cases" (Moody, 1997, 55). Best (1990, 150–151, original emphasis) makes an acute observation in relation to the debates about teamwork and the organization of the labor process:

> The integration of thinking and doing has a crucial implication for managerial hierarchy and power relations within the firm. Thinking and planning *by* workers required horizontal information flows across functional boundaries; thinking by management and planning *of* workers' activities by management require vertical information flows coordinated by middle management. Thus the relations of teamwork are superimposed on relations of hierarchy. But teamwork demands relations of trust between managers and workers that are antithetical to the top-down power relations between manager and worker that are built into the scientific management paradigm.

At the same time that Taylorist principles are being increasingly introduced and reworked in large swathes of the services sector (as noted above), there are claims that other new sorts of employment are emerging—or at least becoming more prevalent—in services. These jobs are seen as characterized by a greater degree of worker autonomy, empowerment, and responsibility (to a degree analogous to new forms of manufacturing employment). Sometimes it would seem that what is involved is less the emergence of new forms of employment and more a reinterpretation of the characteristics of well-established jobs. Fashion retailing is hardly a new activity, for example, but McRobbie (1997, 87) has recently argued that aspects of performance and presentation involved in the work of selling are both specific to that activity, integral to the job, and tied to the appearance of the person performing the work. Work in a variety of service occupations associated with tourism and leisure is also seen to involve embodied performances requiring a range of personal and social as well as technical skills that provides satisfying work for those that carry it out. Even poorly paid workers in restaurants have a considerable degree of autonomy in organizing their work activities. Indeed, much of their work consists of socializing with customers who are also often friends

(Marshall, 1986). As a result, much of their work revolves around interpersonal interaction and coproduction of services. The work of waiting in restaurants does not simply involve low skills and all-embracing managerial control. It also involves skilled performative displays to customers, the workplace becoming a stage on which particular types of performance involving a mix of emotional, manual, and mental labor are played out, creating a particular atmosphere that staff must work to sustain (Crang, 1994). Such dialogic coproduction involves the development of fine classificatory distinctions between service consumers and producers associated with increasing individualization of consumption, especially among the new middle classes (Bourdieu, 1984).

In such services the labor process necessarily involves ceding considerable responsible autonomy from managers to workers since part of the delivery of the service involves interpersonal interaction between a copresent customer and supplier. Nonetheless, such work remains poorly paid (not least because wages can constitute up to 75% of total costs in highly competitive sectors) and often precarious. Moreover, insofar as workers become the product, they become involved in a particular form of self-exploitation. Furthermore, insofar as such work necessarily depends upon the appearance and personal attributes of the worker, it may be linked to age and stage in life cycle and as such be limited in its duration for any one individual. As McRobbie (1997, 87) puts it, fashion retail workers' "self-image must surely be undercut by the reality of knowing that in a few years time, possibly with children to support, it is unlikely that they would hold onto the job of decorating the shopfloor at Donna Karan." It may well be the case that what is involved here is in fact a reinterpretation of the character of old service sector occupations rather than the emergence of new and qualitatively different ones.

Service occupations and service sector labor processes do not therefore always sit easily within the "classic" Marxian conceptualization of the labor process of transformative manufacturing industry. Indeed, similar points can be made in respect to the labor process in agriculture and mining. In these the focus is, respectively, upon maintaining or enhancing the conditions in which natural processes operate or in appropriating elements from nature rather than transformation within a manufacturing process.[2] As Benton (1989, 69, original emphasis) puts it, within the "classical" Marxian framework for analysis of the labor process, "Labour processes whose intentional structure emphasises the dependence of labour on non-manipulable conditions and subjects in which labour adapts to its conditions, sustains, regulates or appropriates its subjects, as distinct from transforming them, are given *no independent conceptual specification.*"

This is not to deny the validity of the Marxian framework but rather to point to the need to extend and refine it to encompass a wider range of

labor processes organized within capitalist social relations of production. Such "eco-regulatory" labor processes and labor processes of "appropriation" often of necessity cede considerable autonomy to workers, weakening effective managerial control. This was perhaps to be expected—indeed, to be unavoidable—in activities such as underground mining, in which there was a considerable separation of workers from managers, which led the latter to strive to restructure the labor process to approximate more closely the effective working rules of the transformative factory production line.[28] More generally, it helps to explain why management strategies in a wide range of nonmanufacturing activities have often sought to reorganize such work so as to conform more closely to the characteristics and organizational forms of the transformative manufacturing labor process.

4.5. Summary and Conclusions

Within the limits defined by regulatory systems, companies and workers routinely struggle over the extent, terms, and conditions of employment. Workers form trade unions to seek to further their interests, while companies often form alliances to seek to further *their* interests. This struggle is conducted on a territorially varied regulatory terrain that defines both possibilities and problems for both companies and workers but in circumstances in which there is a powerful structural asymmetry in the powers of capital and labor. Companies seek to recruit different types of labor, with different combinations of technical skills, social skills, and personal attributes, in varying ways and via varying mechanisms, and on different terms and conditions, depending upon their chosen production strategy and prevailing labor market conditions. They vary recruitment strategies depending upon the types of labor that they require and whether they are seeking to preserve existing models of production or to move to new ways of producing. The combination of labor market conditions and mode of regulation of labor at the point of production becomes crucial in shaping labor recruitment strategies. Recruitment strategies and the mix of workers recruited, (non)retention strategies, and the choice of production strategy and production model are interrelated.

Ways of organizing work and the labor process vary with the nature of the product, choice of production strategy, and the extent to which firms are dependent upon retaining skilled and knowledgeable workers, often with company-specific knowledge and skills. What is at issue is not only the quantitative division of the working day between productive and nonproductive (in relation to producing surplus-value) time and but also

qualitative issues associated with the working environment, the culture, and the social relations of production. While *analytically* distinct strategies for organizing work and the labor process can be specified, in practice companies use more than one of them simultaneously, though in varying combinations at different times and in different places. Capital's attempts to introduce changes to working practices and ways of organizing the labor process are not unproblematic, however; they are often contested by labor. Not least, this is because the restructuring of work and working practices implies changes to workers' identities and the ways in which they relate to other workers. The fact that workers contest the restructuring of production and work is an important reason why companies may search for a "spatial fix" via relocation. This in turn however can lead to localized job losses and in turn may be vigorously contested by those who may lose their jobs.

Notes

1. See "Establishing Legal Frameworks for Markets" in section 3.7.

2. Divisions and competition between companies and between groups of workers are considered in the next three chapters.

3. This is also considered more fully in Chapter 6.

4. Recognizing the inherent difficulties that such a project involves; see section 3.2.

5. See section 7.3.

6. Moreover, even during the Fordist era marked subnational divisions continued to characterize the organizational geography of trade unions; see section 7.2.

7. See Chapter 5.

8. See also Chapter 3.

9. It is important to note that the definition of the service sector and "services" is far from unproblematic, and that this has had implications both for academic analysis and trade union practice. This is discussed more fully in later chapters.

10. That is, workers with no previous history of working in a given industry or, alternatively, no history of the social relations of capitalist industrial production in any form.

11. See section 7.3.

12. These issues are discussed more fully in section 8.6.

13. Conceptualizing and measuring efficiency depends upon the way in which production is envisaged within different "cultures of production." Best (1990, 148–149, original emphasis) makes the point as follows: "*Operational* throughput efficiency, the indicator of success for mass production, is measured in terms of productivity per labor or machine input hour. *Process* throughput efficiency is the ratio of the time a product is being transformed in the production

system. Process efficiency has led to a new set of success indicators. One is work in progress (WIP) turn: the ratio of WIP to annual sales."

14. Issues of competitive strategy are discussed more fully in Chapters 5 and 6.

15. Such divisions between workers are discussed further in section 7.3.

16. Interestingly, the Ford Motor Company established its own sociology department as the vehicle through which its paternalistic policies of labor recruitment and control were primarily pursued ideologically, along with a de facto private police force that provided physical force and violence when needed.

17. This was highlighted in 1999 when Nissan announced a major redundancy program that resulted in layoffs in its Japanese factories.

18. See also Chapter 8.

19. This is in part a result of process of centralization of capital via acquisitions, takeovers and mergers, which are discussed in section 6.5.

20. Clearly this dichotomy fails to reflect the complexity of the processes through which work is organized and labor processes are controlled, but as an analytic division it represents a useful starting point. Within the categories of "manager" and "worker" there are important variations in power, autonomy, and control.

21. See sections 5.3, 5.4, and 5.5.

22. Since innovations (process, product, and organizational) tend to diffuse within a sector, or in the case of generic technologies across sectors the competitive advantage that companies achieve via increasing relative surplus-value production in these ways tends to be temporary; see section 5.3.

23. Labor market conditions are not the *only* variable affecting choice of production model, for ultimately the selection of a particular model depends upon perceived profitability. That said, there is no simplistic or deterministic economistic process at work here, but rather a more subtle and nuanced process of selection. See Chapter 5.

24. In part, however, this increase is due to the outsourcing of fabrication as part of a continuously redefined sociospatial division of labor (Sklair, 1990).

25. Although often represented as new, such approaches share much in common with what Friedman (1977) termed "responsible autonomy" managerial strategies.

26. Such systems of work organization have become increasingly common within manufacturing in the United States. Between 1987 and 1995 the proportion of workers employed in self-managed teams rose from 28% to 68% in the clothing, medical electronics, and imaging, and steel industries in the United States (Economic Policy Institute, 2000).

27. The implications of this are discussed more fully in Chapter 9.

28. For example, in the deep mines of the British coal industry managers in the nationalized industry sought to introduce more automated methods of production (the MINOS system) that would enhance managerial control of the process of mining coal (see Winterton, 1985).

Company Connections

Competition and Cooperation, Part 1

5.1. Introduction

A central insight of Marxian political economy is that competition between companies is central to the developmental dynamic of capitalist production, providing the impetus for revolutionizing the "how" and "what" of production. Such competition pivots around the production and distribution of profits. Companies compete over a range of issues in pursuit of profits—for market share or control of new growth products and sectors, for example. They therefore compete in various ways—for example, via product price and quality. Others have subsequently taken up these ideas. While several dimensions to intercorporate competition can be identified, Schumpeter (1961, 60) famously summarized these in terms of a distinction between adaptive forms of competitive strategy that take given constraints as binding and creative strategies that do not. This dichotomy has been echoed within recent approaches in economic geography under rubrics such as "weak" and "strong" competition (Storper and Walker, 1989) or "structure dependent" and "structure focused domains of competition" (Clark, 1992). These distinctions (setting aside semantic differences in the terms used to describe them) are important in denoting qualitatively different forms of intercapitalist competition. Whereas "weak" strategies revolve around price competition within a given technological-organizational paradigm, "strong" strategies are based upon quality, product differentiation, and product innovation. As such, "strong" strategies crucially depend, among other things, upon the intrafirm development of specific capabilities and competencies that allow companies to develop particular—even unique—segments of markets and production.[1]

These distinctions between types of strategies are, however, ana-

lytic—a company can pursue several types of strategy simultaneously. There is abundant evidence that in practice corporate decision making cuts across this analytic distinction (Sabel and Zeitlin, 1997). In terms of the dynamics of historical geographies of production and which firms survive longer-term, however, the development of successful Schumpeterian "creative" strategies is critical. Schumpeter saw "market disturbing activity" as lying at the heart of competitive strategy, raising questions as to *how* markets are to be "disturbed" and how methods of "disturbance" vary among companies, sectors, times, and places. This is closely echoed in concepts of "strong" or "structure focused" strategies. This chapter explores these issues of diverse forms and dimensions of competition and the ways in which differences between places and spaces are implicated in them. While some attention is given to the relationships between collaboration and competition, consideration of collaborative strategies is largely reserved for the next chapter.

