Chapter One
From Fordism to Lean Production

Our story begins with the "crisis of Fordism," considered in the first section of this chapter. In the second section I argue that there are good reasons to consider lean production the most significant form of capitalist restructuring undertaken in response to this crisis. I then briefly sketch the main ways in which lean production represents a serious challenge to Marxian thought.

A. Fordism

It has become customary to refer to the form of capitalism dominant in the mid-twentieth century as "Fordism." There are a number of problems with this practice. It is certainly true that many features of the Fordist model have their roots in nineteenth century capitalism (Hounshell 1984; Clarke 1991, 114). It is also true that this model appeared in anything close to a pure form only in the United States, and that even here there were numerous sectors where few of its characteristic features could be found (Walker 1989; Tolliday and Zeitlin 1992; Jessop 1991; Webber and Rigby 1996).

In general, the dangers of employing ideal types such as "Fordism" are obvious and serious. Out of the indefinite number of ways in which different phenomena can be brought together in thought, which should be selected? What ensures that an ideal type will not obscure profound differences among the divergent empirical phenomena it brings together? How do we know that these differences are not more important than the shared features emphasized in the ideal type? Conversely, how do we know that features shared by two ideal typical models are not more significant than the distinctions drawn between them? What guards against these sorts of issues being decided arbitrarily by the social theorists constructing the ideal types in question? What guards against dominant cultural values and ideologies determining how these questions are resolved?

I believe that there is no way to resolve these sorts of difficulties *a priori*. But we should remember that if we abandon the use of ideal typical

models to concentrate entirely on case studies of individual events and processes, we would soon be adrift in countless contingencies. Some sort of conceptual framework is necessary if we are not to lose ourselves in the ontological infinitude of the world; this is the price that must be paid for focusing on the part of the world most relevant to our theoretical and practical concerns (Weber 1959). Ideal types, in brief, are necessary to orient empirical work. This remains true even when empirical work documents aspects of the world that do not fit neatly under those types.

In the case at hand if the only ideal types at our disposal were those that held for capital generally, it would be extremely difficult to study capitalism as the sort of system we know it to be, a system that regularly undergoes significant restructuring. And so ideal types at an intermediate level of analysis between the general logic of capital and individual case studies must be employed. "Fordism" is such an intermediate category (as is "lean production").

There are certain general questions to consider when constructing an ideal type on this intermediate level. However vague and open-ended these questions may be, they can still provide some protection against theoretical arbitrariness.

1. Does the ideal typical model capture essential features of the most pervasive empirical phenomena of the historical period in question?
2. Does the proposed ideal type capture the essential features of the leading economic sectors of the relevant period, that is, the sectors where growth rates are highest, the greatest amount of surplus profits are appropriated, and so on?
3. Does the model focus attention on the social institutions and social agents of most relevance to future historical development? Does the ideal type in question define "best practice" cases that undergo rapid diffusion? Does it help pick out social agents with a capacity to bring about significant social transformations in the given historical context?
4. Does the model capture the framework to which appeal was most often made in legitimations of the social order during the period in question?[1]

The answers to these questions may conflict with each other. An ideal type of the numerically most prevalent phenomena in a given period may differ from a model of the phenomena most closely associated with leading sectors of the economy. Ideal types capturing either of these concerns may well differ from thought constructs emphasizing the social forces most responsible for historical transformations, which in turn may diverge from the

models used to legitimate the social order of the day. All we can say is that any ideal type relevant to one or more of the above considerations in principle may be helpful for grasping essential features of particular periods in economic history.

I believe that the use of the category "Fordism" can be justified by these criteria, at least in certain contexts. During the mid-twentieth century more and more leading firms in more and more sectors took on the characteristic features of "Fordism," including those in the most economically dominant industries. The internal dynamic of Fordism also provides a helpful framework for grasping significant historical transformations in capitalism. The dynamic between Fordist firms and the mass production worker of Fordism, for example, is crucial for understanding both the potential for social change in this historical period and the contradictory ways in which that potential was actualized. Lastly, the Fordist model played a central role in the chief legitimations of the social order formulated during this period (Smith 1992, chapter 8).

There are certainly many theoretical and practical contexts in which a more fine-grained empirical analysis than that provided by the relatively abstract Fordist model would be necessary, as critics of the model have correctly insisted. Further, there are many contexts in which it would be fully warranted to stress the profound continuities connecting earlier periods of capitalism and the Fordist epoch (Glick and Brenner 1991).[2] Nonetheless, if one wishes to examine the dominant structural features of mid-twentieth-century capitalism, I know of no better alternative. It should be possible to avoid the pitfalls here, as long as we do not forget that we are dealing with thought constructs rather than concrete phenomena, and as long as we do not confuse general features of the logic of capital with features distinguishing one particular period in capitalism from another.[3] It is now time to turn to the main features of this ideal type.[4]

Since Fordism is a particular variant of capitalism, its basic features can be introduced in terms of the circuit of capital accumulation (M-C-P-C′-M′).[5] The first phase in this circuit is M-C, the use of investment capital (M) to purchase two sorts of commodities (C), means of production and labor power. In Fordism, control of initial investment capital was largely centralized in the hands of large firms. The most important means of production purchased by these firms were large-scale single purpose ("dedicated") machines. These machines demanded extensive supplies of raw materials and considerable energy resources (especially oil).

