

# JAPAN'S ROLE IN A POST-FORDIST AGE

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**The shift away from mass production industries to new information-intensive industries is leading to speculation on what will supersede the Fordist model of industrial organization. This article outlines alternative models advanced as potential replacement for Fordism, and presents a new post-Fordist future, based upon exploration of the post-war evolution of Japan. Fujitsuism is posed as a potential post-Fordist form of industrial organization, and is investigated as a new mechanism for sustained economic growth particularly suited to the information age.**

The world economy has reached an important turning point. We are currently witnessing a series of technological transformations as profound as any since the birth of industrial capitalism. The intertwined development of mass production and mass consumption—the hallmark of the post-war economy—has broken down and alternative forms of industrial organization are emerging to replace it. The shift away from mass production industries to new information-intensive industries like semiconductors, biotechnology and automated manufacturing is bringing about complementary transformations in industrial relations, economic institutions and industrial organization in general.

It is not surprising that the current situation has led to a great deal of speculation about what lies beyond the traditional assembly line or 'Fordist' model of industrial organization. Recently, a number of authors have offered the concepts of 'neo-Fordism', 'global Fordism', 'post-Fordism' and 'flexible specialization' to explain the possible future organization of advanced industrial economies.<sup>1</sup> While each of these approaches captures a distinct element of the current process of restructuring, we believe that all of them fall short of providing a coherent model of a sustainable political economic future. In this article, we provide the outlines of a new post-Fordist future based upon a detailed exploration of the post-war evolution of Japan.

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Our major line of argument can be briefly summarized as follows. We contend that Japanese industrial organization has reached a level of development that is post-Fordist. This replaces the specialization and deskilling of the Fordist model with a new industrial organization based upon integrative and flexible work organization, shopfloor learning, and networked production complexes. As Alain Lipietz has stated, 'Japanese capitalism did not simply catch up with the USA; it overtook it by discovering a new post-Fordist way of translating the skill of its producers, both manual and intellectual, into productivity'.<sup>2</sup>

We further suggest that the early rise of post-Fordist manufacturing in Japan provides the foundation for Japan's extraordinary success in a range of high technology fields. 'Fujitsuism' is the term we use to refer to this important new model of organizing high technology industries. Fujitsuism is taken from the name of one of Japan's most important information-based companies, Fujitsu Ltd, which in 1980 replaced IBM-Japan as Japan's largest computer company. Its spinoff, Fujitsu Fanuc is currently the largest robot manufacturer in the world. At the Fanuc Niigata factory, unmanned robots work at night producing parts of other robots in the dark.<sup>3</sup> At a deeper level, we explore Japan's ability to create the new institutional forms needed to channel consumer demand and bring consumption in line with emerging Fujitsuist industrial organization. These new institutional forms hold the potential for creating the technological and economic base for the next long wave of self-reinforcing economic growth.

Before proceeding, two general points are in order. First, we disagree with those who contend that Japan can be adequately understood as a more exploitative version of Fordism—an argument which is most clearly stated in a recent article by the German scholar, Dohse and his colleagues.<sup>4</sup> Our argument similarly takes issue with the 'strong state' interpretations offered by mainstream political scientists such as Chalmers Johnson and others.<sup>5</sup> In contrast to these approaches, we place primary emphasis on the relationship between industrial organization and technological change. We argue that post-Fordist industrial organization is especially well suited for new information-intensive technologies.

Second, and related to this, we believe that the development of more appropriate policies for technological change and industrial restructuring must be based upon a coherent understanding of the Japanese case. Dismissing the Japanese experience as irrelevant to Western industry is both shortsighted and misleading. Not only has the Japanese model succeeded in achieving extraordinary growth, with disconcerting consequences for its major rivals, Japanese industrial organization is being transferred to the West both through the relocation of Japanese-owned corporations—most notably by Japanese electronics and car manufacturers—and by the attempts of US and European corporations to implement aspects of Japanese-style industrial organization.<sup>6</sup>

In advancing our argument, we first briefly summarize some of the major conceptual contributions made by the 'regulation school' of political economy. We then outline the alternative models advanced as potential replacements for Fordism, illuminating the major contributions and weaknesses of each. The basic elements of our model of post-Fordist Japan and its applicability to the information age are then explored, and we pose

Fujitsuism as a potential post-Fordist form of industrial organization, investigating its potential as a new mechanism for sustained economic growth. To conclude, a general conceptual discussion of post-Fordist restructuring is presented.