5.2. Competition within Existing Socio-Organizational and Technical Paradigms

"Weak" forms of competition revolve around companies seeking reductions in production costs within the parameters of an existing technological paradigm, within which all firms producing a particular product operate.[2] Such competition can occur in many domains. It can, for example, involve price cutting via discovering cheaper sources of varied factor inputs. This form of competition thus emphasizes the importance of "know where."[3] Cheaper sources of inputs to production are typically—though not necessarily—found in more distant locations. This enhanced "distanciation" (Giddens, 1984) of the social relations of production is made possible by technological improvements and resultant falling costs of communications and transport, often allied to shifts in state policies. It is reflected in new patterns of commodity movements, trade, and geographies of production. For example, changes in U.K. national state policies, the growth of international coal markets, and improved bulk transportation of coal enabled the British Steel Corporation to switch to importing coking coals. This led to new geographies of the coal trade, linking its Teesside works in northeast England with a range of locations and, as a result, coking coal collieries in nearby County Durham closed, as their market disappeared (Beynon et al., 1991).

However, the most visible and well-publicized direct impacts on geographies of production have resulted from firms using knowledge of the location of cheaper and more malleable labor to seek "spatial fixes" via

relocating production to enhance or preserve competitiveness. Thus, companies compete by seeking out "better" labor market conditions, both intranationally (Lipietz, 1980; Massey, 1995a) and internationally (Fröbel et al., 1980). There are numerous well-documented cases of multinational companies exploiting differences in wage rates and other labor market conditions in organizing production, both in terms of their intracompany geographies and subcontracting strategies. For example, Nike pioneered a shifting international division of labor in athletic shoes production that relies largely on subcontractors in a hierarchically nested set of offshore production locations. Shoe assembly remains a highly labor-intensive operation, sensitive to variations in wage rates (Donoghue and Barff, 1990; Schoenberger, 1998). If local costs become too high, a given location may be either upgraded in its tasks so that its costs are not out of line or abandoned in favor of a less expensive locale. This strategy has been imitated by most of Nike's competitors. Companies in labor-intensive sectors *become* multinational, exploiting variations in labor market conditions as a necessary condition to their survival. For example, until 1990 Dewhirst (one of Marks and Spencer's main suppliers) produced clothing only in the United Kingdom. It opened its first factory outside the United Kingdom in Malaysia in 1990. In the latter half of the 1990s it opened further plants in Indonesia and Morocco, locations in which labor costs were a fraction of those in the United Kingdom, closing factories there as a result. By the end of the 1990s only one-third of its labor force remained in the United Kingdom (Blackwell and Voyle, 2000).

This reshaping of corporate geographies of production requires manufacturing companies to have sophisticated systems for monitoring spatial variations in wage costs and adjusting production strategies in light of this knowledge (Kehoe, 1992; Marsh, 1997).[4] Often subcontracting in manufacturing involves widespread use of informal work in peripheral locations in the global economy. Hadjimichalis and Vaiou (1996, 4) refer to the growth of "what may be called 'bloody informalisation' due to extremely exploitative conditions including child labour from the age of four."[5] Such labor market differences are also helping shape a new international division of labor in service sector occupations such as those involved in electronic data processing (Pearson and Mitter, 1994; P. Taylor, 1995).[6] It is important, however, not to overstate the significance of labor cost differences in the construction of new international divisions of labor. Reliance upon low wages in newly industrializing countries is a very sectorally and temporally specific form of intercapitalist competition (Berry, 1989; Gordon, 1988). Nevertheless, such labor cost differences can set the scene for restructuring labor relations and working conditions in situ under the threat of relocating (Beynon et al., 1994; Hudson,

1989a; Marsh, 1997) unless labor agrees to such changes, as well as to the transfer of production to more favorable locations.

Companies may openly seek to set factories against one another, playing upon and exploiting the immobility of labor and people's ties to place. The threat of relocation can, in these circumstances, be as effective in meeting corporate goals as actually relocating. Beynon (1984, 52–53) describes the situation as experienced by workers at Ford's Dagenham plant in southeast England in the mid-1960s:

> The full meaning of multinational production began to make itself apparent in the PTA [Paint, Trim, Assembly] at that time. The company owned another assembly plant in Cologne [in the Federal Republic of Germany] manned mainly by Spanish and Turkish workers whose immigrant status made them extremely vulnerable. The sack [that is, dismissal] could mean deportation. The "Cologne Yardstick" was increasingly applied to the Dagenham PTA plant in the 1960s. Supervisors were frequently taken to the Cologne plant to compare the way the job was run in the two plants.

Some thirty years later, workers at Osram's Augsburg factory in southern Germany agreed to move to more flexible shift systems. They did so knowing that the company was considering moving to Bari, in southern Italy, which would cut labor costs by 40% (Marsh, 1997). However, Osram did not relocate there, illustrating that variables other than wage costs were relevant, including plant flexibility, labor productivity, the technical content of the work, and closeness to markets. There is therefore no simple deterministic relationship between de-skilling and relocation of production. Activities may remain "in situ," as work is de-skilled, without the threat of relocation or competition from another plant. For example, printing has certainly been de-skilled via technological change, as typographic skills have been rendered redundant and printers reduced to button pushers. Even so, a considerable amount of printing—especially small-batch job printing for small businesses, or of local newspapers—remains constrained by the necessity for physical proximity to markets (Cox, 1997, 180). Similarly, many service industries remain close to markets despite an efflorescence of new job categories that require little skill in the way of training but that are highly market-oriented. These include the armies of cleaners in the downtown and city center offices and hotels and the rapidly expanding corps of private security guards and parking garage attendants.

In summary, specific forms of capital-versus-labor relations are a strategic element in intercorporate competitive strategies. Companies use them to preserve or enhance competitiveness vis-à-vis competitors

working within the same technological paradigm and others deploying more advanced technologies and/or bringing new products to the market.

5.3. Competition via Creating New Technical and Organizational Paradigms of Production and New Products

Whereas the emphasis in "weak" competition is upon allocative efficiency within a static equilibrium economy, the emphasis in "strong competition" is on dynamic disequilibrium. This latter view of competition has its roots in the concerns of classical political economists. It is, however, perhaps most closely associated with Schumpeter and other evolutionary economists and concepts such as "creative destruction" and the associated redrawing of historical geographies of production as companies strive to create sustainable long-term competitive advantages. For example, global competition forced semiconductor producers in Silicon Valley to prioritize strategies of strong competition over those of weak competition. It became increasingly important to integrate innovation and production more closely since the dynamic of this industry has been driven by innovation rather than the search for cheaper labor (Jonas, 1997, 17).

Strategies of strong competition revolve around chronic and deliberate disturbance of capitalist markets, the constant revolutionizing of the what and how of production via innovation in products, processes, and forms of production organization, and the redefining the socio-organizational and technological paradigms of production. This constant pressure for innovation is often seen as a progressive aspect of capitalist production, generating a constant flow of new products and processes of production. Moreover, relationships between different types of innovation may vary within different models of production. The simultaneous development of product and processes is a well-established feature of the system of mass production. Even so, as products move through their life cycle, the appropriate processes of production are altered. Within mass customization, however, the importance of any individual product decreases "because there are so many of them. Processes become decoupled from products and now outlast individual products—some of which are developed and sold only once—and can outlast the entire product life cycles. It is *process life cycle* that has become more important" (Pine, 1993, 215, original emphasis). Others suggest that variations in regulatory regimes can shape the trajectories of innovation. For example, different national regulatory régimes for intellectual property rights can encourage some innovations while discouraging others. Conversely, the viability of

such régimes depends upon their compatibility with particular forms of innovation (Foray, 1993).[7]

Organizational Innovation

Companies seek to increase productivity via organizational innovation, discovering new ways of producing more efficiently via "better" use of labor and other resources. These are changes that involve discovering new ways of working more efficiently *within* existing technological paradigms. Organizational innovations therefore directly impact upon regulation of the labor process and the organization of work at different points along the production filière. Initially within industrial capitalism such innovations revolved around bringing production into factories; since then, various approaches have been developed to increase the efficiency of production within given technological paradigms. The pressure to design productive organizations—more specifically, those that can integrate thinking and doing and recombine mental and manual work—is increasing because "Schumpeterian competition is turning into time competition" (Best, 1990, 14). Whereas mass production focused upon one form of time competition, namely, economies of time in throughput, newer forms of production emphasize the importance of process time, the time required for materials to be processed. Japanese firms have organized plants to reduce process time from days to hours and raise productivity without increasing the speed of work or machines (Stalk, 1988). For example, Toyota developed the concept of multimachining based upon machines arranged in U-shapes with a group of machines overseen by a single worker. This permitted a discrete increase in labor productivity based on organizational innovation rather than intensification of the pace of work of the individual worker.

In addition to utilizing organizational innovation at the immediate point of production, companies seek to compete via organizational innovation in methods of management. For example, during the 1920s General Motors was transformed by the introduction of new managerial methods and structures.[8] In the contemporary globalizing economy large companies are devising new "hybrid" organizational structures to cope with the complex challenges posed by increasingly fluid and dynamic markets. In such an environment large firms, seeking to build their "strategic architecture" on carefully selected core competencies, tend to develop a dual organizational structure that emphasizes, first of all, an integrated network structure to manage core competencies. This assumes intense exchanges of all forms of knowledge between the component elements of the firm to enhance their ability to exploit local externalities and contribute to the construction of sustainable collective knowledge.[9] Deci-

sions concerning core competency activities are detached from regular and ongoing decision-making mechanisms based on transaction costs. Long-term commitments based on sunk costs are required to assure the learning capabilities of these core components. The smooth functioning of the whole network of core competencies requires specific governance mechanisms to ensure the effective circulation of knowledge within it. Second, such firms need a classical hierarchical managerial structure to manage their noncore competency activities, which form the majority of their activities. This hierarchical structure is needed for two reasons. First, managing the company as a whole via the mechanisms used to govern core competency structures would be prohibitively expensive. Second, noncore activities satisfy the current allocation of resources for the firm and as such principally require regulation of basic flows of codified information between noncore components. The decision as to whether to retain these activities within the firm depends upon "traditional" transactional cost criteria. The "major fault line" between core and noncore activities is that the former are vital for the firm, and the decision to sustain them "is disconnected from any current make or buy decisions" (Amin and Cohendet, 1997, 13). However, the boundary between core and noncore is fluid and shifting, for these activities are relationally defined. Indeed, it may be more helpful to think of a shifting continuum of activities rather than a dichotomy between "core" and "noncore." A corollary of this is that the boundaries of the firm are also fluid and dynamic as the make or buy decision fluctuates and the boundary is redefined or as acquisition and merger or divestment and demerger redefine the anatomy of the firm and the boundaries of core competencies.[10]

Organizational innovation is an ongoing process. The emergence of the "virtual firm" may signal a significant change in corporate organization. This brings together members of existing companies to execute a specific task quickly and efficiently—effectively a process of "mass customization of the enterprise" linked to the emergence of "agile manufacturing enterprises," with "the ability to form virtual companies routinely." Pine (1993, 258–260) elaborates on this concept:

> Virtual enterprises are cross-functional and multi-company teams brought together solely to accomplish a specific task; then, once the market opportunity fades, the team is disbanded so that the enterprise can re-apply its capabilities and resources to the next task through the next virtual enterprise. Tasks can range from providing a total solution to meet the wants and needs of one individual consumer to developing a new product or service that itself can be mass-customised for thousands or millions of consumers, to creating new processes that can provide their own dynamic flows of goods and services.

This new and project-based organizational form renders the boundaries of the firm, in the conventional sense, virtually irrelevant. The key element becomes the networks of linkages within and across the boundaries of the firm. Moreover, "virtual enterprises" simultaneously contain and combine different existing approaches to production. There are examples of companies that already come close to meeting the specifications of such a virtual enterprise (Pine, 1993, 262–263):

A special attraction to companies (and indeed to national governments formulating strategic industrial policy, as in Japan over the past fifty or so years) of seeking to ground competitive advantage and success in organizational innovation and structure is that organization is a nonmarketable input. Once established, it is difficult, time-consuming, and expensive for competitors to emulate or match. Companies seek competitive advantage via organizational innovation precisely because it is embedded in company-specific knowledge and skills that rivals cannot buy in the market or easily imitate. It is not amenable to diffusion in the same way as, say, technical knowledge about a new production process. This sort of competitive advantage, embedded in the institutions of the firm and the expressed and latent knowledge of those who work for it, may allow a company to maintain a long-term competitive edge over its rivals. This is very much the basis of competitive success for a range of "learning" companies—from the major corporations of Japan to the small and medium-sized enterprises of the Third Italy or Jutland in western Denmark.[11] There may, however, be limits to the extent to which organizational innovation can be sufficient to guarantee competitiveness. For example, significant differences in labor or other input costs may offset superior organization in sectors producing mature products.