The Fordist firm sought a high degree of vertical integration in the hope of obtaining significant economies of scale. As a result, many inputs were produced within the firm itself prior to final assembly. But this vertical integration was never complete; some purchase of raw materials and parts from suppliers was always required. The relationship between a manufac-

turer and its suppliers was a "hands-off" one. Manufacturers wanted low prices from their suppliers, and were quick to change to new suppliers when they were willing to undercut previous prices. In this sense the boundaries separating firms were obvious and fixed.

Besides means of production, the other sort of commodity purchased as an input into production was labor power. In the early years of the Fordist epoch, firms regularly resorted to violence to resolve wage disputes. Gradually, however, labor relations became more institutionalized. Most leading Fordist firms were eventually unionized, and wage levels became the subject of routinized negotiations leading to regular wage increases for the (mostly white and male) workers in the unionized sector.

In the next phase of the capital circuit, P-C′, means of production and labor power are set in motion to produce (P) new commodities (C′). The single purpose machinery characteristic of Fordism allowed the mass production of standardized products. Unit costs decreased with each additional product, and so product runs tended to be extended as far as possible. This tendency was reinforced by the fact that the machinery was difficult to replace without shutting down production for an extended period of time. Facing relatively limited competition in their national markets, Fordist oligopolies could extend product runs and plan extensively for the costly and time-consuming switch from one product line to another.

Turning to the labor process, the classic Fordist arrangement revolved around assembly lines in which each worker was assigned a specific task to be performed repeatedly. This was similar to the detail labor Marx described as holding in nineteenth-century "machinofacture." What was new to Fordism was the way labor was subjected to "scientific management." In the initial version of scientific management, termed "Taylorism" in honor of Frederick Taylor, its founder, the goal was to fragment the labor process and deskill the laborer with the aid of time/motion studies undertaken by industrial engineers. In this manner management's control over the labor process could be increased (Braverman 1974). Soon, however, the illusory goal of complete and direct management control was abandoned as a result of worker resistance, the inherent need for the active cooperation of labor in production, and the continued dependence of management upon certain skills in the workforce. Elements of Taylorism were instead combined with a system of formal job classifications and work rules regulating the labor process. These classifications and rules provided the workforce with some protection against especially arbitrary managerial interventions into the work process. They also institutionalized a seniority system holding out hope for advancement to higher levels of status and remuneration. These advantages came at a cost to the workforce, however. The classifications and rules were premised upon a strict separation of mental and manual labor.[6]

And decisions regarding the development and implementation of new technologies were defined as "management prerogatives" exclusively.

This complex system of control and compliance was administered by a bureaucratic apparatus of supervisors and middle managers. Conflicts over work rules and classifications were resolved in routinized arbitration with labor unions, whose bureaucratic organization mirrored that of management.

Bureaucratization within Fordist firms also involved the separation of functions into distinct divisions within the organizational structure. Responsibility for the quality of the produced goods and services was assigned to a quality control department separate from the production process itself. Responsibility for developing innovations was located in a R&D lab physically removed from the production site. Product design, manufacturing, and marketing were all undertaken by separate divisions operating in quasi-autonomy.

The height of the Fordist era coincided with the first period of the so-called computer age. Beginning in the 1950s corporations introduced mainframe computers for data processing. This form of computing fit neatly into the organizational structure of Fordism. The computing intelligence was located in a "host" computer (typically a mainframe or, later, a minicomputer), while the local or remote terminals were "dumb," that is, totally dependent on the availability of the host computer to function (Tapscott and Caston 1993, 122, 209). This host-based hierarchy computing paralleled the centralized command and control organization of Fordism. Computing strategies also followed the same "bigger is better" philosophy found in the search for economies of scale in Fordist production and distribution. It was thought that the cost of processing would fall as more applications were combined on a single computer. This reasoning led the biggest Fordist firms to undertake a series of multimillion dollar upgrades of their mainframes (ibid., 128). Finally, computing did not challenge the balkanization of the Fordist firm into separate divisions. Organizational barriers separated data-processing departments from engineering, production, marketing, and administration divisions, each with their own separate data bases (ibid., 61).

Throughout the chain of production the operative precept of Fordism was "just in case." Raw materials and parts were stockpiled just in case provision by suppliers was interrupted. Partly finished goods were amassed at each step of the production process just in case problems in production arose later. Reserves of labor were hired just in case there were absences. Finished goods piled up as inventory just in case sudden orders from distributors came in.

In the final phase of the circuit of capital accumulation, C′-M′, the new commodities (C′) resulting from the process of production are (hopefully!) sold for more money (M′) than the initial money invested. I have already

noted that the technologies associated with Fordism allowed the mass production of commodities, and that as the product runs of these commodities were extended, unit costs declined. This allowed a decline in prices, fulfilling one condition for the emergence of a mass consumer market. The other precondition was a broad growth in disposable income. The routinization of class struggle played a central role here, bringing regular wage increases to many categories of workers.[7] Once these wage increases were won, the oligopoly position of the largest Fordist firms allowed them to pass on rising wage costs to consumers. Higher prices simply led to another round of wage increases, and so mass production and mass consumption could remain roughly in sync.