### **The 'regulationist' perspective of political economy**

While there is a significant range of differences between the four models reviewed below, all are influenced by the conceptual approach of the 'regulation school' of political economy. It is thus useful briefly to review the basic concepts associated with the regulation approach.<sup>7</sup>

Regulation theory focuses on the determinant role of the production process. The given state of technology, organization of work, labour process, and social relationships forged in production opens up the possibility for increased wages, consumption and living standards.<sup>8</sup> Yet, sustained growth requires an ongoing efficient allocation of net product between profit, reinvestment and consumption. The regulation school describes such stable and reproducible patterns as constituting a 'regime of accumulation'.

Since capitalism has no intrinsic mechanism to ensure that workers correctly adjust their work habits, training, attitudes, location and so on, to sociotechnical change, or that consumers adjust their purchases to a growing social surplus, regimes of accumulation must be given coherence by social processes and institutions that collectively constitute a 'mode of regulation'.<sup>9</sup> These elements are not automatically generated, so modes of regulation are distinctly historical entities created as outcomes of political struggles and compromises.<sup>10</sup> Economic institutions evolve as a process of response and adjustment to political conflict.

According to regulation theory, economic crises are initially signalled when the organization of production runs up against its own internal limits.<sup>11</sup> This inability to realize productivity increases sets in motion a growing divergence between the ability to generate output or social product and to allocate appropriate shares to accumulation and consumption.<sup>12</sup> During such periods the institutional arrangement of the economy hardens, blocking the kinds of institutional reorganization necessary for restructuring to occur.

The solution to crisis is twofold. On one hand, development of new technologies and/or reorganization of work is needed to create the conditions for a new round of economic expansion. On the other, only social conflict can bring about the kinds of institutional restructuring needed to set such growth in motion. In effect, social forces provide the motor force of economic change; they must be effectively harnessed before another long wave expansion can begin.

We now turn to an examination and critique of the alternative models put forward within the general framework of regulation theory as potential successors to Fordism.

### **Neo-Fordism**

The concept of neo-Fordism suggests the transformation of traditional mass production through the use of information technologies. As proposed by

Palloix,<sup>13</sup> Aglietta,<sup>14</sup> and Blackburn *et al*,<sup>15</sup> neo-Fordism emphasizes the restructuring of production through industrial automation, computer numerical control, and flexible manufacturing systems (FMS). According to the neo-Fordist model, fully automated production environments permit industry to overcome the limits of human labour, resulting in a less labour-intensive, more efficient production process and hence increased accumulation and profit. As Aglietta poses it:

Since it is no longer necessary to individualize jobs, and since the ending of manual operation of machines makes tasks objectively homogeneous, it is easy to switch workers around, adding some and taking away others, and in this way reduce to a considerable extent the problems posed by absenteeism. The number of foremen, quality controllers and other supervisory staff is also reduced.<sup>16</sup>

The neo-Fordist model explicitly assumes that the implementation of new technologies will bring about worker deskilling. It is just as likely, however, that aspects of industrial automation will require skilled workers, albeit less of them. In fact, recent research on the impact of automated manufacturing on worker skills<sup>17</sup> shows very uneven levels of skill upgrading and downgrading, depending upon the type of technology introduced, previous work organization, organizational size and other factors. Other research shows that German workers typically retain more skills under automated manufacturing than their US counterparts.<sup>18</sup>

More importantly, the relationship between industrial automation and worker skills is embedded in the broader organizational context of production itself. Where industrial automation is used for the production of large batches of standard commodities, deskilling is likely to be more extensive. Where automation is used to produce small batches of specialized products, it is likely to require greater worker intervention and skill. These new 'think workers' will not resemble the craft workers of the industrial revolution, however. Think workers will have highly specialized skills that will be utilized in team environments where team performance, not individual performance, is the key. In his research on automated factories in Japan, Jaikumar found that intensive training of workers was essential to success.<sup>19</sup> The neo-Fordist model oversimplifies the complicated trade-off between automation and skills. While deskilling increases management control, it eliminates the wide range of productivity increases which can be gained by tapping the intellectual capabilities of workers.