Process Innovation and New Technological Paradigms of Production

Process innovation denotes technologically new ways of making existing products. Consequently, there is a critical link between process innovation, fixed capital investment, and technological change. Different methods of production involve varying combinations of dead and living labor (that is, different technical compositions of capital)[12] as well as differing ways of organizing the labor process and relationships between production and the natural world. In part, companies generate new production processes and ways of organizing production because on occasion new products require such changes. For example, many product innovations in financial services have been possible only because of changes in production processes enabled by developments in communications and information technologies (Sassen, 1991, 5). In some cases, organizational innovations have been necessary to ensure that such technologies, often

culturally emblematic of the modern world, be economically viable (Lash and Urry, 1994, 253). There are, however, more generally applicable and strong systemic competitive pressures to find "new" ways of producing "old" commodities. An important analytic distinction can be drawn between incremental process improvements within an existing technical-organizational paradigm and the shift to a new paradigm. Once this latter shift occurs, companies can compete via choosing between models of production for a given product.

Companies seek to revolutionize production processes in order to steal a competitive head start on their rivals. Process innovations can be particularly important in mature industries such as chemicals, coal, and steel.[13] Thus, industries often represented as "old" and "smokestack" experience radical changes in process technologies via the deployment of "high technology" production processes. This "hunt for technological rents" (Mandel, 1975) enables "surplus" profits to be made. Process innovations permit the labor time needed in production to be reduced below the existing socially necessary amount. This is significant because producers who use the "new" technology can then sell at below average prices, increasing market share while collecting above average profits on each unit of the commodity sold. Such a strategy is risky, however. There is no guarantee that it will work; it may not and the company could fail. On the other hand, if it succeeds, its rivals may fail. If it does succeed, it retains this competitive edge until the "new" technology diffuses to other producers and becomes generalized, establishing new productivity norms for that commodity (or sector). Thus, the new productivity norm reduces the required amount of socially necessary labor time. This in turn triggers a fresh round of R&D in search of another technological advance and competitive advantage. In this way the process of constantly revolutionizing production technologies proceeds, and competition becomes the motor of accumulation.

This conception of the dynamics of process innovation is specific to certain sorts of production approaches and market conditions, however: essentially mass production of standardized commodities sold in mass markets. In other models of production, process innovation has a differing significance. Decoupling product and process technologies in flexible forms of high volume production has further enhanced the importance of process innovation to competitive strategy, with significant implications for the ways in which companies deploying these production approaches seek to compete. Such companies are investing in general-purpose processes that are more flexible, responsive, and easily reused across products and product families. They have longer process life cycles relative to the products they create, thereby providing a stable base for the dynamic supply of products and services. Thus, "once developed process change is

evolutionary and often developed for its *potential* applicability to a broad range of future products. *Therefore businesses no longer need to be defined by their products but can be defined by their processes*" (Pine, 1993, 216–217, emphasis added). Consequently, companies seek to move from mass-customizing products and services on the basis of flexible process technologies to the "mass customization of process uniquely suited to their new market opportunities" (Pine, 1993, 256). There are, however, limits to the decoupling of product and process innovation within these new high-volume approaches to "agile production." For example, Pine (1993, 241–253) identifies several sources of such limitations: radical new product and process innovations that homogenize markets via creating new dominant designs (homogenizing consumer demand, for example, via a reaction to accelerating product obsolescence); information overload, as consumers are overwhelmed by information on a burgeoning range of products; minimum times for development cycles; and minimum life cycles for products and services. Such limits would tend to reestablish different relationships between product and process innovation strongly reminiscent of those characterizing mass production.

Process innovations can have direct implications for where production occurs as well as for how production is organized. Conversely, spatial variations in labor market conditions can shape which sorts of process technologies and competitive strategies are deployed in particular locations. These locational implications arise for two reasons. First, companies using "old" technologies and/or organizational forms may become bankrupt; they may selectively close some plants; or they may relocate production to places in which labor market (or other) conditions permit the "old" technology to be competitive with the "new" one. Second, companies using the "new" technology may need to find fresh locations in which it can be profitably deployed. For instance, this could be in areas in which labor that is "green"[14] in the context of producing those commodities *in these new ways* is available. Such labor will lack knowledge and experience of *existing* "norms of production" for these commodities and thus will accept the conditions associated with the "new" technology more readily. Conversely, in other circumstances the importance of knowledgeable labor can tie production to particular places as these develop the endogenous capacity to generate new processes (and products) that ensure a competitive edge in the market. Such "technology districts" are places in which economic growth occurs on the basis of in situ "product-based technological learning" (Storper, 1993).

Once two or more ways of producing the same commodity exist, companies face difficult decisions about how and where to produce, which may also be linked to the choice of what to produce within a given product sector.[15] For example, in clothing the high fashion industries of

the Paris region include two basic segments. First, "true haute couture," where the product is made in batches of less than ten and the production process is truly artisanal (St. Laurent, for example, has less than fifty in-house couturiers). Second, the much larger brand-name ready-to-wear market (that is, moderately expensive clothes produced in small to medium-sized batches, on a strictly seasonal basis). These branded ready-to-wear (*prêt-a-porter*) garments cannot be competitively produced in-house. Consequently, a hybrid production system has evolved that is "a kind of half-way house between high fashion and the competitive sweatshop system found in the United States" (and in many other places), with considerable decentralization of production to peripheral regions within France (Storper, 1993, 442). Elsewhere clothing manufacturers mass-produce clothing, often with direct links to major retailing chains (Crewe and Davenport, 1992), locating production in diverse areas with abundant cheap female labor. These include inner-city areas and peripheral regions in core capitalist countries: for example, the sweatshops of core metropolitan regions such as Los Angeles and New York (Sassen, 1991); peripheral regions (such as northeast England) in core countries (Hudson, 1989a); and varied locations in semiperipheral countries (such as inner Thessaloniki and peripheral regions of eastern Macedonia and Thrace in Greece; Hadjimichalis and Vaiou, 1996); and parts of the Third World (Elson and Pearson, 1981; Portes et al., 1988).

The most significant process innovations have undoubtedly been linked with the emergence of mass production. The essential innovative feature of mass production is its focus upon economies of time rather than scale of production per se—that is, increased scale has been a result, rather than a cause, of increased throughput. Mass production generated economies of operation and lower unit production costs by accelerating the passage of materials through a workplace rather than by increasing the workplace's size (Chandler, 1977, 257). The emergence of the then new American system of manufacture in the nineteenth century was based upon incorporating new specialized machines to produce interchangeable parts, significantly increasing labor productivity. Production was still organized around ensembles of machines, however. Consequently, increasing scale of production required adding identical sets of machines rather than accelerating the pace of production. The critical innovation in the latter part of the nineteenth century was the replacement of functional machines with the sequential layout of the flow-line, arranging machines in the order of machining operations. Flow-line arrangements explicitly revealed the different time cycles of each stage in a production sequence, with bottlenecks emerging at machines with longer time cycles. Enhancing time economies on any one machine immediately creates excess capacity for that machine and/or bottlenecks at the next

machine in the flow-line sequence. By reducing the time cycle of the machine with the longest cycle, engineers could speed up the whole line, but removing a bottleneck at one point simply transposed it elsewhere. Seeking to achieve a balanced flow implied one of three things: running a machine below its potential capacity; adding machines at the bottleneck; or reducing the time cycle of the slowest machine. By the 1880s flow-line methods had been refined to produce continuous flow processes. Functionally distinct machines were linked into a single complex, with materials input at one end and processed products output at the other. Initially developed in refining and distilling industries utilizing gas and liquid materials, continuous flow-line technologies were subsequently introduced into industries such as bulk chemicals and metals production, with continuing refinements of production technologies via ongoing process innovation. These resulted in significant territorial agglomeration of production because of economies of scale and interprocess and interfirm linkages and flows of materials (Hudson, 1983, 1994a).

The adaptation of flow-line methods for use in mass production of consumer goods, involving the assembly of large numbers of often complex components, following Ford's path-breaking innovations in automobile production, was of crucial importance. This dramatically reduced the labor time needed to produce automobiles.[16] A corollary was an equally dramatic reduction in price. Thus, mass production paved the way for, and simultaneously necessitated the rise of, mass consumption, creating pressures for further organizational and process innovation. Designing complex integrated machines capable of exploiting economies of time by incorporating flow-line principles became a challenge for production engineers in other consumer goods industries as diverse as "white goods" and clothing. These process innovations generated new sources of market instability as the high fixed-cost structures of mass production altered the dynamics of market adjustment. Scale economies (like "technological rents") present companies with a strategic opportunity to reduce prices and increase production, provided that increased sales volumes more than offset lower unit prices. Seeking to enhance market share in static or declining markets inevitably reduces the market share of rival companies, however. This could destabilize existing mechanisms for regulating market prices, possibly leading to "ruinous competition." In recognition of this, there are strong systemic pressures for firms to find ways of controlling or bypassing markets as regulatory mechanisms in sectors and product segments in which mass production is prominent.[17]

In due course, mass production reached its limits in the core territories of the capitalist economies in which it first became established. In response, companies sought spatially to extend mass markets and further standardize consumer tastes. The limits of this response were soon

reached, however. The methods and practices by which mass production achieved success (a focus on operational efficiency, on Taylorist control of the labor process, on breakthrough innovations, on selling low-cost standardized products in large homogeneous markets) increasingly became a barrier rather than a route to competitiveness. Each focus carried with it a number of detrimental effects that undermined mass production from within (Pine, 1993, 100). An initial response was (implicitly) to deny that the problems originated "from within" and to seek to contain the inherent contradictions via "spatial fixes" (Harvey, 1982), first intranationally and then internationally, to sustain mass production.[18] Another, sometimes linked, neo-Fordist (Palloix, 1976) response was to increase automation within mass production factories (for example, by introducing robots into parts of automobile production lines). Neo-Fordism can be defined as "automatic control or automation. . . . The basis of the entire system is thus the ability *to construct machines that control their own operations*" (Aglietta, 1979, 123, original emphasis). As such, it can be seen as a further attempt to perfect flow-line principles within mass production.[19]

Companies also began to seek systemic alternatives to mass production, however. In part this depended upon technological innovations, allowing the use of "very flexible machine systems in manufacture" to cut setup times and accelerate materials flows (Schamp, 1991, 162). These changes impacted upon the ways in which individual companies and workplaces organize production. Moreover, "through changes in the technical foundations of accumulation, there has been a reorganisation of the industrial economy as a whole. New principles are at work and are re-shaping it" (Coriat, 1991, 134). While Coriat was particularly concerned with the impact of programmable machines, the point he makes has a more general validity. Redefining economies of time and distinctions between productive and unproductive time and operational and process efficiency is central to the competitiveness of these new methods of production (Best, 1990, 147–148). Operational efficiency measures the success of mass production, process efficiency that of methods of flexible high volume production. Operational efficiency is defined in relation to productive time, the time during which materials are being transformed by machining operations, for example, in terms of labor productivity. Process efficiency is defined in relation both to productive and unproductive time (the time materials spend in inventory or other nonoperational activities such as handling, transporting in the workplace, inspecting, reworking or recording), measuring the total time a product is being transformed via variables such as work-in-progress (WIP) turns.[20] These newer approaches to flexible high-volume production therefore conceive of economies of time and production efficiency in a way different from

mass production, for "over and above the capacity to reconcile high productivity and product diversity, it is 'dynamic flexibility' and adaptation to the uncertainties associated with movements in demand that are becoming strategic factors. . . . The integrated management of time is becoming the strategic factor in the search for competitive advantage" (Veltz, 1991, 198).

In one sense any process innovation necessarily involves organizational innovation and changes in management practices to ensure efficient production incorporating the fresh possibilities offered by new hardware and "hard" technologies. For example, Toyota introduced "automatic machines" and a new configuration of machines on the factory floor, enabling one worker to manage several machines. For Toyota, automation meant creating machines with a built-in capacity to stop before defective products were produced. Automated machinery revolutionized the organization of production in several ways. First, it liberated machine operators from constant attention to a single machine. Second, machines shut themselves down every time an abnormality occurred, focusing worker and management energy on detecting these problems and developing a solution. Increasingly the task of the workers shifted from mere operators of a single machine to maintaining machines and seeking modifications so that machines would not shut down. "*Thus workers became problem solvers as opposed to merely machine minders*" (Best, 1990, 154, emphasis added).