This completes the sketch of Fordism. As with all ideal types, it is always possible to eliminate certain features of the model and to add others. The theoretical and practical interests motivating the inquiry provide the only standard for assessing whether such subtractions and additions are warranted. There are certainly circumstances in which the model described above would need to be significantly modified. But for present purposes the above sketch provides a fairly helpful way of articulating the characteristic features of mid-twentieth-century capitalism. This conclusion holds despite the fact that many features of the model were neither unique to mid-twentieth-century capitalism, nor exemplified always and everywhere during this period.

By the mid-1970s a "crisis of Fordism" was well underway in the global capitalist system, measured by a general decline in the rate of profit.[8] At the risk of some slight repetition the factors alleged in the scholarly and popular business press (and much of the left press as well) to have hampered capital accumulation in Fordism can be grouped under six headings.

1. Difficulties connected with *constant capital*[9] included:

- high raw material costs (especially oil);
- high inventory costs; and
- the use of machinery that discouraged rapid shifts in product lines.

2. *Circulation time and costs* were another relevant factor in the crisis of Fordism. Factors resulting in an extension of circulation time and an increase of circulation costs included:

- lengthy delivery times between suppliers and assemblers;
- extended interruptions in production due to the need to retool;
- the length of the time required to make decisions within an extensive corporate bureaucracy;
- the time required to correct quality problems;

- the time demanded to work off previous inventories; and
- the length of the time required to institute innovations, due to the institutional separation of design engineers and production personnel.

3. A third difficulty concerned the connection between *science and the capital form*. The separation of research and development departments from other divisions in the Fordist corporate structure has already been mentioned as a factor increasing circulation time. This also limited the degree to which science could be effectively subsumed within the circuit of accumulation.

4. Regarding *the capital/wage labor relation* we can mention:

- mounting unproductive expenses connected with the supervision of the workforce;
- worker resistance at the point of production, taking both overt and indirect forms (e.g., strikes and absenteeism, respectively);[10]
- wage increases not always matched by productivity advances; and
- quality problems stemming from the separation of quality control to a separate department (this also involved mounting unproductive expenses).

5. The *capital/consumer* relation was also characterized by certain shortcomings:

- a host of factors prevented a quick response to shifts in consumer demand; these included high levels of inventories, bureaucratic decision making, the need to have long product runs to amortize fixed capital investment, delays in the innovation and diffusion process, and so on;
- the mass production of standardized products did not allow producers to produce commodities fitting the needs and wants of individual consumers;
- consumers were negatively affected by quality problems in production.

6. Finally, *relations among units of capital* were also beset by a series of difficulties:

- the institutional separation between engineers in supplier firms and in assembly firms prevented close co-operation, thereby increasing both circulation time and the costs of circulation;

- competition among suppliers on the basis of price encouraged suppliers to cut costs, generating yet more quality problems;
- the hands-off relationship between suppliers and assemblers discouraged the latter from sharing innovations with the former, thereby increasing the time it took for innovations to diffuse.

In chapter 6 I shall return briefly to the question of the causes of the global crisis of Fordism and question certain aspects of the above account. For now the key point is simply this: by a certain point in time (the early 1970s) the above sorts of difficulties appeared to most observers to reach a critical mass in those regions and sectors where the closest approximations of the Fordist model could be found.[11] The crisis of Fordism then set off a significant restructuring of capital that continues to this day. How ought we to conceptualize this restructuring? Opinions here are sharply divided.

B. Responses to the Crisis of Fordism: Some Alternative Perspectives

Economic restructuring is a vast process, with many dead-ends, reversals, and contradictory developments. Stephen Wood's assessment is surely correct: "There do not appear to be powerful homogenizing forces to push work organizations and market strategies down one channel" (Wood 1989, introduction 26). But even if a number of distinct social structures coexist in a given period, this surely does not mean that they are all of equal interest in every theoretical and practical context. Is it possible to pick out a dominant trend in the contemporary economy among the vastly divergent forms we see around us? Four attempts to do so will be considered in the present section. Some social theorists hold that the notion of a postindustrial economy allows us to grasp the basic direction being taken in response to the crisis of Fordism. Others continue to make the industrialization process central to their analysis, disagreeing on the way recent developments ought to be categorized. Three main competing options here are "flexible specialization," "lean production," and "neo-Fordism." Defenders of the postindustrialist, flexible specialization, and lean production viewpoints hold that a new stage in the economic evolution of capitalism is emerging in response to the crisis of Fordism, an assertion denied by defenders of the neo-Fordist perspective. All four perspectives emphasize the close connection between forms of social organization and technical developments in microelectronics.[12]

The first two positions can be discussed rather quickly; the crucial debate for our purposes is between advocates of lean production and neo-Fordism.