Neo-Fordism also contends that the productivity increases associated with automated manufacturing can be met by reorganizing demand, largely through a publicly-supported minimum income. Blackburn and his colleagues suggest that the technologies associated with neo-Fordist production are likely to allow automation of the production and delivery of many formerly labour-intensive services, opening up new areas for accumulation and profit.<sup>20</sup> Here, a relevant example is the current transformation of healthcare delivery in the USA from independent physicians to health maintenance organizations, clinics, and large private medical facilities boasting high levels of information processing equipment.

In sum, the neo-Fordist model explores the possibility of industrial society moving beyond Fordism. Its major shortcoming revolves around the view that information technologies (ITs) can transform older industries

without large-scale transformations in the social relations of production. While ITs are crucial to post-Fordist restructuring, they cannot simply be forced into a Fordist context. They require new forms of organization, a redefinition of traditional social relationships, and new institutions in order to be effective.

### **Global Fordism**

The concept of global Fordism revolves around the extension of the Fordist model to at least a segment of the Third World.<sup>21</sup> In contrast to the neo-Fordist model, it offers a consumptionist solution to economic stagnation. For the supporters of global Fordism, renewed world economic growth is most expected to be the result of the development of Fordism in the newly industrializing countries (NICs)—ie, Mexico, Brazil, Iran, Korea and Taiwan. Worker struggles for higher wages in these countries could provide the necessary impetus for income redistribution, igniting a surge in consumer demand and a new virtuous circle of self-reproducing growth. The development of Fordist solutions in the NICs could then accelerate the emergence of a 'global new deal', providing a demand-side solution to world economic crisis.

Mass consumption in the NICs seems necessary for any global recovery. The weak point of the global Fordist model is that it does not link its consumption-side approach to transformations in production. The rise of ITs and automated manufacturing imply that older, Fordist methods of production are becoming sorely outmoded and are being replaced by new forms of industrial organization. Thus, the Fordism that developing countries undergoing a global Fordist boom would experience is likely to be quite different from the Fordism pioneered by the advanced industrial countries. Paraphrasing, it should be remarked that Japan stands to benefit from the rise of global Fordism by selling producers' goods, factories and technical know-how to developing countries. Japan also has the capital resources which could potentially finance such a reconstruction.

### **Post-Fordism**

In a recent article, Roobeek suggests the idea of post-Fordism as a clearcut break with Fordism.<sup>22</sup> According to her model, new information-based technologies will increasingly disrupt Fordist industrial organization. For Roobeek, microelectronics, biotechnology and new materials are causing the 'dematerialization' of production; ie, fibre optics made from silica replace copper, biotechnology allows the production of valuable pharmaceuticals and chemicals from inputs such as glucose and vitamins, and superconductors perform far more efficiently than current materials. Coupled with increased industrial automation, these new technologies enable industries to respond more effectively to differentiated consumer demands.

In addition, Roobeek's post-Fordist model envisions massive technological displacement and increased unemployment. To ensure adequate demand, a guaranteed 'social wage' will be necessary. Roobeek thus suggests the need for a 'reliability wage' for production workers since strikes, for example, could be extremely expensive in highly capitalized automated factories.

Post-Fordism is a major conceptual advance over neo-Fordism, emphasizing the necessity for a new link between production and consumption. However, it too minimizes the way that new technologies require new forms of social organization and the manner by which such changes are likely to affect industrial relations and corporate organization generally. While the notion of 'reliability wages' is a compelling one, it overlooks the necessity of creating institutions which influence workers' behaviour. Wages are just one component of a set of mechanisms for organizing production and demand. For example, US car workers were paid high wages (stability and reliability of the workforce were obvious goals of this strategy); however, other structural aspects of production and industrial relations were needed—such as industry-wide collective bargaining, clearly defined job descriptions and promotion ladders—to stabilize relations on the shop floor and to channel post-war consumption and growth.