More generally, new methods of flexible high-volume production involve bringing together four basic innovations (Pine, 1993, 50): first, just-in-time delivery and processing of materials and components to eliminate process flaws and reduce inventory carrying costs; second, reduced setup and changeover times, directly lowering batch sizes and the costs of variety; third, compressed cycle times throughout all processes in the value chain, eliminating waste, increasing flexibility and responsiveness while decreasing costs; and fourth, producing upon receipt of an order instead of a forecast, lowering inventory costs and other costs such as writeoffs of unsalable products. This may involve the use of computer-assisted design and manufacturing technologies that simultaneously offer economies of scale and scope, reducing unit production costs as the variety of products increases by expanding the overall volume of production. It may, however, simply involve changing the ways that workers work with existing technologies. The systematic exploitation of economies of scope—whether via implementation of design changes (range of product) or flexibility of product mix—is a "key way in which the hegemony of the canonical Fordist model is broken" (Coriat, 1991). While each of these four elements involves technical process innovations, it is their combination into new ways of producing via organizational innovation and innovative

methods of managing the production process that confers competitive advantage.

However, flexible high-volume production methods require particular combinations of labor and product markets in order to be profitable. Consequently, in a variety of product markets companies face a choice between Taylorist mass production and newer forms of more flexible high-volume production. Coriat (1991, 150) stresses that in situations in which output is increasing "everything" depends on the relative importance of the economies of scale and of scope for specific products. Once the former are large and greater than the latter, "it will be more efficient to produce in two specific plants in longer runs the two joint products formerly made with a flexible technology." The relative importance of economies of scope and scale thus determines whether flexible specialization or dynamic flexibility becomes the dominant organizational model. Moreover, these new forms of flexible production do not necessarily rule out the survival of earlier forms of mass production:

> Diverse strategies are . . . possible on the basis of the implementation of complex principles governing the externalisation of functions, industrial subcontracting, and co-operation and partnership, in addition to or in conjunction with different modes of implementation of flexible and/or classical mass production.

As a result, such new organizational developments are creating more varied landscapes than those of the 1950s and 1960s (Veltz, 1991, 194). Nonetheless, there may well be strong continuities between the past and present landscapes (Martinelli and Schoenberger, 1991, 119). Mariti (1993, 193), however, suggests a need for caution in assessments of the extent of landscape variability, as empirical evidence suggests that economies of scope are "somewhat limited" in the field of production, mainly influencing selling and marketing. Current developments in manufacturing flexibility made possible by computer integrated manufacture (CIM), however, "seem to provide a technological solution to flexibility problems." These techniques in general require substantial, often specifically dedicated, investments. Because of them, larger businesses can quickly change products on the assembly line and fill different market segments or niches and at lower cost than small specialized firms. Thus, "flexible manufacturing techniques *could* act to negate some of the advantages of small firm flexibility and reduce its scope. With reference to Japan there is, however, some support for the idea that CIM may in fact be restricted to single applications . . . to solve specific production problems." Mariti is careful to speak only of the possible implementation of CIM in manufacturing, and in practice the limits to CIM alluded to are by no means re-

stricted to Japan (Hudson, 1994b, 1997; Hudson and Schamp, 1995a, 1995b).

In general, companies deploy a mixture of production approaches, dependent upon labor and product market conditions (Hudson and Schamp, 1995b). Small-batch production of specialized and sophisticated products is based on short production runs and long job cycles. Indeed, major items of equipment and the means of production and transport (for example, power stations, generators) have always been produced on this basis, and complex commodities (for example, large jet airliners and ships) have never been mass produced but rather built to order.[21] It would however be erroneous to suppose that flexible production centered around economies of scope has become dominant and that mass production has disappeared. Mass production remains prominent, not least in "high-tech" sectors typically seen as characterized by rapid product and process innovation. As computer manufacturers have increasingly sought to compete via more customized products, "the search for scale effects has been displaced from computers to standardised components, particularly the semi-conductor components" (Delapierre and Zimmerman, 1993, 77–78). The continuing importance of mass production in large, often vertically integrated, companies and large factories is strongly at variance with suggestions that "leading-edge" sectors are dominated by small firms and vertical disintegration of production. The development of new areas of growth in electronics "provides little support for models of flexible specialisation" or for the view that a new order has been established in which vertical disintegration and market relations are increasingly predominant (Dunford, 1991, 78). In the United States, electronics companies typically seek to introduce Taylorist mass production of standardized products. The "conventions of the system" effectively encourage invention and innovation but then privilege the efficiencies of mass production (Storper, 1993, 449).

The rise of vertically integrated Japanese semiconductor producers to a position of global domination in merchant (mass) semiconductor markets during the 1980s exemplifies the reasons for the persistence of mass production in new "high-tech" sectors. Their rise coincided with some important changes within the global industry, ultimately driven by the pursuit of profits via deployment of new technology. Semiconductor production was becoming more capital-intensive. Packing the maximum amount of circuitry into a state-of-the-art chip required increasingly expensive manufacturing equipment and machinery. The capital costs of a fabrication line for leading-edge chips rose from about 15% of total fabrication costs in the mid-1970s to about half the costs by the mid-1980s and over 60% by the early 1990s. Much of this equipment was highly specialized, with little or no scrap value outside of the semiconductor

business. Due to the rapidity of technological change, it had a relatively short economic life span. "Investments in semi-conductor manufacturing therefore were often difficult to liquidate for more than a fraction of their acquisition cost. Such investment took on the character of a sunk cost. The increasing share of such sunk costs in total manufacturing costs made entry to and exit from the industry more expensive and difficult" (Flamm, 1993, 66–70).

In summary, these factors combined to create considerable pressures for dedicated mass production of successive generations of chips within large vertically integrated companies. The changing character of the product because of technological innovation is of particular importance for the choice of the production model. Previously, when only relatively small numbers of circuit elements could fit within a single integrated circuit, manufacturers developed "standard" chips that produced general "generic" functions that could then be combined into more complex proprietary systems. Once entire systems could be integrated into a single chip, it was no longer competitive to assemble standard building blocks into more complex systems, as the costs of wiring and testing became prohibitive. However, continuous mass production requires particular labor market conditions to allow companies to produce on a 24-hour-per-day, seven-day-per-week basis in order to minimize the turnover time of fixed capital (Kehoe, 1992).[22]

Product Innovation

Whereas process innovation involves firms in competition for shares of existing markets, product innovation aims to create new markets in which companies can be sole and monopolistic producers. Given the pace of technological change, "performance superiority will be brief," however—hence the emphasis on continuous product innovation as a route to competitive advantage (Mitchell, 1998). The scale of product innovation is truly staggering. For example, from 1980 to 1993 the number of new products introduced in supermarkets in the United States grew at an average annual compounded rate of 14%. More than 17,000 appeared on store shelves in 1993, a pace of product innovation linked to the increasing customization of commodities (Wernick et al., 1997, 148). Product innovation can thus relate to enhancement of "existing," often seemingly mundane, products. Such innovation can also involve creating qualitatively different products within the same market segment as companies strive for a competitive edge by further segmenting mature markets (Griffith, 1998).[23] Incremental innovation is increasingly important in allowing changes in response to consumer demand in more differentiated markets (Nooteboom, 1999). Such product differentiation and market segmenta-

tion encompass both manufactured goods and services. For example, product innovation in holidays has involved a switch from an "old" tourism based around packaging and standardization to a "new" tourism that encompasses segmentation, flexibility, and customization (Poon, 1989). Creating totally new products is of the greatest significance, however, and involves the construction of new markets rather than a "zero sum game" as to the allocation of shares of a given market. It therefore has a potentially much greater transformative impact on the geographies of production and trajectories of economic growth. New products need to open up new markets if they are to succeed within the parameters of capitalist production and allow individual companies to increase their mass of realized surplus-value. Capital displays great ingenuity in creating new products. For example, people's growing anxieties as to their identities in a period of fierce time-space compression led to the (re)invention of tradition as a sphere of commodity production and consumption (Harvey, 1996, 246). There are, however, no guarantees of success, as product innovation is risky (Mitchell, 1998).

The systemic tendency of capitalist production to generate new products in turn raises further issues. The first relates to the ways in which companies develop new products and the relationship *between* research and development. In Taylorist mass production there is a linear sequential model of R&D creating "breakthrough" product innovations, then producing them in long runs of standardized products. In more flexible systems of high-volume production the processes of product innovation and development are structured differently. In particular, there are three distinctive organizational features: "self-organizing" development teams; overlapping development phases, replacing a segmented with a shared division of labor; and a commitment to continuous learning. Changing the form of product innovation from the mass production linear R&D model to new flexible forms of production—at the limit, producing batch sizes of one in deeply fragmented markets—severely circumscribes the utility of the concept of the product life cycle. Competitive success depends upon being the first to identify an emerging market, a segmenting market, or a change in consumer requirements in a previously unchanging market. Success depends upon minimizing product development and product changeover times, not upon being the lowest-cost (or highest-throughput) producer. In California, for example, small and medium-sized enterprises (SMEs) manufacturing "high-tech" products are involved in an intensely competitive "race to the market," as many of them are seeking to make the same product innovations. This "race" is the principal axis of competition for these small firms—not price competition. Moreover, such pressures for accelerating product innovation are increasing. This is linked to increasing volatility and ephemerality in fashions and tastes as product

life cycles for many commodities become increasingly brief, even transitory, as when the commodity is a performance or spectacle (Harvey, 1989).

The growing emphasis on networked approaches to production organization has also influenced product innovation and has led to a reappraisal of the linear R&D model, in two spheres. First, the emergence of new forms of network relationships between firms is influencing the organization of product innovation. "Quasi-vertical disintegration" can help facilitate coordinated design and investment. As a result, the product development process, from planning and conceptualization through designing and engineering to manufacturing, is more reflexive, consisting of overlapping and recursive rather than discrete linear stages (Sayer and Walker, 1992, 218). Second, incorporating network concepts into the internal organizational structures of firms as well as the structuring of interfirm relations, has also influenced processes of product development by highlighting the importance of information flows and interaction within and between all sections of a company.[24]

Nevertheless, human creativity remains central to product innovation, however this process is organized and whatever model of production is deployed. Consequently, there may well be tensions and complex relations between certain sorts of processes and product innovations. Not least, there are limitations to innovation and product flexibility within automated production systems and computer integrated manufacturing. The product flexibility of such systems depends upon modeling the part or product within the computer system. As such, product flexibility is confined to the range of possibilities programmed into the controlling computers, and this becomes critical to product innovation. Thus, firms committed to developing highly automated production strategies and "unmanned factories" still depend upon people somewhere for innovative capacity. This raises important questions about creativity and the creation of new knowledge—as opposed to the diffusion of existing knowledge and learning by others seeking to "catch up."[25]

The second issue concerns where new products are produced—in "new" or "old" firms, in "new" or "old" industrial spaces, in previously unindustrialized areas or in areas with an industrial history and tradition—and the factors influencing this locational choice. In some circumstances there is a close relationship between product innovation and new firm formation in particular locations. In certain respects, the volatility and ephemerality of products is enhancing the significance of particular places as centers of product innovation. Industrial districts, producing a range of commodities, have often been centers of product innovation, based on intense linkages and sharing of knowledge between firms and other institutions. For example, product innovations in banking and fi-

nancial services have become closely linked to London, New York, and Tokyo, centers of innovation, interpretation, and interaction (Amin and Thrift, 1992; Sassen, 1991). In the late twentieth century new industrial spaces of California, new firm formation is closely tied to product innovation in the information technology and computing industries (Storper 1993, 446). New product-pioneering firms are spun off from existing ones, deepening both horizontal and vertical divisions of labor and the transactional tissue of the local industrial complex. Cox (1997, 179) notes the importance that analysts such as Storper have placed upon spatial proximity between the producers and users of new technologies in product innovation and development. He points out that at another stage in the development of new products, their actual launching on the market, spatial concentration again becomes important because frequent personal communication and rapid decision making are crucially necessary at that stage (Pryke and Lee, 1995). There are echoes here of an older notion of product innovations diffusing down the settlement hierarchy, from the largest to successively smaller cities and towns. The greater density of population in metropolitan areas, along with the greater receptivity of at least some of their residents to more radical change, makes them the most promising locations in which to launch new products (Brown, 1975). The third issue of how demands are created for new products is explored in the next section.