1. The Postindustrial Model

Defenders of the postindustrialist thesis assert that we are entering a period in which the service sector will predominate in the economy. Certainly the so-called service sector has grown in importance. But many activities ordinarily characterized as services are in fact industrial processes. McDonald's assembly line, for example, involves the material transformation of inputs as much as any Fordist automobile plant. Also, a great many "services" are themselves a part of manufacturing, such as writing computer programs to run machine tools. Other services are auxiliary to manufacturing, and would vanish if the manufacturing activities were to disappear. Examples include bank lending to manufacturers, the advertising of manufactured products, and the drawing up of legal contracts between suppliers and assemblers. Finally, information-intensive activities are commonly taken to be the core of the postindustrial economy. But information-intensive activities require information technologies, and these, of course, must be produced in an industrial sector.

In the light of all these considerations it makes far more sense to say that the contemporary economy is characterized by *increasing* industrialization than it does to speak of a sudden shift to a postindustrial economy (Cohen and Zysman 1987; Sayer and Walker 1992). On this point the remaining three positions all agree.

2. Flexible Specialization

The theory of flexible specialization was developed by Piore and Sabel (1984) as part of an extended study of "industrial divides." This term refers to historical periods in which there is an open choice between economic development based on craft production and a path of mass production. Contingent factors then determine which option is selected. Once one or the other option has been institutionalized, it may be reproduced for an extended period of time, pushing the other option to the margins of economic activity. At some later point, however, a new set of historical contingencies may arise that brings society to a new industrial divide, where the choice between craft production and mass production is once again open.

In the nineteenth century Proudhon formulated a vision of a society based on small-scale independent worker cooperatives and craft labor. For Piore and Sable, Proudhon's vision was a viable option; European society faced an industrial divide at that juncture. But Proudhon's proposals went unheeded. Small scale co-ops lost out to the factory system, in which wage laborers were hired for mass production. The Fordist model discussed in the previous section counts as the most developed stage of this system. Accord-

ing to Piore and Sabel, the crisis of Fordism has now brought us to another industrial divide.

Piore and Sabel suggest that matters may be resolved differently than they were in the nineteenth century. For one thing, mass production markets are now saturated. Consumers have grown tired of standardized products, and sudden shifts in demand are becoming more and more frequent. Second, technologies have arisen that allow new products to be developed without massive amounts of additional investment. With the flexible multipurpose technologies of the microelectronics revolution we are moving closer to a time when a new product line can be introduced simply by typing in a new program. As a result "economies of scope" can be attained, as opposed to economies of scale; short runs of diverse products can be produced just as efficiently as extended runs of standardized products. Finally, the costs of these flexible technologies has been declining rapidly. They are now within the reach of most small-scale enterprises.

Of course, not all organizational forms are equally capable of instituting flexible responses to sudden shifts in consumer demand, even when the right sorts of technology are employed. In Piore and Sabel's view, decentralized worker-run firms are in the best position to make use of microelectronics technologies in this manner.[13] Small worker cooperatives are not hampered by slow-moving bureaucratic hierarchies, and they possess a more committed workforce. Piore and Sable point with approval to regions in Northern Italy and elsewhere where new forms of craft production have arisen. In these regions small-to-medium batch production by skilled workers has replaced the mass production of standardized goods by a deskilled workforce. Work is organized by self-directed teams responsible for quality. This arrangement both reduces rigidity and increases productivity.

The regional organization of these small firms into flexible networks bound together by relations of trust completes the flexible specialization model. In Northern Italy and elsewhere, temporary affiliations of firms arise in order to produce specific products, to be replaced by different alliances when consumer demands shift. This flexibility requires long-term bonds among the firms in an extensive regional network:

> Sabel and others stress that the widespread development of flexible specialization will depend on co-ordination and long-term links between firms, each of which will be specialized in one part of the total production process (including design and distribution). Flexibility is thus provided as much by this overall arrangement as by anything one firm does (Wood 1989, Introduction 24).

There are a number of problems with the flexible specialization perspective. Most striking is the absence of a strong tendency in the contem-

porary economy to move to decentralized worker cooperatives of the sort they describe (Williams et al. 1987). While Fordist firms have certainly been "downsizing," they have hardly been fragmenting into small worker-run firms. Differences in size and relative economic power among enterprises remain quite striking. While the decentralization of production is no doubt occurring in many areas, economic power is hardly becoming less concentrated. It remains disproportionately in the hands of a relatively small number of global firms. The reach of these firms is increasing, not decreasing; their ability to organized production on the global level is growing, not shrinking, even if they allow somewhat greater autonomy to local units (Harrison 1994). And in the regions where small firms once dominated in a manner consonant with the flexible specialization model, successful firms have tended over time to increase in both size and relative economic power. Northern Italy is itself an example of this; Benetton, for instance, has become a giant firm dominating a network of small suppliers (Wood 1989, introduction 24–25).

Another difficulty for the flexible specialization model is that there is little evidence that mass production markets have become saturated; demand for autos and televisions remains a high percentage of overall consumer demand. And it has not been proven that economies of scale suddenly disappear with the computerization of manufacturing. Taking both points together, it follows that there is little reason for asserting that large firms producing for mass markets are about to disappear.