### Flexible specialization

A somewhat different model for economic restructuring has been proposed by Piore and Sabel, who argue that the capitalist economies are on the brink of a 'second industrial divide' which involves a fundamental transformation from mass production to flexibly specialized manufacturing.<sup>23</sup> Their argument draws upon case studies of the textile producing district of northern Italy<sup>24</sup> and the textile machinery manufacturing district of Baden-Württemberg in West Germany.<sup>25</sup> These industrial districts are 'vertically disintegrated', ie, characterized by interactive networks of small and medium-sized enterprises which both compete and cooperate by sharing information and expertise.<sup>26</sup> Workers in flexible districts possess high degrees of skill and an apparent unification of conception and execution. Information flows relatively easily, both within firms and among them, giving rise to an economic environment characterized by mutual adjustment, learning and innovation. For these reasons, workers, firms and entire districts are able to respond quickly to external stimuli—be it the adoption of technological improvements or changing market conditions. This rapid response is especially vital as consumer demand becomes increasingly disaggregated.

A more contentious claim is that flexible specialization will lead to worker reskilling and enable communities more effectively to achieve self-governance. The simple reskilling thesis has been clearly refuted by empirical research, which shows uneven patterns of skill level changes in factories using flexible manufacturing technologies.<sup>27</sup> Shaiken and his collaborators make the compelling point that even under the best possible scenarios, reskilled workers will not possess the unification of conception and manual skill that was characteristic of artisanal craftsmen.<sup>28</sup>

An even more serious weakness of the Piore and Sabel argument<sup>29</sup> lies in its apparent inapplicability to the most important sectors of industrial production. It appears doubtful that flexible specialization, *as they envision it*, will transform the car, steel, or chemical industries.<sup>30</sup> Simply put, where either long production runs of standard goods, or production of large capital-intensive products such as ships or aeroplanes are involved, it remains unlikely that small, flexible firms will displace large factories. In short, Piore and Sabel prove their case by virtue of the industries they

choose to examine—high fashion shoes and textiles, textile machinery, and machine tools—industries which by their very nature are produced in smaller batches, are characterized by rapidly changing models, require highly skilled human intervention, and thus demand flexibility and specialization. A more telling test of their theory lies in heavy manufacturing, an area which they have chosen to ignore.

Despite these flaws, the notion of flexibility is an important one. Post-Fordist restructuring will certainly be distinguished by some degree of increased flexibility. Indeed, the industrial structures of most advanced countries show evidence of increased vertical disintegration—defined by high degrees of spinoff activities and new business startups. This is perhaps most evident in the innovation complexes of California's Silicon Valley and Boston-Route 128, and is also manifest in Japan's just-in-time production complexes.<sup>31</sup>

Flexibility is clearly an important element of technological innovation and the social context in which it is embedded. In addition, the capacity flexibly to respond to disaggregated demand is the key to understanding the nature of post-Fordist society. However, as we will demonstrate, Piore and Sabel substantially underestimate the ability of large enterprises to integrate aspects of flexibility into their operations.<sup>32</sup> This omission seems particularly glaring in the case of Japan.

### **Japan's role in post-Fordist restructuring**

We now introduce our analysis of post-Fordist restructuring in Japan, posing the institutional configuration of the Japanese political economy in light of the themes previously addressed. We contend that an analysis of post-Fordist industrial organization must take seriously the sweeping transformations in production and labour relations which have occurred in Japan over the past four decades. We further suggest that Japanese industrial organization is advancing on a path that is taking it beyond Fordism in the direction of a new model which incorporates many of the most salient features suggested by the above models.