5.4. Competition via Market Creation and Marketing Innovation

Best (1990, 14, emphasis added) argues that firms can succeed by identifying and "*responding to*" changes in markets or consumer preferences. "Responding to" changing demands means being the first to supply consumers with a newly designed product, highlighting the significance of minimizing product development cycles. As such, Best perhaps overestimates the extent to which firms simply respond to exogenously given changes in market demands rather than actively seeking to change consumer tastes and cultivate preferences for new products via advertising as part of Schumpeterian "market disturbing" competitive strategies. Because consumers possess imperfect knowledge, they are susceptible to influence via advertising (Mort, 1997).

Advertising has a venerable history, but it is only quite recently that it has been more than a marginal influence on patterns of sales and production (Williams, (1980, 177–186). The great bulk of products manufactured during the early stages of the factory system were sold without extensive advertising. The formation of modern advertising has to be traced to the emergence of new forms of monopoly capitalism around the

end of the nineteenth and beginning of the twentieth century. The development of modern advertising—or, put another way, product and process innovation in advertising—was one element in corporate strategies to create, organize, and where possible control markets, especially for mass-produced consumer goods. Mass production necessitated mass consumption, and this in turn required a certain homogenization of consumer tastes for final products. This entailed radical changes in the organization of advertising itself, both in terms of advertising media and via more conscious and serious attention to the "psychology of advertising." Thus, the period between 1880 and 1930 saw the "full development of an organised system of commercial information and persuasion, as part of the modern distributive system in conditions of large-scale capitalism." Indeed, modern capitalism could not function without advertising, which offered mass-produced visions of individualism (Ewen, 1976). It is impossible fully to grasp the significance of advertising "without realising that the material object being sold is never enough: this indeed is the crucial cultural quality of its modern forms." Thus, commodities, even the most mundane necessities of daily life, must be imbued with symbolic qualities and culturally endowed meanings. Commodities thereby meet both the functional and symbolic interests of the consumer (Williams, 1980, 185, original emphasis):

> We have a cultural pattern in which the objects are not enough but must be validated, if only in fantasy, by association with personal and social meanings. . . . The short description of the pattern we have is *magic*: a highly organised and professional system of magical inducements and satisfactions, functionally very similar to magical systems in simpler societies, but rather strangely co-existent with a highly developed scientific technology.

The competitive pressures of contemporary capitalism have stimulated further refinements to "the magic system," with heightened importance attached to culturally endowed and symbolic meanings of commodities and the identities that people (in part) form through consuming them. People's identities have been "welded to the consumption of goods" (Ewen, 1988, 60), linked to further product and process innovations in the form of advertisements (Lash and Urry, 1994, 140–141). One corollary of the enhanced significance of cultural capital and the meanings of things has been a deepening social division of labor that incorporates a complex and sophisticated advertising sector in addition to advertising divisions within companies. The growing significance of advertising and marketing has generated "white-collar" jobs, heavily concentrated in major urban areas, in—or subcontracted from—manufacturing firms

(Perrons, 1992). Advertising knowledge and skills have become critical resources and marketable commodities. Moreover, in strong opposition to those who argue the case for "consumer sovereignty," Williams (1980, 193) emphasizes that "in economic terms, the fantasy operates to project the production decisions of the major corporations as 'your' choice, the consumer's selection of priorities, methods and style." Or, as McDowell (1994, 160) puts it: the production, advertising, and marketing of goods is a crucial part of their consumption, "as anyone who wears Levis knows!" This highlights the ways in which companies seek to imbue commodities with particular meanings via advertising and marketing strategies.[26]

Although Warde (1994) argues that there is a strong tendency to exaggerate the significance of establishing self-identity via consumption, others have emphasized the increased significance of advertising for contemporary capitalism in creating consumer demand via appeals to consumer individuality and identity (Lury, 1996). Jameson (1988, 84), for example, argues that there is now an absolute preeminence of the commodity form. The logic of the commodity has reached its apotheosis. This is based upon a heterogeneous market that thrives on difference and incommensurability, fueled by the cut and thrust of "symbolic rivalry, of the needs of self-construction through acquisition (mostly in commodity form) of distinction and difference, of the search for approval through lifestyle and symbolic membership." This elaboration of commodification has been made possible by the development of the mass media, especially television. Advertising and design companies, in conjunction with the mass media, have produced an enormous machine for generating a desire for commodities—a greatly enhanced "magic system"—via more powerful, sophisticated, and persuasive processes of sign production. Such production via the advertising industry is a necessary condition *for* exchange relations and the circulation of capital, the dominant driving process.[27]

Some argue that such a perspective tends to overemphasize the power that advertisers, allied to retailers, can exert over consumers (Jackson, 1993). Advertising is rarely the sole or even most important source of prepurchase knowledge about the existence or qualities of particular commodities, "seldom the single stimulator of wants and desires" (Pred, 1996, 13). It is certainly the case that "consumers do not *straightforwardly* draw upon meanings prescribed by retailers and advertisers, but rather that commodity meanings are often contested and re-worked by consumers" (Leslie and Reimer, 1999, 433, emphasis added). While producers "create a series of texts," these are "read by different audiences according to their own social conditions and lived cultures" (Jackson and Taylor, 1995, 365).[28] While the process may not be straightforward, advertising undoubtedly can exert enormous influence in mediating and

shaping the changing relationship between the sign values of commodities, their symbolic meanings, and their material content and form (Fine and Leopold, 1993, 28). One can, however, go too far in celebrating consumer autonomy, reflexivity, and resistance. Not least, companies continue to realize surplus-value via the successful sale of commodities, suggesting that advertising strategies have considerable efficacy in relation to reproducing capital on an expanded scale. While Jameson may underestimate the capacity of consumers to challenge or even subvert the commodification strategies of capital (Thrift, 1994a, 222), it is more difficult to challenge claims as to the creation of demand via advertising and marketing strategies.

There is therefore a decisive difference between firms in "structure dependent domains of competition" that react to market conditions as exogenously given and firms in "structure focused domains" that actively create demand and shape markets (Clark, 1992). Unlike the representative small firm, the strategies of representative large management-controlled corporations are not dependent on market structure (Clark and Wrigley, 1995, 207). These latter have the resources and market position to formulate and implement strategies aimed at changing the long-term configuration of the market via product development and advertising. While capacity to shape markets should not be conflated with firm size, it is important to differentiate between firms that respond strategically *to* market turbulence and those that, by being first-movers in their industry, strategically *create* market turbulence for their competitors (Pine, 1993, 135). Reducing product life cycles, fragmenting demand, and creating demands for new products can yield powerful advantages for those causing these changes and problems for those forced to react to them.

The power to shape demand, to create and disturb markets, has become an increasingly important part of competitive strategy as product life cycles shorten and/or markets become increasingly fragmented and segmented and/or the boundaries between goods and services become increasingly blurred. The fusion of goods and services, redefining what constitutes the product, and the consequent mutation of markets are "without doubt" the most significant aspect of the "new economics of production." Rather than, say, a car being thought of as simply a material product, it "is conceived from the outset as a set of services provided to the user; in addition it is sold with various services that make it a service good" (Hudson and Schamp, 1995b; Veltz, 1991, 199). This, among other things, strongly challenges conventional accounts that seek to differentiate between services and manufacturing or to identify a "post-industrial" economy.[29]

Corporate (lack of) capacity to create and shape demand and markets is thus crucial to competitive strategy. Some firms can only react to

exogenously given market changes. Their focus is essentially short-term, reactive, and adaptive. Other firms generate these changes and deliberately introduce market instability as part of *their* longer-term strategies for competitive success, often allied to product, process, or organizational innovation and the shaping of demand within a "strong" competitive strategy. The way in which leading companies in a sector (re)structure product markets thus becomes critical. Lagging companies can only delay and not permanently forestall the factors that cause markets to change: "Companies that recognize this will not so much manipulate the market to regain stability as much as revel in its uncertainly to gain significant advantage over competitors" (Pine, 1993, 61). Recognition of the significance of different types of corporate responses is important, although Pine (like Best; see above) understates the extent to which companies create market turbulence rather than simply "revel" in exogenously produced uncertainty resulting from rapidly and unpredictably changing consumer preferences in markets shaped by "consumer sovereignty."

5.5. Market Structures, Competition, and the Processes of Globalization

The processes of globalization generate coexisting pressures to both homogenize and differentiate product markets via advertising. On the one hand, there are pressures toward market segmentation. In higher-income countries there is more scope to play upon the symbolic aspects of products; the same point could be made with respect to higher-income social groups irrespective of location. This suggests that companies will develop strategies to segment markets socially and spatially and will develop different advertising and sales strategies dependent upon the characteristics of consumers and places. For example, in clothing the mass market has undergone a process of fragmentation in terms of both consumption patterns and retailers' attempted manipulation of these. This has led to the growing importance of strategies aimed at tapping precise segments of the consumer market and hopefully building up allegiances to one store (Crewe and Davenport, 1992, 186). Storper (1993) attributes the growth in the branded ready-to-wear (*prêt-a-porter*) clothing market in France to the rise of new social groups, especially the urban professional classes, and the resultant new forms of social distinction in fashion. High fashion in the strict sense has been replaced by widely marketed but nonetheless not mass-produced garments. More generally, there has been a clear relationship between the rise of "flexible specialization," the production of commodities for niche markets, the expansion of certain types of private sector services, and the regressive redistribution of disposable income to the middle classes in the core capitalist countries. This further concentra-

tion of purchasing power in already affluent social groups was central to neoliberal political projects in the 1980s (Currie, 1993).[30]

On the other hand, there continue to be pressures globally to homogenize consumer tastes for final products (for example, to allow the continuing realization of scale economies). This is an important pressure toward globalization (Mariti, 1993). Many argue that market structures have changed decisively as one dimension of the processes of globalization, as companies seek to shape markets within a global economy. In a wide range of industries and product groups, the world market is shared by, at most, ten to twelve firms (Organization for Economic Cooperation and Development, 1992). In these circumstances leading firms have considerable scope to create market conditions via a variety of regulatory and governance mechanisms—for example, by market sharing and price setting—rather than simply respond to them, thereby avoiding the worst excesses of "ruinous competition." Such behavior is not, however, new. Best (1990, 50–72) notes how capitalists in the United States responded to the threat of "ruinous competition" in the late nineteenth and early twentieth century by, among other things, seeking to control product markets and to coordinate supply and demand at profit-making levels. They sought to do so in one of three ways: via dominant firm regulation, interfirm cooperation and cartel formation, or government regulation. The owners of the Great Northern Coalfield in northeast England effectively controlled markets via the Vend, a market-sharing arrangement, during the eighteenth century (Sweezy, 1938), while cartels were central to the organization of the interwar economies of Germany and Japan (Best, 1990). More generally, markets are of necessity routinely governed and regulated in varied ways.[31]

Global oligopoly has become the most significant type of supply-side structure, coupled with important changes in the marketing strategies of multinational enterprises (Chesnais, 1993, 12–13). It is now the dominant form of supply structure in most R&D intensive or "high-technology" industries as well as in many "scale-intensive" manufacturing industries in which scale economies remain pivotal. Moreover, new forms of flexible high-volume production have reinforced the significance of oligopoly, since the firms involved in such production evolve in a world of oligopolistic competition. Their capacity and cost strategies "*reconstitute* the principle of barriers-to-entry—and oligopolistic rents—which characterize large scale production" (Coriat, 1991, 155, emphasis added). The oligopolistic character of markets was further reinforced—given an "irreversible character" (Chesnais, 1993, 17)—by the entry of the Japanese keiretsu onto the global stage in the late 1970s. While seeking to extend their global reach, the keiretsu also developed sophisticated systems of excluding foreign companies from much of the Japanese economy by de-

nying them acquisition of any Japanese company that could serve as a market entry point or enable them to control any distribution system. By keeping tight control of distribution systems in Japan, the keiretsu could charge market prices significantly above those of their competitors in western Europe and North America. The resultant superprofits could then be used to take risks and support new technologies that were unprofitable in the short run but were seen as significant to long-term strategic corporate goals (Lie and Santucci, 1993).