This conclusion is reinforced if we consider the question of innovation. Small-scale workers' cooperatives do indeed mobilize the intelligence of laborers on the shop floor. As a result flexible specialization appears to be well suited to two types of innovation, incremental product innovation and incremental process innovations. But other sorts of innovation must be considered as well, such as system innovations that take a number of related technologies and fit them together, and the development of hybrid technologies that take previously unrelated technologies and merge them in a new way (recent examples include opto-electronics and mechatronics). For these types of innovation to occur more is generally required than just a close connection between manufacturing and design work within the same organization. They appear to demand large-scale enterprises in which people working in one technical area have regular formal and informal contact with those concerned with quite different matters. For this reason Florida and Kenney (1990) argue that large-scale corporations are likely to be more successful than small-scale ones in an economy based upon the ceaseless commercialization of innovations.[14]

There is also the question of the costs of technical innovation, especially those associated with microelectronics, the technology of most importance to the flexible specialization model. Processing power per dollar

invested has indeed fallen drastically, putting fairly advanced computer equipment within the reach of many small enterprises. But the development costs connected with each successive generation of microelectronics technology has increased geometrically.[15] Small firms are simply not able to devote the funds necessary for fundamental innovations in this area.

Other advantages of large firms must be mentioned here as well. Large firms including both a consumer electronics division and a division devoted to high technology products have a considerable advantage; the consumer electronics division provides a large internal market for the high technology products.[16] The income from this internal market can then fuel further high tech research. This arrangement also allows a rapid diffusion of the results of high tech research to other divisions, rejuvenating sectors that had previously appeared to be "mature" (Kenney and Florida 1993, 73). It would seem that large enterprises are not likely to disappear anytime soon, a point recognized by advocates of both of the two remaining perspectives.

3. Lean Production

Due to a series of historical contingencies the leading firms in postwar Japan never completely embodied the Fordist paradigm. They instead evolved the lean production system, which many take to be a new variant of capitalism. The authors of an influential study of the global automobile industry, *The Machine That Changed the World: The Story of Lean Production,* believe that this new model is in the process of proving its superiority in the global market:

> [I]n the end we believe lean production will supplant both mass production and the remaining outposts of craft production in all areas of industrial endeavor to become the standard global production system of the twenty-first century. (Womack et al. 1990, 278)

A composite picture of lean production will now be presented, based upon the writings of those who defend the "lean production thesis" articulated above by Womack and colleagues. Critical remarks will be postponed until subsequent chapters. Once again we may use the different phases of the general circuit of capital as an ordering device to bring out the salient features of the proposed model.

In the first stage of the circuit of capital, M-C, investment capital is used to purchase means of production and labor power. In the model of lean production the means of production employed are "flexible," that is, they can be shifted rapidly from one configuration to another.[17] To some extent this can be done with conventional technologies. While U.S. manufactures chased the dream of full automation, the Japanese learned how to create

what were in effect "multifunctional" machines through combining low-cost conventional machines in manufacturing cells (Warner 1989, 276). It is clear, however, that lean production systems tend to evolve such that conventional machines are replaced by programmable multifunctional machines, capable of switching from one production application to another at low cost (Ohno 1988; Maleki 1991). Computer numerically controlled (CNC) machine tools, robots, and networks of desktop computers are the most important examples of such machines. In this manner computing intelligence is dispersed throughout the enterprise, rather than being centralized in a host computer only. The lean production model thus represents a second age of information technology, beyond the host-based computing that fit so easily within Fordist structures (Tapscott 1996).

I would like to postpone consideration of the labor market in lean production to the following two chapters, and move immediately to the next stage in the capital circuit, the production of new commodities (P-C′). One goal of lean production in this context is the reduction of indirect labor costs. All forms of labor that do not add "value" to the final product are targets.[18] This includes supervisory labor, quality control, maintenance work, cleaning, and so on. Many of these positions can be eliminated if the operator on the shop floor (or office) becomes a multiskilled laborer capable of self-direction, as opposed to the detail laborer of past epochs of capitalism. The multiskilled worker incorporates quality concerns (often involving relatively sophisticated forms of statistical reasoning), machine maintenance, and cleaning assignments into the labor process.

In lean production it is assumed that multiskilled workers have a unique perspective on the labor process. They are therefore in a unique position to formulate insights regarding how to manage the complexity that arises at the point of production. The model thus includes attempts to mobilize workers' insights in a process termed "kaizen" ("continuous improvement") by the Japanese. Developing, testing, and sharing insights is an inherently intersubjective matter. And so the model also includes work teams, which provide a forum for such intersubjective relations.

According to the advocates of lean production, this new form of production overcomes the functional boundaries characteristic of Fordism. Close ties are established between R&D and manufacturing, and between both and marketing, as representatives of all three divisions regularly serve on the same work teams. With these closer ties across divisions the rate of both process and product innovations tends to increase.