Generally, research on the Japanese industrial organization and economic development can be divided into two camps. On one side stands the 'statist' version of Japanese development associated with Chalmers Johnson.<sup>33</sup> According to this view, post-war Japanese industrialization was premised upon the actions of a highly centralized 'developmental state' which functioned more or less to oversee economic development. This view overestimates the power of the Japanese state. According to aggregate measures the Japanese state is among the smallest in the advanced capitalist world. Recent work by Pempel reconceptualizes the role of the Japanese state as organizational and directive, an important but not overly determining factor in Japanese economic development.<sup>34</sup>

A second view of Japanese development emphasizes the 'superexploitation' and attendant powerlessness of Japanese workers. As suggested by Dohse and his collaborators, this view poses 'Toyotism' as a more advanced and exploitative version of Fordism—a sort of 'hyper-Fordism'. They put it as follows:

While the Japanese organization of the labor process differs from that of the U.S. and European automobile industries, it is not a basic alternative to Fordism, as is commonly believed. 'Toyotism' is simply the practice of the organizational principles of Fordism under conditions in which management prerogatives are largely unlimited.<sup>35</sup>

According to the Toyotist model, sweeping rationalization of production and the superexploitation of labour are the cornerstones of Japanese industrial progress and result directly from the relative disorganization and powerlessness of Japanese workers.

Quite recently, Andrew Sayer, David Friedman and Christopher Freeman have attempted to rethink Japanese development in a way that avoids the pitfalls of Dohse and others.<sup>36</sup> They see Japanese development in terms of the changing social and organizational context of production. Sayer explicitly compares the US just-in-case (JIC) system with the Japanese just-in-time (JIT) system. For Sayer, the emergence of flexible labour market practices and tightly integrated producer-supplier complexes in Japan is symptomatic of a qualitative break with the rigid Fordist institutional structure. Freeman focuses on Japan's adaptability to major changes in the current techno-economic paradigm.

Friedman views Japanese development in terms of a process of symbiosis or mutual adjustment between large and small. According to his view, neither the state nor powerful industrial sectors were able to impose Fordist solutions on the Japanese political economy. Based upon a detailed case study of the Japanese machine tool industry, Friedman argues that large firms were forced to decentralize due to a combination of market forces, public policies and labour market practices. Given this context, a new institutional 'space' for small firm production was created. This gave rise to a hybrid economy where new symbiotic relations developed between large and small firms. The Friedman argument is correct in its discussion of the importance of small firms. His analysis of large Japanese firms incorrectly implies that they are Fordist.

Our account of post-Fordist restructuring in Japan, presented below, builds on the analyses of Sayer, Freeman and Friedman. We believe, however, that our argument provides a more thorough conceptualization and a broader perspective. Building on the concepts of the regulation school and integrating a wide body of work on Japanese history, industrial relations, production organization, management, research, and innovation, we examine both the origins and evolutionary tendencies of post-Fordist development in Japan.

### **Post-Fordist Japanese production**

Post-Fordist industrial organization in Japan differs markedly from that of Fordism. In Japan, work teams, job rotation, learning-by-doing, and flexibility have been used to replace the functional specialization, task fragmentation and rigid assembly-line production of US Fordism. This social organization of Japanese manufacturing was not the product of managerial fiat, but rather evolved from the outcomes of bitter post-war political struggles.<sup>37</sup> As in other industrial nations, neither capital nor labour was able entirely to

impose its will on the other—a relatively stable series of ‘trench lines’ being the result. In Japan, these lines of accommodation revolved around guaranteed long-term employment, a unique wage system and enterprise unions in the core of the economy.<sup>38</sup>

The unique nature of Japan's trench lines are what made it possible to create positive incentives for experiments with flexible and interactive production. Contrary to what might be assumed, long-term employment can diminish the severity of many organizational rigidities that are endemic to Fordism. Tenure guarantees improve incentives for workers to resist automation and work redesign. Since job protection is no longer an issue and wages are largely based on seniority, there is less need for the elaborate job classification system that characterized Fordist industrial organization. Rotation can then be used to upgrade skills and increase interaction and information transfer among workers.<sup>39</sup> Because employees stay with one company until retirement, investments in human capital have long amortization periods and remain internal to the enterprise.

Under Japan's post-Fordist system there are few job classifications, work rules overlap, and production is organized on the basis of teams. Since tasks are allocated by team, workers can cover for each other and experiment with new allocations and machine configurations. Work in progress is passed sequentially from team to team. Industrial production is no longer limited to functionally specialized or discrete jobs conducted by stationary workers, but is comprised of teams of workers accomplishing batteries of tasks.<sup>40</sup> The dedicated transfer lines and conveyor belts favoured by US manufacturers are replaced with modular systems that can be reconfigured.