More generally, within the constraint that prices must allow for a return on capital invested in the form of profits, pricing policy reflects corporate goals and the time span over which companies consider profitability. In circumstances of serious overproduction, perhaps coupled with technologically obsolete production methods, companies may adopt predatory pricing structures via the phenomenon of "dumping" goods. There is a well-documented history of such dumping practices in the steel industry in Europe, for example (see Hudson and Sadler, 1989). There may be important differences in pricing policy guided by varying strategic objectives. Companies use average cost pricing in situations of rapid technological advances in which they anticipate falling marginal costs because of scale economies and learning effects (for example, in the electronics industry) and in which their concerns are directed at long-term profitability and reasonable market share (Lie and Santucci, 1993). Conversely, in circumstances in which there is an emphasis upon short-term profitability and a rapid turnover time for the capital invested, prices are set in relation to actual costs, typically on a cost-plus basis. While the former approach is often thought of as representative of major Japanese firms, the latter is typically seen as characterizing Anglo-American companies (reflecting different cultures of capitalism).[32]

While competition is often much more complex than simply setting appropriate prices, embracing issues such as product quality, reliability, and after-sales service, it is important not to underestimate the continuing salience of price competition. The benefits of low prices arising from economies of scale and other cost advantages of mass production are enduring features of production (Pine, 1993, 50). Companies that can produce at lower costs and prices have a distinct competitive advantage. They will however be more successful if they can retain low prices while providing the variety that their customers demand. Put slightly differently, other things being equal, price competition remains very significant—and in some circumstances lower prices may well take precedence over higher quality (for example, because of income constraints on consumers). On the other hand, as the feedback loops from customers to suppliers become reinforced, niche markets become smaller and the logical limit to this process is the customization of individual commodities, analogous to

the outputs of craft production, the significance of price as a dimension of competition is diminished. While this may be the *logical* conclusion, it is certainly not a practically *feasible* conclusion. There are two main reasons as to why this is so. First, because of technological constraints, mass customization seems most feasible in product segments in which new information or telecommunications technologies are central to the provision of goods and services (Pine, 1993, 155). Second, because of income constraints on consumers that both limit the extent to which markets can be fragmented into myriad niches and generate pressures toward consolidation and homogenization of consumer demand (Pine, 1993, 241–253). Consequently, many products will continue to be produced on a mass or batch, as opposed to individually customized, basis, and price will remain a critical dimension of competition in many markets.

The unprecedented variety of choices available to companies in terms of combinations of marketing and production strategies can be illustrated with reference to the ways in which they can respond to market saturation in sectors dominated by mass production. For example, in the most advanced capitalist countries markets for many "white" consumer goods had reached saturation levels by the 1960s and 1970s. Companies wishing to grow in saturated markets can adapt one or more of several approaches, some of which are explicitly spatial (Pine, 1993, 64): they can invade foreign markets with current products; create alternative uses for current products, to "break through a natural saturation limit"; create extended products for alternative use; increase the rate of innovation to decrease the life of existing products and speed up product replacement times; or meet customer needs more closely by increasing the amount of variety or product customization, to gain a larger share of new or replacement sales. The first two, perhaps three, of these options allow firms to retain mass-production strategies—and to these one could add relocating production to cheaper production sites to reduce prices and increase market share.[33] The last two, perhaps three, of these options involve moving toward different methods of more flexible high-volume production, although the geographies of production associated with such a shift are contingent. Moreover, each of these options implies different strategies in terms of marketing and the creation of markets.

5.6. Competition via Learning and the Creation and Monopolization of Knowledge

Innovations depend upon learning, the production and dissemination of knowledge. Recently the significance of knowledge and learning in the contemporary organization of production and the performance of indi-

vidual firms within the economy has been increasingly emphasized (Giddens, 1990; Strange, 1988). Knowledge is seen as the most strategic resource and the capability to learn as the most important process within the contemporary capitalist "learning economy" (Lundvall, 1995). Information increasingly forms outputs from as well as inputs to production. However, knowledge and learning have always been central to economic performance and commodity production. Knowledge has always been embodied in goods and services. The key issue is therefore the *new* ways in which knowledge is important in production.

Some years ago Penrose (1959) developed a theory of the firm that revolved around notions of learning. She defines the firm as a bounded administrative unit, involving teamwork among individuals in order for it to function. Since everything cannot happen at once, it takes time for people to learn and for teamwork to develop.[34] Similarly, the boundaries of the firm can only be extended with time. The idea of the "learning firm" is therefore not new, but it too has recently experienced a revival. There are, however, several strands to the learning literature, emphasizing different aspects and ways of learning: learning-by-doing (Arrow, 1962); learning-by-using (Rosenberg, 1982); and learning-by-searching (Boulding, 1985; Johnson, 1992). Such ideas of learning explicitly or implicitly are central to evolutionary and institutional approaches that emphasize the centrality of knowledge to behavior. For example, the idea of learning-by-doing underpins that of firms as communities of practice.[35] Perhaps the most influential, however, has been learning-by-interacting (Lundvall, 1992). It focuses upon companies learning about and adapting to "best practice" via networked interaction with other firms and institutions as the route to competitiveness in circumstances of rapid technological change and uncertainty. Learning thus involves more that simply transactions of information within markets or hierarchies, in turn raising questions about the extent to which such networks are sectorally or territorially constituted (and, if so, at which spatial scale; see below). It is acknowledged to be strongly path-dependent, although significant breakthroughs often involve shifting onto new, rather than further along existing, paths.

Another important distinction can be drawn between single-loop and double-loop learning, especially as this relates to incremental and radical innovations (of product, process and organizational form). Single-loop learning involves the exploitation of possibilities within the boundaries of existing production paradigms, while double-loop learning is a means of exploring alternatives to those paradigms (Levinthal, 1996). As such, single-loop learning involves incremental change within a given production paradigm rather than redefinition of that paradigm. Learning can thus entail a form of inertia via cognitive lock-in, thereby threatening

competitiveness. Double-loop learning reflects the increased grounding of production in discursive knowledge. Knowledge based on reflexivity operates via a double hermeneutic in which the norms, rules, and resources of the production process are constantly called into question (Lash and Urry, 1994, 160–161). Thus, production involves complex processes of learning. Double-loop learning entails radical transformative change and, as such, involves an "unlearning" process, as learners discard obsolete and misleading knowledge. Such an "unlearning" capacity may be critical to corporate survival in uncertain and volatile environments. Conversely, for leading-edge firms, the ability to create "market-disturbing" strategies based around radical change and double-loop learning can be a source of considerable competitive advantage.

Learning thus both presupposes and produces knowledge, and some sorts of learning require forgetting what is already known. However, knowledge is heterogeneous. It exists in varied forms. There is, in particular, a critical qualitative difference between information and tacit knowledge, and this can be related to different forms of transmission mechanisms and corporate governance structures (see Table 5.1). Information is codifiable (and so commodifiable and tradeable) knowledge that can be transmitted mechanically or electronically (for example, as bits along the fiber optic cables of a computer network). In principle it can become

TABLE 5.1. Types of Knowledge and Modes of Learning

	Types of knowledge	
Modes of learning	Tacit	Codified
Internal	• Learning in doing and experiential learning • Communities of practice • On-the-job training • Need for local action	• In-house R&D • Intrafirm training programs • Coordination between R&D and workforces
External	• Largely learning localized tacit knowledge • Face-to-face contact and informal exchanges by acquaintances • Importance of the localized learning milieu	• Organizational embodiment of external explicit knowledge • Interfirm alliances and joint ventures • Importance of a firm's absorptive capacity • Need for a mode of coordination between participating firms

Source: Based on Lee (2001).

ubiquitously available. Tacit knowledge in the form of know-how, skills, and competencies cannot be so codified and ubiquified. "Experiential, practical or 'tacit' knowledge may be embedded in skills, routines, practices or teamwork" (Polyani, 1967, 127). As such, tacit knowledge "is inseparable from the collective work practices from which it comes"[36] and "some tacit knowledge is always required in order to use new codified knowledge" (Foray, 1993, 87).[37] Foray thus emphasizes the asymmetric relationship between qualitatively different types of knowledge. Acknowledging that knowledge is "tacit" problematizes its communication and transmission to others who lack access to the unwritten codes of meaning in which such knowledge is embedded and upon which its meaning depends.[38] Such tacit knowledge may indeed be unique to particular individuals rather than collective in character—in which case communication is, for even greater reason, problematic—but it often *is* collective rather than simply individual, locally produced, and often place-specific. Know-how thus cannot be divorced from its individual, social, and territorial contexts; as such, it is at best only partially commodifiable. It can only be purchased, if at all, via the labor market as embodied knowledge and not in the form of patents, turnkey plant, or other forms of "hard" technology. In certain circumstances mobility within the labor market can be a crucial mechanism of knowledge diffusion. For example, the labor market of Silicon Valley "serves as a conduit for the rapid dispersal of knowledge and skills among Silicon Valley firms" (Angel, 1989, 108). Recognition of these uncodifiable aspects of learning and knowledge creation is important, signifying that these processes are qualitatively different from the simple transfer of codifiable knowledge as information. Such tacit knowledge and learning capacity is often seen as *the* key competitive corporate and territorial asset.

For knowledge to be commodified it must exist in an alienated form. Much of the debate about knowledge versus information and codified versus tacit knowledge "is actually about the possibility of, and difficulties with, such alienation in the case of technological knowledge" (Athreye, 1998, 14). For knowledge to become information and markets in technological knowledge to emerge, it must become commodified and exchangeable. It must be produced by a firm not for its own use (as a use value) but to sell to another to deploy in its production process (as an exchange value). Technological convergence is necessary in creating the "unique conditions" under which specialized markets for selling knowledge-embodied products can emerge (Athreye, 1998, 13–28). Furthermore, technological convergence goes hand in hand with the emergence of new generic technologies. As industries share similar technological bases, "technological knowledge can be freed from its particular context and sold in specialised ways." Such convergence also makes possible a

second condition necessary for the emergence of specialized knowledge markets: that is, the existence of recurring and reasonably frequent transactions. Industries based upon specific and nongeneric technologies do not develop such markets, and production remains grounded in firm- or industry-specific technologies and tacit knowledges. Athreye stresses that the emergence of markets in technological knowledge is historically (and one can add, geographically) specific, confined to periods of technological convergence. Even so, their existence does not guarantee equality of access to information traded in them. There may, for example, be considerable barriers to acquisition and entry to such markets as a result of cost.

Renewed emphasis on the generalized significance of knowledge in production problematizes the distinction between "product" and "process" innovations. It challenges the validity of the "linear" Taylorist R&D model and of the routinization of R&D within large firms as dominating knowledge production. This organizational model remains appropriate and powerful in some circumstances but in others can incorporate crucial weaknesses, especially given rapid shifts in product markets, for there are no necessary feedback loops from users of and customers for innovations to those within the firm charged with responsibility for producing them. Consequently, new products may not be attuned to consumer tastes and may fail in the marketplace. As Cornish (1995, 34) puts it, "Continuous learning on the part of both producer and consumer leads to the dynamic process of perpetual innovation that, in successful firms, results in growth." Conversely, opportunities for new products may be missed. Furthermore, the growing significance of the symbolic meanings attached to consumption, especially in circumstances in which the commodity is an event or spectacle (Harvey, 1989), places an even greater premium on knowledge of consumer tastes and the ability to shape them via advertising.