In lean production firms concentrate on areas of production that match their "core competencies." Aspects of the work process that distract attention from these core concerns are "outsourced" to specialist firms. More and more enterprises, for instance, no longer hire janitors or security guards themselves, but contract these jobs out to specialized agencies. The

same point holds for an increasing range of inputs to final assembly. The lean production model thus includes a variety of subcontracting arrangements, spin-offs,[19] joint ventures,[20] and so on.

Turning to the C′-M′ phase of the capital circuit, in which finished commodities are offered for sale to consumers, the lean production model incorporates a variety of information technologies allowing firms to track consumer behavior in great detail. This allows them to grasp both nuances in consumer demand and shifts in demand to a much higher extent than was possible in Fordism. The production technologies and organizational innovations mentioned above then allow producers to respond to this information much more quickly as well. As a result a greater range of products is offered to consumers than in Fordism, and product runs tend to be of significantly shorter duration.[21]

The enhanced significance of consumer demand is reinforced by another crucial feature of the model, the "just-in-time" mode of organizing the various stages of production and distribution. In Fordism high levels of inventory would pile up in the hope that it could be sold later. In lean production inventories are kept low, and only replenished after information regarding sales establishes that this is warranted. When information to that effect arrives, a chain of events is set off: information that a completed product is needed by a customer is transmitted back to final assembly; requests for the different parts required for final assembly are transmitted back to the sites where partially finished goods are produced; and so on, all the way back to the transmission of requests to suppliers to deliver raw materials and other inputs to the plant. Each step in the production and distribution process completes its task on an as needed basis, that is, "just-in-time" for the results to be used by the next stage in the process. Once again, it is consumer demand that sets off this chain of events, thereby integrating consumer activity into the production and distribution process much more than was the case in Fordism.

The just-in-time approach obviously implies that relations between assembly firms and their suppliers and distributors cannot be of the "hands-off" variety characteristic of Fordism. Defenders of the lean production thesis hold that suppliers, assemblers, and distributors now form networks within which information and technologies are shared. This allows new practices such as "concurrent engineering," in which design engineers working for suppliers collaborate closely with engineers from core assembly firms.

Advocates of lean production insist that scale and volume have hardly become irrelevant in the contemporary economy.[22] Nonetheless, the greatest profits today are won from tailoring goods or services to the specific needs of particular customers in a way that cannot be easily duplicated by others.[23] This requires a quickness of response and commitment to continuous ex-

perimentation that firms with an extensive bureaucratic apparatus have great difficulty attaining. And so in lean production the bureaucratic apparatus tends to shrink relative to the norm in Fordism. Developments in information technologies aid this process. I have already mentioned that the lean production model reflects a "paradigm shift" from host computing to distributed (or "networked") computing. Host computing was based on centralized computing power, as more and more applications were added to mainframes in a search for economies of scale. In contrast, network computing is based upon the relative price/performance advantages of microprocessors dispersed throughout the enterprise. As computing resources are moved closer to the operational areas of business, the traditional centralized command and control approach tends to break down. The monopoly on information that propped up much of the prestige and power of corporate bureaucracies is undermined, and the autonomy of work teams is furthered. Also, "cooperative processing involves spreading application components across multiple platforms and using the network to link these components" (Tapscott and Caston 1993, 125). This means that information technologies now aid in breaking down the bureaucratic barriers separating design, production, marketing, and administration functions. Before each division had its own data base, which few the outside the division could access without going through bureaucratic channels. Now someone engaged in any one of these functions has relatively easy access to information gathered in the course of any of the other activities.

This concludes the provisional sketch of lean production as articulated by the model's leading advocates.[24] It should be noted that other terms have been used to refer to this model. Some authors speak of "the Japanese model." I consider that to be a profoundly misleading appellation, implying as it does that the practices just described are an expression of cultural attributes supposedly unique to Japan, such as cultural homogeneity, a predisposition to obedience, groupism, and paternalism. Lean production practices have been institutionalized successfully in a great variety of different national settings (Babson 1995b, passim.), albeit with regional variations (Kochan et al. 1997). This shows that lean production does not depend upon cultural factors specific to Japan.

Sayer and Walker refer to the "just-in-time" model (1991). Strictly speaking, this refers to a part of the new system rather than to the model as a whole. Kenney and Florida speak of "innovation-mediated production," and this too seems to describe certain aspects of the model rather than the whole (Kenney and Florida 1993, 4). "Flexible production," another term often used, has a number of problems as well. As Sayer and Walker correctly point out, the reference to "flexibility" is potentially misleading. In some respects and in some contexts the Fordist approach may be *more* "flexible" than lean production. The hands-off relation between assemblers and suppliers

in Fordism, for instance, often granted firms more room to maneuver than they have in lean production networks. The term "flexible" is also quite ambiguous in itself. It can be used to refer to a myriad of quite distinct phenomena, including pay flexibility, flexible technologies, the flexible use of technologies, organizational flexibility within firms, flexibility in subcontracting work outside of firms, work flexibility ("functional flexibility"), flexibility in numbers of people employed, flexibility in firing, flexibility in alliances with other firms (start-ups, strategic alliances, etc.), flexibility in product mix, and so on (Wood 1989, introduction 1). Firms that are committed to "flexibility" in one or more of these dimensions need not pursue it in any of the remaining dimensions. Even worse, the pursuit of flexibility in one dimension may demand a sacrifice of flexibility in one or more of the other areas.