Shopfloor learning is a basic characteristic of post-Fordist production in Japan. Team organization and increased worker input not only increase productivity, but reduce certain aspects of worker alienation which resulted in high rates of sabotage and absenteeism under Fordism.<sup>41</sup> Under Japan's post-Fordist model, workers obtain a somewhat broader view of the production process, become polyvalent and are more completely integrated into the production system. Management in post-Fordist Japan can be characterized as comprised of many ‘little brains’ sharing information, as opposed to the one ‘big brain’ directing many ‘appendages’ of Fordism. This constant circulation of information is also captured in Aoki's characterization of Japanese factories as ‘information systems’,<sup>42</sup> and in Shimada and MacDuffie's portrait of the Japanese labour force as ‘humanware’.<sup>43</sup> Learning-by-doing at many levels makes the Japanese firm an information-laden enterprise with problem-solving capabilities which far exceed its Fordist counterparts.<sup>44</sup>

Post-Fordist manufacturing in Japan rests on a JIT system of producer-supplier relations. Under this system, inventories and work-in-transit are reduced by having suppliers locate in close proximity to assembly facilities. This is particularly striking when compared with the highly decentralized, JIC production system of Fordism.<sup>45</sup> The objective of JIT is to squeeze more productive labour out of workers, not through ‘superexploitation’ but via increased technological efficiency, minimal scrappage or rework, and decreased inventory.<sup>46</sup> JIT also creates additional conduits for knowledge sharing. Suppliers and subcontractors share information under the umbrella of corporate federations.<sup>47</sup> Parents or core companies take an active hand in

helping suppliers cope with problems, and typically dispatch personnel to help solve them.

Japanese manufacturing is not simply a better or more advanced version of Fordism, it is supersession of it. For us, the organizational context of Japanese production far outweighs issues related to labour costs or comparative levels of exploitation. Clearly, this new form of industrial organization did not emerge in a vacuum, but was created by an evolving constellation of social forces that were different from those of US or Western European Fordism. Of fundamental importance were the tremendous social upheavals and labour militance of the immediate post-war era which gave rise to the Japanese system of industrial relations anchored by enterprise unionism, the seniority wage system and long-term employment tenure. The institutional matrix of post-war Japan thus opened up a series of important pathways outside and beyond those of Fordism. Evolving within those pathways, large Japanese corporations were able to overcome many of the blockages which characterized Fordist mass production.

### **Fujitsuism—a model of post-Fordist development**

Fujitsuism is the term we use to refer to the way Japan is moving beyond post-Fordism to a new model of industrial organization which is particularly well suited to the information age. The rise of Fujitsuism revolves around three basic dimensions:

- the use of ITs to transform traditional manufacturing;
- the linkage of innovation to production; and
- new ways of organizing demand and channelling consumption.

The integration of ITs into traditional production processes was shaped by the institutional flexibility of post-Fordist industrial organization. This is clearly evident in the comparative responses of Japan and the USA to automated manufacturing. According to Jaikumar and Krafcik,<sup>48</sup> the USA has fallen far behind Japan in the adoption of flexible manufacturing systems (FMS)—self-contained cells of machine tools controlled by computers. More significantly, the introduction of FMS in the USA was thoroughly bound by the institutional rigidities of Fordist industrial organization. In many US factories, FMS is being used to deskill workers, increase management's power and produce large batches of relatively standard products (thereby vitiating the benefits of 'flexibility'). The USA is currently trying to move beyond FMS technology to fully automated, computer-integrated manufacturing in order to achieve 'workerless' production environments.

The Japanese approach to automation has been quite different. In Japan, FMS was complemented with significant worker reskilling. As Jaikumar points out, multidisciplinary project teams were allowed broad latitude to adapt FMS technology to a wide variety of production environments.<sup>49</sup> Shopfloor operators were trained and encouraged to undertake the reprogramming of robots. Managers focused their attention on mobilizing workers' capabilities in ways that could create an effective organizational context for FMS technology. The implementation of industrial automation in Japan involved the creation of new work environments and the cultivation of

workers' intellectual assets and technical skill. The pre-existing framework of Japanese industrial relations provided the context in which shopfloor workers were transformed into 'think-workers'.