In these circumstances, knowledge creation and innovation must become pervasive processes throughout the firm. The ideal is to emulate the (originally Japanese) process of "kaizen," continuous improvement through interactive learning and problem solving (Sadler, 1997), generated by an actively committed and engaged workforce dedicated to enhancing corporate performance.[39] The emphasis is upon creating dense flows of knowledge and information, horizontally and vertically within and between the functional divisions of a company, while sensitizing those involved within the company to voices from outside its boundaries. The aim is to create and support "communities of practice" within the company and build a "seamless innovation process," bringing together everyone involved in product development, from those who have the initial idea to those who finally take it to the marketplace. Creation of multidisciplinary and cross-departmental "concept teams" with responsi-

bility for product development is seen as a way of sharply reducing the socially necessary labor time taken to bring new products to market. Increasingly these are organized as "globally distributed teams" which "meet" via video conferencing and other forms of electronic technology. This reliance on distanciated social relationships of intellectual production, rather than face-to-face meetings, reflects increasing pressures on managerial time and resources but can also create problems in transmitting tacit forms of knowledge as these teams seek to work together on very tight deadlines (Miller et al., 1996). While these globally distributed teams are not quite "virtual organizations" or "virtual corporations" (Pine, 1993), they do represent a significant change in the organization of intracompany processes of knowledge creation and innovation.[40]

Because social systems evolve nonlinearly (Amin and Hausner, 1997), revolutionary innovations may be produced in unexpected ways via interactive processes that involve synthesizing different types of knowledge rather than by privileging the scientific knowledge of the R&D laboratory over other knowledges. Indeed, the production of such general and abstract formal knowledge depends in part upon other sorts of knowledge, tacit skills, and capabilities (Arora and Gamborella, 1994, 528), but "firms cannot be content just with understanding problems in abstract terms. In order to come up with specific new products or processes, they have to deal with the complexity and idiosyncratic aspects of applying knowledge to concrete problems, a process which relies heavily on tacit abilities and trial-and-error." This requires acknowledging the legitimacy and "voice" of different types of knowledge (not least as radical innovations often challenge the dominant "logic" within an industry) and enhancing corporate competitiveness by producing higher-quality products more flexibly. It necessitates closer integration of R&D with other sections within companies, with far-reaching implications for their internal organization and operation. Such tendencies are observable in both small flexibly specialized firms and units and in new forms of high volume production.[41] In its most pronounced and knowledge-intensive form, production becomes very much a "design process" and an "R&D process"; production becomes R&D and the production system operates as an expert system (Lash and Urry, 1994, 96). Growing emphasis on the significance of learning and knowledge creation in new forms of production organization links in with propositions about emergent forms of more rewarding, satisfying, and engaging work, reuniting the manual and the mental.[42] Even at the high point of Fordism, however, much manual work was performed by knowledgeable craft workers (Pollert, 1988). Innovation and learning are now nonetheless seen as creative processes that must be suffused throughout the entire workforce, capturing the knowl-

edge of *all* workers to increase productivity and enhance the quality of both product and work in a knowledge-based economy (Florida, 1995). Flexible production is both innovation-intensive and knowledge-intensive. "Specialised product requires flexible process, requires innovatory process, requires knowledge-intensive process" (Lash and Urry, 1994, 121).

Know-how historically was, and in large measure still is, typically a kind of knowledge developed within, and then kept within, the confines of a firm. Such knowledge defines its core capabilities and competencies (Penrose, 1959). As such it is an asset that companies seek to keep from their competitors, imposing an economic limit on the extent to which companies are prepared to share at least some sorts of knowledge. Nevertheless, the growing complexity of the knowledge base upon which the economy depends is increasing the social division of labor in knowledge production, resulting in growing numbers and varied forms of collaborative long-term relationships between firms. Consequently, know-*who* is of growing importance in the production of know-how (Lundvall and Johnson, 1994). Enhanced emphasis on knowledge and learning therefore links with claims about new forms of relations between companies, based on cooperation, trust, and sharing knowledge for mutual benefit.[43] Emphasizing networks has foregrounded the significance of territory and proximity. Proximity may be critical in innovation and learning, especially in situations of rapid and radical technological change (Lundvall, 1988, 355, emphasis added):

> When the technology is complex and ever changing a short (geographical and cultural) distance *might* be important for the competitiveness of both producers and users. Here the information codes must be flexible and complex, and a common cultural background *might* be important in order to establish tacit codes of conduct and to facilitate the decoding of the complex messages exchanged. . . . When the technology changes rapidly and radically . . . *the need for proximity in terms of geography and culture becomes even more important.* A new technological paradigm will imply that established norms and standards become obsolete and that old codes of information cannot transmit the characteristics of innovative activities. In the absence of generally accepted standards and codes able to transmit information, face-to-face contacts and a common cultural background *might* become of decisive importance for information exchange.

Subsequently, the importance of spatial proximity to corporate innovation, learning, and competitive success has been increasingly emphasized. Lundvall (1992) stresses the significance of national innovation sys-

tems and shared language and culture, as well as formal legislative frameworks, in shaping trajectories of innovation and learning.[44] Others privilege the local or regional over the national in the production of knowledge and learning,[45] heavily influenced by the "rediscovery" of industrial districts in the Third Italy (Bagnasco, 1977). The major strength of such districts is an institutional capacity continuously to learn, adjust, and improve in economic performance. The ideal of a dynamic industrial district is networking without hierarchy. The notion of a community of producers, in which a single firm is at the apex of a captive hierarchy, is replaced with that of intersecting networks with multiple apexes in which no single firm is permanently at the head of any hierarchy. This "protean" feature of a dynamic industrial district enhances learning capacity. Supplier firms with multiple relations to firms in other sectors are exposed to new ideas (Best, 1990, 234–237). The merits of complex networks of territorially agglomerated small firms are stressed as the main—perhaps the only—route to learning.

However, the conditions for social learning and development of the division of labor cannot be reduced to some ideal type of network composed of vertically and horizontally disintegrated small firms. They may be within-plant and within-firm as much as they are between plant and between firm. The occurrence of "extremely dynamic firms, like Boeing, Cummins or Pilkington dominating local economies with little local synergy is exemplary" in this regard (Cox, 1997, 179). Furthermore, in some circumstances linked processes of interfirm and intrafirm learning may be decisive. For example, complex processes of interactions between and within firms of varying sizes characterize the Italian case, often seen as the archetypical example of the advantages of small firms linked into industrial districts. Thus, the Italian model "very effectively illustrates the mechanisms by which channels of accumulation of tacit or non-tacit codified knowledge develop and shows how virtuous circles are established between these channels and the processes of formation of industrial know-how in advanced mid-sized and large companies or in integrated networks of firms (industrial districts)" (Garonna, 1998, 228).

Others have sought further to develop these ideas of regionally based learning via concepts such as "technology district" or "regional world of production" (Storper, 1992, 1993), "learning region" (Morgan, 1995), or "regional innovation system" (Braczisch et al., 1998), which do not *necessarily* privilege networks of small firms. Storper (1993, 434–435; emphasis added) insists that user–producer interactions

> involve the difficult and not easily objectifiable process of interpretation. . . . The whole transaction structure may be subject to redefinition as new types of products and new firms enter the structure and as

> whole new sub-nodes, channels and codes of transactions are defined. *Where rapid learning is taking place, the transactional structure is likely to involve constant negotiation, re-negotiation and dependence upon achieving common re-interpretation of new evidence and opportunities.* . . . Rules, institutions and practices of key collective agents enable local technological learning.

Technologically dynamic production systems consist of clusters of firms linked into an intricate social division of labor—both horizontal and vertical in nature—*at the regional level* (Storper, 1993, 450). These production systems continually redefine best (product and process) practices for their respective markets. Territorially bounded conventions grounded in a shared culture make product-based technological learning possible and define the basis of external economies within them (Storper, 1992, 86–90).[46] Thus, this particular type of corporate learning is seen as territorially grounded, collective, and socially governed and regulated.

There has therefore been growing acknowledgment of the significance of noneconomic relationships in underpinning regional economic success and regionally based learning systems. Emphasis is placed on territorially embedded shared values, meanings, and understandings, and tacit knowledge and the institutional structures through which it is produced. This is registered in concepts such as "institutional thickness" (Amin and Thrift, 1994) and "social capital" (Putnam, 1993) but perhaps most powerfully in the idea of "regions as a nexus of untraded interdependencies." As Storper (1995, 210, emphasis added) puts it, "the region is a key, *necessary* element in the 'supply architecture' for learning and innovation." Emphasizing "untraded interdependencies" or "relational assets" foregrounds the necessary territoriality of critical elements of nonmarket relations and tacit knowledge. This decisively shifts the focus from firm to territory as the key institutional form in the knowledge-based competitive struggle, to a collective and territorialized definition of competitive advantage that emphasizes the cultural and social underpinnings of economic success.

Regional institutional formations that allow regions to adjust to, indeed anticipate and shape, changing market demands are seen as pivotal. Innovation and knowledge creation are conceptualized as interactive processes, shaped by a varied repertoire of institutional routines and social conventions. This creates links between companies, the (local) state, and institutions in civil society as well as intercorporate collaborative links as the basis of regional competitive advantage. In a world in which codified knowledge is becoming increasingly ubiquitously available, uncodified knowledge rooted in relations of proximity becomes critical in deriving competitive advantage. Thus, "*as long as institutional sclerosis can be*

avoided," the relational assets of regions constitute a prime, and unique, source of success in a globalizing political economy "owing to their inimitability" (Amin and Cohendet, 1997, 4, emphasis added). The specific caveat "as long as institutional sclerosis can be avoided" is a crucial one, however. More generally, it is important to be aware of the limits to such an approach and emphasis.

Rather than privilege territorial over corporate knowledge production and learning (or vice versa), the *relationships between* these two institutional bases of learning must be explored. Equally, there is no a priori reason to privilege any particular spatial scale or size of firm, irrespective of time and place. Regional and locality-based learning and knowledge production systems can be of great significance (Larsson and Malmberg, 1999; Maskell and Malmberg, 1995, 1999; Maskell et al., 1998), especially if innovation systems are constituted sectorally—and at least potentially globally—rather than nationally (Metcalfe, 1996). The sectoral constitution of innovation systems across national boundaries emphasizes the significance of the place-specifically local within the global and of the links between corporate learning and territorially embedded knowledge. Globalized forms of corporate organization are predicated upon integrating fragmented products of local learning to further corporate interests. This may involve disembedding them from the contexts in which they were initially produced, and perhaps therefore finding ways of converting tacit knowledge into codifiable information.[47] Global corporations are developing organizational forms to repatriate the varied results of different localized learning experiences and integrating them within a collective body of knowledge to serve strategic corporate interests in increasingly international markets. There are powerful pressures on companies to source key inputs to production on a worldwide basis, notably in the form of scientific and technological advances made in foreign countries (Chesnais, 1993, 14–15). Securing access to locally produced knowledge is therefore also a process of intercorporate competition, involving complex relationships between knowledge production and acquisition and competition and cooperation between various territorial and corporate interests.

Competitive success depends upon how companies combine different types of knowledge and learning strategies rather than on a choice between types of knowledge (tacit and codified) or the strength of ties among firms and business networks. The critical factor is the corporate ability "to *evolve in order to adapt*" (Amin and Cohendet, 1997, 6, original emphasis) or anticipate and shape evolving internal and external environments. This primarily depends upon organizational structure and a culture of strategic management and coordination. Such success in com-

plex environments depends upon governance cultures that facilitate the generation of variety and mixtures of competencies rather than privileging one type of knowledge over another. This emphasizes the interaction between knowledge and managerial strategy and corporate governance structures. Major firms, especially those that are developing global strategies, are developing dual organizational structures,[48] dealing with qualitatively different types of function and requiring qualitatively different types of knowledge and learning mechanisms.