A much more accurate term in this context has been coined by David Harvey: "flexible accumulation" (Harvey 1989). This expression conveys that the flexibility that ultimately matters here is flexibility in the strategies employed to accumulate capital. In Harvey's usage, however, the term refers primarily to the strategies of finance capital, specifically, the awe-inspiring ingenuity with which ever new forms of fictitious capital (that is, paper wealth and assets) are deployed. The importance of these phenomena in the contemporary economy cannot be overstated (Henwood 1997a). The intricacies of finance capital, however, demand a separate investigation, and will only be referred to in passing here.

I have decided to use the phrase "lean production" simply because this term appears to be becoming fairly established in the literature. I take it to refer to a central component of the so-called new economy. I am hopeful that the analysis of the model does not stand or fall with the choice of the term used to refer to it.

The lean production model includes a number of features discussed by postindustrial theorists and defenders of the flexible specialization perspective. The model incorporates the growing importance of service-related activities (design, marketing, customer service, etc.) emphasized by postindustrialist theorists. The importance of rapid product cycles, multi-purpose machinery, changed work relations, and interfirm networks emphasized by Piore and Sabel is found here as well. But the lean production viewpoint is clearly distinct from either of these perspectives. The notion of lean production is based on the assumption that the process of industrialization continues to be an essential feature of the economy, and that large-scale firms seeking economies of scale continue to be of central economic importance. The thesis that lean production is emerging as a response to the crisis of Fordism appears to incorporate many of the strengths of these two competing accounts, while avoiding their greatest weaknesses. From the stand-

point of a fourth perspective, however, the lean production model is itself fatally flawed, both conceptually and empirically.

4. Neo-Fordism

In my estimation the strongest case against the view that lean production represents a new stage in capitalism is posed by those who believe that the heightening of Fordism is the most significant form of contemporary capitalist restructuring. For defenders of this "neo-Fordist" view there is indeed something new in the contemporary economy. In leading industries and regions of the mid-twentieth century something of a class compromise was in place that allowed certain sectors of the workforce to enjoy improved living standards. Falling rates of profit led many units of capital to reject this dimension of traditional Fordist practices. An all-out attempt to weaken labor organizations and roll back labor gains has been undertaken, an offensive that includes a shift from full-time permanent workers to part-time and temporary workers, wage cut-backs, the reduction if not elimination of benefits, job speed-ups, forced overtime, legal and illegal harassment of labor activists, and so on. None of this implies that a qualitatively new form of production has emerged; Fordism with a strong capital offensive remains Fordism. All of the talk of lean production as a new epoch in capitalism thoroughly obscures this state of affairs (Pelaez and Holloway 1991).

The debate between defenders of the lean production thesis and neo-Fordists can be considered in the light of the four criteria for assessing the historical significance of a model of production introduced at the beginning of the chapter:

1. The number of empirical instances illustrating the model in question
2. The extent to which the most dynamic sectors and regions of the given period illustrate the model in question
3. The extent to which the model points towards the most likely path of future capitalist development
4. The extent to which the model was (is) employed in the most significant attempts to legitimate the social order of the day.

(1) Regarding the question of the number of empirical instances illustrating lean production, neo-Fordists make two quite different sorts of arguments. The first is that most so-called lean-production firms retain basic elements of Fordism, and therefore should count as examples of Fordism rather than as instances of some new type of economic model (Dohse, Jurgens, and Malsch 1985; Williams et al. 1992; Williams et al. 1995). The sec-

ond grants that lean production is distinct from Fordism in principle, but denies that there are sufficient instances of the former to justify proposing the emergence of a new stage in capitalist development.

Steve Babson summarizes the first argument in the following passage:

> From this alternative perspective, lean production, rather than marking the end of Fordism, extends it by modifying certain features and retaining essential elements of the Fordist regime: jobs are still subdivided into narrowly defined tasks (though workers sometimes rotate through a few tasks within their immediate area); work is still regimented by the assembly line and by strict adherence to standardized procedures (though workers are expected to suggest refinements and solve minor problems); mass production at high volumes still characterizes the system's output (though ar somewhat lower levels and shorter runs per model than the peak years of the past); and management retains fundamental control of the overall production process. (Babson 1995a, 14)

There are a number of problems with this argument from the standpoint of proponents of lean production. For one thing, its force rests on terms such as "sometimes," "few," "minor," and "somewhat" found in the parentheses. These terms are inherently imprecise. Who gets to decide when such terms are appropriate, and when stronger terms should be used instead? It seems obvious that those working in self-proclaimed lean production enterprises have as good a claim to decide this as anyone. If lean production were not qualitatively distinct from traditional Fordism we would expect these workers to be indifferent to the prospect of returning to traditional Fordist practices. More relevant to an assessment of the neo-Fordist thesis, if lean production were no more than a hyperintensive version of Fordism we would expect laborers in lean production facilities to desire a return to more traditional Fordist arrangements. Yet it is all but impossible, claim the defenders of the lean production thesis, to find members of the workforce in these facilities who wish to return to old Fordist arrangements (Adler 1995, 214). To my knowledge no neo-Fordists have ever disputed this claim. This suggests that in the lived experience of those most directly affected by capitalist restructuring, workers at the point of production, differences in the new system clearly outweigh continuities with Fordist practices. If this is so, by what right are these differences to be dismissed as "minor"?[25]