Perhaps more significant is the close linkage which is developing between innovation and production in Japan. This differs markedly from Fordist practice where innovation and production are separate activities—a process which is perhaps best reflected in the emergence of centralized corporate research facilities far from the actual sites of production.<sup>50</sup> In Japan, innovation is tied directly to production. For example, when a product development project is approved, research and project engineers are joined by manufacturing engineers, industrial designers, a few hands-on production personnel, and so forth.<sup>51</sup> As product engineering advances, more manufacturing engineers are added in order to focus on machine set-up, component design, and assembly. Having hands-on personnel involved at early stages ensures that the product engineering staff does not develop plans which are too difficult to implement. Although previous members drop off as various stages are completed, representatives of each group remain with the project until production runs are accomplished. Staged overlap facilitates learning-by-doing in yet another aspect of the production process, one which feeds back into the most basic aspects of research and product planning.

Japanese research and development is also integrated with production through rotation of personnel and overlapping project teams. Japanese research takes place in multidisciplinary teams which are self-organizing rather than imposed by management.<sup>52</sup> Researchers are also allowed to devote small percentages of time to so-called 'unofficial projects'.

Finally, Japanese industrial organization enables new technologies or products to be spun out as independent businesses. Recent research by Aoki documents how Japanese corporations organize this spinoff process to avoid the diseconomies of scale associated with Fordist corporations and to develop satellite organizations suitable to a variety of types and stages of economic activity.<sup>53</sup>

In short, the movement of the Japanese political economy into the information age was to a great extent determined by the institutional parameters of post-Fordist manufacturing. By creating the social 'space' and institutional openness in which experimentation with the organization of production could occur, the rise of post-Fordist industrial organization paved the way for a synthesis of production and innovation and for integrating new technologies into the production of manufactured goods. The Japanese political economy thus represents a qualitative break with Fordism—an alternative model of industrial organization.

### **Consumption, demand and economic reproduction**

Fujitsuism promises dramatically to restructure many elements of the Japanese political economy. According to regulation theory, a balanced allocation of economic output or net social product between accumulation and consumption or mode of regulation is necessary for a stable pattern of growth to occur.<sup>54</sup> The major outlines of this new mode of regulation are set

by two basic facets of the Japanese political economy—long-term employment and the relatively unique system of wage determination. This differs markedly from the organization of demand under US Fordism, which was premised upon productivity-indexed wage increases for core workers, trickle-down effects for others in the labour market, and state-associated social welfare spending for marginal groups.<sup>55</sup>

The Japanese system is characterized by substantially greater flexibility. In an environment of growth, wages and consumer demand rise in tandem with productivity increases and corporate profits. It is during downturns, however, that the Japanese system provides a resilience that can ameliorate decreases in demand. Long-term employment ensures that workers face layoffs only as a condition of last resort. The Japanese system of wage determination allows workers' income to fluctuate with corporate performance (especially through the size of the bonus). This is bolstered by enterprise unionism which often forces unions to moderate demands in economic downturns.

While this system obviously imposes costs on workers, these costs are not as onerous as dismissal (*à la* Fordism) and the Japanese political economy is more capable of adapting to business cycles. The long-term employment commitment mitigates fear of unemployment as a reason for workers to resist automation. Simultaneously, automation is not an immediate threat to demand. The employment commitment also creates tremendous additional pressure for management to generate new schemes for redeploying workers, to enter new high growth fields, and to innovate.

Institutional mechanisms to channel consumption are also important. Japan currently possesses the second largest aggregate consumption base in the advanced industrial world. Yet, this consumption differs markedly from the housing-car complex of US Fordism.<sup>56</sup> Japan is at the centre of a number of revolutionary consumption trends. The first has been termed the 'home information revolution'. At one level, this revolves around the consumption of personalized entertainment devices or consumer hardware such as televisions, videocassette recorders, stereophonic equipment, compact discs and other digital recording devices. The second level is consumption of more sophisticated information processing and telecommunications devices—including personal computers, car phones, information storage devices, facsimile machines and satellite dishes. In many of the high consumption sectors of information electronics, Japanese industry has proven able rapidly to penetrate growing markets and revolutionize production technologies (especially hardware), making products obsolete virtually overnight and establishing new niches for expansion and profit.