Moreover, there are definite geographies associated with these forms of knowledge and organizational structures. The network structure for core competencies allows the firm to benefit from "decentralized specialization" by coupling islands of localized knowledge, each exhibiting strong advantages deriving from local externalities. Within this structure, the firm functions as a real processor of knowledge. The production and circulation of knowledge between different islands is critical for enhancing the efficiency of each component island as well as that of the firm as a whole. The hierarchical structure for regulation of noncore activities is premised upon a more traditional conception of the firm as a processor of information, focused on efficiency of distribution of codified knowledge. This dual organizational structure requires a dual governance structure: one set of governance mechanisms for producing, circulating, and distributing knowledge relating to core competencies and another for transactions related to other activities. The central problem for the firm is the coupling between the two sets of mechanisms and their successful reproduction in the day-to-day practices and transactions of the firm, its workers, and the communities of practice that they form within and across the firm.[49]

The strategic key to sustained competitive success is identifying and assembling appropriate core competencies. This presumes mastery of diverse learning processes—know-what; know-how; know-why; know-who; and the ability to integrate fragmented pieces of localized learning. Effectively exploiting the advantages of strong localized learning depends upon the firm's successfully managing the circulation of knowledge among its core locations. This necessitates the effective circulation of codified knowledge through new information systems and the efficient circulation of any kind of knowledge through the development and control of all modes of knowledge conversion within the knowledge creating company (Nonaka and Takeuchi, 1995).[50] The globalized firm therefore must direct learning in the desired direction while ensuring the repatriation of different local experiences to the collective body of knowledge. For example, globalized chemical and pharmaceutical companies and agribusinesses accumulate competencies to shape their selection environment and

to negotiate collaborative agreements that give access to new knowledge. In their learning processes, the development of corporate capacities for exploiting new technology is based as much on their ability to appropriate exogenous knowledge as on their own R&D (Walsh and Galimberti, 1993, 187–188). Difficulties arise, however, when key technical knowledge required for application is not built into equipment or machines but is intertwined with nontransferable local knowledge (Zysman, 1993, 109). Possible corporate responses to this problem include developing technology in-house (hierarchies), buying on the open market (markets), and teaming up with others (joint ventures and networks). Globalized firms must select and integrate fragmented core competencies that resulted from the wave of mergers, acquisitions, and joint ventures made since the early 1980s,[51] which led to the emergence within firms of local islands of knowledge spread all over the world (Amin and Cohendet, 1997, 8).

While there has been considerable advance in the sophistication of analyses of learning processes, the decisive issue of the processes of the "*creation*" of knowledge remains largely unexplored. There are important differences between "learning to adapt" to best-practice standards set by others and "creating" knowledge, that is, "learning to produce new knowledge" that redefines best practice. The processes of *producing* new knowledge, knowledge that comes into existence for the first time, are not dealt with directly in learning approaches because of their grounding in associationist, stimulus-response conceptions of learning and their concern with outcome rather than process (Odgaard and Hudson, 1998). This represents a major problem with the learning approach *on its own terms*. Equally, there are crucial qualitative differences between strategies that seek actively to redefine the market and wider economic environment rather than adapt to such changes, whether on the basis of anticipation of them or reaction to them once they have happened. There are advantages to being a "first mover" in an industry rather than being an outsider contemplating entry into it. Being in the industry allows for the accumulation of knowledge that cannot be found on the outside, "which tends to reinforce prior choices" (Clark and Wrigley, 1995, 212). This reinforcement points to the advantages of "besting out" via innovation but also emphasizes that path-dependency is strongly built into development trajectories.

5.7. Summary and Conclusions

Competition between companies is central to the organization of production within capitalism, and in this chapter some of the main dimension

and forms of intercorporate competition have been considered. While cost and price are important, they are not necessarily the only—or even the most important—dimensions of competition. From the very inception of industrial capitalism companies have engaged in a search for new forms and methods of competition as they seek to advantage themselves vis-à-vis their rivals. Crucially, this ongoing search has not simply involved attempts to find lower cost production solutions within existing technical-organizational paradigms but, more importantly, has encompassed a search for new products and production paradigms. Such "strong" forms of competition involve (product, process, and organizational) innovation and processes of market creation and market disturbance. This in turn is central to the constant dynamic to revolutionize the what, how, and where of capitalist production. This has not resulted in a simple linear sequence of one form of competition succeeding another but rather in capitalist production being constituted via a complex mosaic of competitive strategies, varying by product, sector, time, and place. At the same time, however, intercorporate competition has often also involved strong elements of intercorporate collaboration, and it is to the consideration of these that the next chapter turns.

5.8. Notes

1. See "Rediscovering the Significance of Motives, Knowledge, and Learning" in section 2.4.

2. These forms of weak competition echo neoclassical economists' views as to the *only* form of competition, predicated upon assumptions of static equilibrium and perfect knowledge. Such views of competition are integral to the locational models of Lösch, Weber, and their adherents.

3. Discussed further in section 5.6.

4. LSI Logic closed a "state-of-the-art" semiconductor factory in Braunschweig, Germany. The advantages of "local" manufacturing in Europe were outweighed by, among other things, lower wage costs elsewhere ($20 per hour in Germany, $15 in the United States, and $2.80 in Hong Kong). As a result, it was more profitable to produce outside the European Union and serve that market via imports, despite a 14% tariff and increased transport costs (Kehoe, 1992). Osram regularly monitors labor costs in different countries. Its labor costs per worker in 1997 were 50 times greater in Germany than in China (Marsh, 1997).

5. See also "Divided by Territory" in section 7.3.

6. In software engineering labor costs account for over 40% of total costs. In North America, Europe, and Japan computer programmers are paid around $4,000 per month, but only $500 to $800 per month in India. Consequently, many companies subcontract computer programming tasks there (P. Taylor, 1995). Alternatively, such skilled workers may become low-cost temporary mi-

grants to the First World; see "Spatial Variations in Labor Market Conditions and Recruitment and Retention Strategies" in section 4.3.

7. See also "Establishing Legal Frameworks for Markets" in section 3.7.

8. These are discussed in "Structures of Managerial Organization within Companies" in section 4.4.

9. The cognitive aspects of this are discussed more fully in section 5.6.

10. See sections 6.2 and 6.5, respectively.

11. Discussed in section 5.6.

12. There is no simple relationship between changes to technical and organic compositions of capital. For example, increasingly technologically sophisticated methods of production may be predicated upon a fall in the value of fixed capital.

13. The introduction of basic oxygen steel-making technology reduced the socially necessary labor time need to convert iron to steel from 8 hours to 45 minutes (Hudson and Sadler, 1989). The invention by ICI of the steam reforming process for ammonia production reduced the number of workers per shift from 63 to 7 (Hudson, 1983). The introduction of mechanized and partially automated heavy-duty faces into collieries in the United Kingdom was intended to lower labor inputs and increase managerial control of the labor process (Winterton, 1985). The widespread introduction of computer control and IT technologies into a range of manufacturing industries in the United States (steel, instruments, electrical and nonelectrical engineering, and paper and publishing), as well as services such as finance, insurance, and health care, was central to sustained high annual rates of productivity growth of almost 6% in the late 1980s and 1990s (Economic Policy Institute, 2000).

14. See Note 14, Chapter 4.

15. Choice of production method may not be straightforward. Approaches may be adopted simply because "they become fashionable in management cultures, because they protect the interests of powerful groups within an organisation, or because managers find it hard to see beyond established social norms and practices" (Halford and Savage, 1997, 109). Furthermore, "like all social interactions, economic decisions are *as much* affected by tradition, historical precedent, class and gender interests and other social factors as by considerations of efficiency and profit" (McDowell 1997, 119, emphasis added). While one might query "as much," the broader point about the complex overdetermination of such "economic decisions" is valid.

16. See "Organizing and Controlling Work at the Point of Production" in section 4.4.

17. These are discussed in sections 5.4 and 5.5; see also Chapter 3.

18. See section 5.2.

19. Such processes of automation involve people, as wage laborers, become little more than extensions of machines; compare Haraway's (1991) theses on cyborgs.

20. In fact, Ford achieved high WIP turns on model-T lines by producing only one model. Toyota devised a system of flexible high-volume production that allowed dramatic reductions in WIP turns, with every doubling of WIP increasing labor productivity by 38% (Best, 1990, 148). By the late 1970s Toyota's WIP

turns exceeded 300, while most western European and North American companies were below 10. Such gaps have subsequently narrowed as western companies sought to imitate "Japanese" production methods, but they have not disappeared. By the early 1990s Toyota was offering five-day delivery of custom-ordered automobiles in Japan.

21. Thus, to equate small-batch with "post-Fordist" production, as Lash and Urry (1994, 94) do, is erroneous.

22. For example, LSI Logic closed a "state-of-the-art" semiconductor factory in Braunschweig in Germany because of, among other things, the superior productivity of its factories in the United States and southeast Asia, operating 21 eight-hour shifts per week, compared to 10 in Germany. See also Chapter 4.

23. For example, Gillette acquired a market share in excess of 70% in North America and western Europe via a strategy of ongoing innovation, bringing a major new product (or "system") to market every nine years since the early 1970s. Even so, product innovation for something as simple as a razor can be a slow process. Gillette took almost thirty years to develop a three-blade razor. The new product required changes in the production process, significantly increasing "continuous" movement of the assembly line and reducing production costs (Griffith, 1998). Its latest premium razor sells at significantly higher prices than its previous "top of the range" model.

24. See section 5.6.

25. These are explored more fully in section 5.6.

26. Gillette's Mach3 razor is an interesting recent example of how companies seek to use advertising to create markets for new products. Describing it as the "stealth bomber of the shaving world," John Darman, vice president of male shaving at Gillette, proclaims on a promotional video that "Aerodynamics and shaving are two technologies that have impacted the lives of men for nearly half a century. Now they come together for the first time" (cited in Willman, 1998). This clearly appeals to a particular construction of masculinity in an attempt to create a market for the new product via advertisements that show a square-jawed fighter pilot breaking through the sound barrier three times "before enjoying the mother of all shaves" (Willman, 1998).

27. In contrast, Featherstone (1991, 66–67), argues that in the contemporary (postmodern) phase of cultural production, the sign value of things has come to dominate exchange relations and consumer culture.

28. They continue: "Moreover, the 'circuit' does not stop there, continuing through successive rounds of production and consumption as consumers 'second guess' advertisers' intentions and advertisers try to anticipate consumers' reactions."

29. These issues are taken up again in Chapter 10.

30. The provision of personal services via servants and paid domestic labor and niche production of luxury goods for the very affluent both predates, and also has always been a part of, industrial capitalism.

31. See Chapter 3.

32. Although by the end of the 1990s such behavioral differences were seemingly narrowing.

33. See the discussion in section 5.2.

34. As Penrose puts it (1959, 53): "Experience . . . develops an increasing knowledge of the possibilities for action and the ways in which action can be taken by the firm. This increase in knowledge not only causes the productive opportunity of a firm to change but also contributes to the 'uniqueness' of the opportunity of each individual firm."

35. See "Institutions, Instituted Behavior, and Social Regulation of the Economy" in section 2.4.

36. That is, it is embedded in communities of practice.

37. Penrose also stressed the crucial significance of "tacit" knowledge in creating competitive assets. Consequently, not all goods and services can have a price and be exchanged in markets. Their value to a firm depends upon experience, teamwork, and accumulated knowledge within a firm. This has "far reaching effects," undermining the neoclassical assumption of homogeneous inputs to production processes and making explicit that inputs to production processes are heterogeneous and firm specific (Best, 1990, 132).

38. There may be a danger of "tacit knowledge" thereby being invoked as an unknowable residual explanatory variable, in a way analogous to neoclassical growth theorists' treatment of technical change (Hudson, 1999).

39. From the perspective of shop-floor workers however, kaizen often appears to be a very different process. As a Mazda worker in the United States put it: "They were going to kaizen out this and kaizen out that. The more they talked, the more it sounded like the whole thing was just a way to squeeze more work out of every worker, with a good old fashioned dose of paternalism thrown in to keep everybody happy" (cited in Fucini and Fucini, 1990, 87).

40. See also Chapter 4.

41. See "Process Innovation and New Technological Paradigms of Production" in section 5.3.

42. See "Organizing and Controlling Work at the Point of Production" in section 4.4.

43. See sections 6.2 and 6.4.

44. See also Chapter 3.

45. Gertler (1997) emphasizes the importance of "proximity," both "culturally" and "spatially," in innovation at the regional level, especially in situations in which technological development crosses a boundary from an "old" to a "new" paradigm. However, he argues that what is often represented as "regional culture" is more appropriately understood as a consequence of differences in national regulatory systems.

46. See "Institutions, Instituted Behavior, and Social Regulation of the Economy" in section 2.4.

47. Alternatively, it may simply involve big firms acquiring smaller ones as a way of gaining access to such knowledge; see section 6.5.

48. See "Organizational Innovation" in section 5.3.

49. Howells (1993, 222) makes a similar point in identifying two strategies global switching and global focusing, that "appear to be emerging amongst key corporate players of international switching under the pressures of 'time space compression.' "

50. Dicken and colleagues (1994, 30) identify a key diagnostic feature of the "newly emerging organisational form" of the "complex global firm" as an "integrated network configuration and . . . capacity to develop flexible co-ordinating processes," both inside and outside the firm.

51. These varied forms of competitive and cooperative interfirm relations are explored more fully in the next chapter.