A second difficulty in the neo-Fordist argument is that it assumes that (supposedly) slight changes (those mentioned in the parentheses of the Babson passage above) have only slight effects. But there is no reason to hold that this is so. It is quite possible that even slight initial changes in a

number of domains simultaneously might set off significant adjustments throughout the entire system, resulting in a qualitative transformation of the system of production as a whole. The neo-Fordist argument does not take the possibility of such nonlinear effects into account.

Of course a defense of the lean production thesis based on the first of the four criteria must go beyond showing that lean production facilities are in principle qualitatively distinct from Fordist ones. It must be demonstrated that such facilities are predominant in the contemporary economy. At this point neo-Fordists make a second move. As of now, they insist, there are relatively few empirical examples of anything approaching the full lean production model described above. A University of Southern California survey of three hundred major U.S. corporations found, for example, that only one in ten had set up work teams covering more than 20 percent of their workforce (Lawler et al. 1992). These results are corroborated by Appelbaum and Batt in the course of a comprehensive overview of recent studies of workplace practices:

> Summing up these diverse surveys is difficult, but it seems reasonable to conclude that between one-quarter and one-third of U.S. firms have made significant changes in how workers are managed and about one-third of large firms have serious quality programs in place or have experienced significant gains from their quality programs. (Appelbaum and Batt 1994, 68)

Since these programs affect only a portion of the employees of these firms, only about 10 to 15 percent of workers in the United States have been touched by "the high performance workplace" advocates of lean production speak of.[26] According to Edward Lawler, a managment professor who has tracked 216 Fortune 1000 firms at three year intervals beginning in 1987, no more than 12 percent of the U.S. workforce were in "high involvement" jobs as of 1998 (quoted in Ross 1998). Fordism, in brief, appears to remain the dominant form of capitalism in the United States, at least. Bloated bureaucratic hierarchies remain a feature of the corporate landscape, microelectronics is often used to exacerbate (rather the eliminate) the split between conception and execution in the workplace, and so on (Gordon 1996). After all, if capital were really serious about creating the "high performance workplace" eulogized by lean production spokespersons, why do U.S. employers devote only 1.4 percent of payroll to training, or increase the money they spend on formal staff development at less than the rate of inflation (Tapscott 1996, 299)? In places such as Canada and Great Britain the story is much the same (Gordon 1996).

Some advocates of the lean production thesis dispute these empirical estimates. Paul Osterman of the Massachusetts Institute of Technology, for

example, asserts that nearly 80 percent of industrial employers in the United States have adopted total quality management, team-based systems, quality circles, or some combination of the three (cited in Hammonds et al. 1994, 84). MacDuffie and Pil's more recent survey of the auto industry in the United States, Europe, and Japan corroborates this conclusion: "[The] data reveal that the direction of the changes in work organization is clearly convergent toward high-involvement practices" (MacDuffie and Pil 1997, 38). Osterman and Macduffie and Pil would certainly grant the relative paucity of instances of the lean production model in anything like its pure form. And along with many other theorists, they would grant the regional variations that have emerged in the course of the diffusion of lean production (Kochan et al. 1997, Introduction, Conclusion; Streeck 1996). But in their view this does not refute the thesis that lean production is the most significant form of capitalist restructuring today. This debate has not concluded.

Of course, other matters are surely relevant here besides the quantitative question of how many instances of a model can be documented in a given period. To make a historical analogy, when Marx wrote *Capital* there were far more instances of agricultural production on small landholdings than there were of machinofacture. Yet for Marx the latter, not the former, defined the most significant form of capitalism in the second half of the nineteenth century. Machinofacture was the most dynamic sector of the economy, there were good reasons to think that this sector would have the greatest influence in determining the future course of capitalist development, and it played a central role in the most significant legitimations of the social order of the day. In an analogous fashion the number of lean production facilities operating today by itself does not necessarily answer the question of the historical significance of the model.

(2) It is worth noting that the same University of Southern California survey that documented how few firms have adopted team systems also documented that 60 percent of the companies surveyed plan to increase the use of "self-managing" teams in the near future. Of course, neo-Fordists are unlikely to be impressed by such a statement of intention. Fads come and go; the fact that firms announce plans to do something doesn't mean much; a new fad may come along in the meantime. While the basic structures of Fordism have an abiding presence, on this view lean production is just the latest in a series of management vogues. It too will be abandoned as soon as the advantages promised to management do not materialize.

With this move we have left behind the question of how many concrete instances of lean production can be counted and turned to the question of the dynamic of contemporary capitalism. Besides arguing that the non-Fordist aspects of lean production are empirically insignificant, neo-Fordist theorists insist that the advantages of these non-Fordist aspects for management have been wildly overstated, while the strengths of a heightened