Infrastructure is a critical element in the organization of demand. This is reflected by the important historical roles played by canals, railways, and the car in previous long waves of capitalist expansion. Japanese industry and government are currently building the information infrastructure for the 21st century. This includes the development of digital fibre-optic systems, wired cities, 'teletopias', and smart buildings.<sup>57</sup> The ultimate goal is the creation of a society-wide telecommunications environment,<sup>58</sup> which can provide a mechanism for both generating immediate demand and laying the communication infrastructure for the information age.<sup>59</sup>

Japan is also witnessing the fragmentation of mass consumption. Fujioka

refers to this process in terms of the emergence of 'micromasses'—relatively small social groupings with unique, but internally uniform, purchasing patterns.<sup>60</sup> The emergence of differentiated markets is facilitated by post-Fordist manufacturing which can quickly reorganize production, discontinue weak products, and meet expanding market opportunities.

Finally, a huge segment of Japanese consumption is 'social consumption', the best example of which is education.<sup>61</sup> Japan devotes a relatively high proportion of public expenditures to education. However, the education phenomenon runs much deeper than formal public education. Private schools service a wide array of demographic groups on subjects as diverse as foreign languages, vocational trades, flower arranging and tea ceremony.<sup>62</sup> Private tutoring is extensive, and corporations have constant training and skill upgrading programmes. Massive social investment in education is vitally important since it enables Japan to generate extraordinarily skilled and remarkably adaptable labour across all segments of society.<sup>63</sup> This is likely to confer distinct competitive advantages in a world economy which is increasingly premised upon intellectual labour.

While these consumption patterns bear some resemblance to tendencies in the USA and Western Europe, Japan has proceeded much further in this direction. Education, culture goods and information creation provide a seemingly inexhaustible space for demand and employment growth.<sup>64</sup> This, in effect, suggests both a partial solution to the shrinkage in employment that will characterize post-Fordist manufacturing and a way to reproduce a new labour force of better educated workers, creating at least the potential for the parallel development of Fujitsuist production and consumption.

## Conclusion

Japan is showing us the way into a post-Fordist future. It is no longer sufficient to explain its extraordinary industrial and technological success in terms of a strong central government or superexploited workers. Japan has developed a new post-Fordist form of industrial organization which is well suited to new high technology industries.

Our findings suggest a general set of concepts for explaining the wide variety of institutional adaptations to economic restructuring that are currently taking place around the world. For example, the primary institutional adaptation of the USA is expressed in the rise of regional innovation complexes, most notably California's Silicon Valley and Route-128 in the Boston area. In related work, we describe such complexes as 'social structures of innovation'—interactive systems of technology-intensive enterprises, highly skilled labour, top-notch universities, tight networks of suppliers and service firms, and informal mechanisms for information exchange and entrepreneurship.<sup>65</sup> For us, the institutional adaptations of Fujitsuism and US high technology complexes, as well as the flexibly specialized industrial districts identified by Piore and Sabel,<sup>66</sup> share striking parallels. Each of the above systems represents institutional mechanisms that reproduce highly skilled labour, continuously mobilize information, and establish a stable structure within which enterprises mutually adjust and learn from one another. We believe that these principles provide the conceptual

underpinnings for a comprehensive theory of post-Fordist restructuring, which moves beyond the simple idea of flexibility.

We have shown the way that Japan is adapting to technological and economic restructuring—emphasizing how new technologies are being introduced, the ways that accumulation and consumption are being reorganized, and how new forms of labour are being harnessed and reproduced. We recognize that we have outlined a tentative model which stands to be substantially altered by human agency and social forces. Here, it must be remembered that the rise of Fordism in the USA and Western Europe took over two decades to achieve and involved a series of experiments with the organization of new mass production technologies, titanic political struggles, a catastrophic world war, and a prolonged period of domestic and international institution building. While the future is always uncertain, there can be no doubt that Japan will play a central role in the coming post-Fordist age.

#### Notes and references

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