

Incentives, bargaining and trust: alternative scenarios for the future of work

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Introduction

During the 1980s, as a consequence of a deepening of the economic crisis, dramatic changes have taken place in industrial relations conditions. The classical collective bargaining agreements (typically represented by the AIF+COLA formula) consistent with the 'Fordist' regime of accumulation have undergone profound changes. The so called 'virtuous circle' of the Fordist regime, based on strong institutional links between mass production and mass consumption, has lost its capacity to ensure sustained growth.

In fact, the defining characteristics of the present period are not only the breakdown of the old 'engine of growth' of the economy and of the patterns of industrial relations embedded in it. A key point is that *new arrangements are emerging*, based on new institutional supports and new explicit (or implicit) agreements among social actors.

Drawing on a set of stylised facts, this paper aims to clarify the rationale and meaning of the different responses that can be observed internationally, and to consider their implications for the future of work. More specifically even if diverse explanations can be raised to account for the specificity of the various responses, or for their commonality, it is our conviction that any realistic exercise in this domain, has to take into account the importance of the economic determinants. *A crucial hypothesis of this paper is that the newly emerging industrial relations arrangements are largely driven by the new forms of competition which determine their direction and their potential stability.* The paper assumes explicitly that there are strong links—not necessarily entirely visible—between 'regimes of accumulation' on the one hand, and the content and pattern of industrial relations on the other. Viewed in this light, it is not surprising to observe that the breakdown of the classical forms of productivity, and the obsolescence of the classical taylorist institutional supports of productivity growth, are giving way to new principles of efficiency, consistent with the emergence of new regimes of accumulation.¹

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¹ See, for instance, Coriat (1990), where I try to sketch the main differences between the classical Fordist regime and the different variants of *post-Fordist* regimes that are emerging. For a simple model of the Fordist regime, drawn in the style of Kaldor, see Boyer and Coriat (1987). For a complete presentation of the concept of Fordism as defined in the French Regulation Theory approach, see Boyer (1990).

In order to develop these ideas, the paper is organised as follows: The first section identifies some key structural determinants of current changes in industrial relations. The second section focuses on the technological or organisational innovations being introduced at the factory level in an effort to adapt productive organisation to the new requirements of the market place. The third section identifies, from labour's perspective, the challenges arising from the new situation created by these inter-related innovations. The fourth section presents three alternative scenarios for the future of work with reference to the changing content and new patterns of industrial relations arrangements developed during the 1980s. Finally, a conclusion tries to indicate how some of the most positive tendencies may be used for improving the competitiveness of European industry.

1. Structural determinants of current changes in industrial relations

In terms of the stylised facts, the present period can be characterised as one of the *collapse of the principles of efficiency underlying the classical 'Fordist' engine of growth*.¹ This breakdown has two basic and largely interrelated origins: The first is the so-called productivity slowdown which began in the US at the end of the 1960s, and spread throughout the OECD countries² during the 1970s and most of the 1980s. Many different explanations have been given for this crucial phenomenon (see, for instance, the many insightful studies in *The Brookings Papers* dedicated to this subject). Obviously there is no unique and simple explanation. It seems, however, that one of the important causes of this productivity slowdown was the exhaustion of the potential benefits embedded in the old 'Smithian paradigm'. The trajectory composed of 'increasing division of labour+mechanisation' reached some clear technical and social limits at this time.³ These limits, reflected in the slowdown of productivity growth, were perceived as increasingly costly and unacceptable when during the 1980s markets began to undergo large and unpredictable changes which dramatically modified the prevailing norms of competition. Competitiveness became increasingly based on such determinants as quality, product differentiation, production delays, and the capacity to react quickly to changing consumer needs. In theoretical terms, these changes amounted to the growing importance of monopolistic forms of competition, as analysed in the Chamberlinian tradition, which penetrated and even modified the classical oligopolistic structure of markets.⁴ In this context, rigid firm organisation based on the principles of 'Scientific Management' proved to be inconsistent with the new characteristics of the markets. New sources and principles of efficiency were clearly required.

In such conditions the whole classical Fordist structure was put under considerable strain and entered into a process of continuous change and adaptation to the new economic reality. Different new techniques, both technological and organisational, were designed and experimented with at the factory level. Finally, at

¹ On this issue, see my paper (1992).

² With the remarkable exception of Japan.

³ These limits were well described in Emery (1969). For an analysis of these limits in the context of the crisis of the Fordist regime of accumulation, see Coriat, 1982. In the 'radical' American tradition, see Bowles, *et al.* (1983).

⁴ This point is extensively developed in my (1991B) paper.

the end of the 1980s three waves of innovation in the areas of technology, organisation of work and firm structure were converging to create a very specific conjuncture.

In the following section I enter into some details concerning these three waves of innovation, since they play a major role (even if only implicitly) in the emergence of new industrial relations arrangements.

2. The specific nature of the present juncture: three convergent waves of innovation

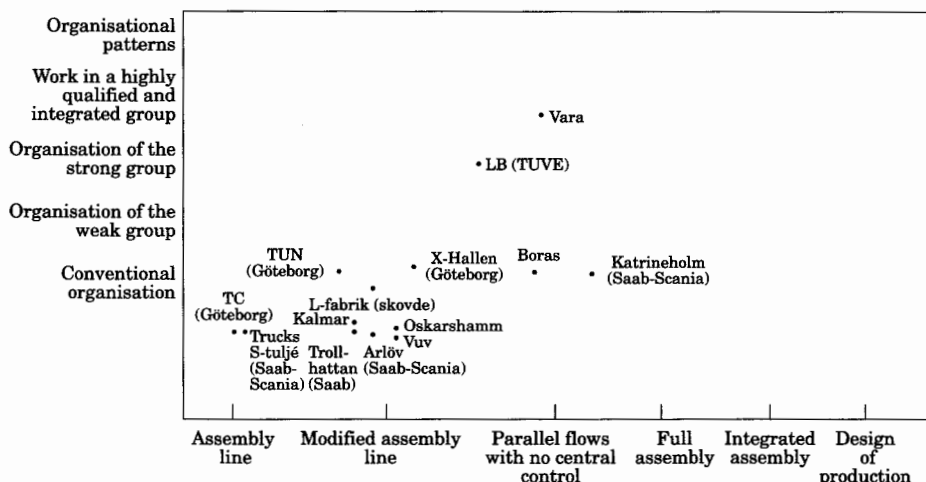
The exceptional nature of this conjuncture can be appreciated by observing that on the three-fold level of *technology, organisation of work, and the structure of the firm*, the present period is characterised by the convergence of a series of changes which took place over a period of time that can be subdivided roughly into three successive periods. (See Fig. 1 for a stylised presentation.)

2.1. Technological change: from rigid to flexible automation

At this level, the changes involve each of the three major periods and correspond to specific types of innovation. If we concentrate on applications at the factory level, each period of innovation is characterised by specific types of equipment and tools. The first period (1900–1960) is that of *mechanisation and rigid automation*, in which the ‘kingpin’ is the transfer machine introduced by the American automobile industry, a fact that accounts for this period being that of Detroit-type automation. Subsequently, a second phase (1960–1970) emerged with the development of *computerisation and numerical control* and ‘remote’ industrial organisation. This wave mainly affected the process industries (glass-making, rubber, oil, etc.). The ‘kingpin’ at this stage was the computer or the process controller. Finally, since 1975 there has been a trend that is laden with consequences and that heralds our entry into the age of *programmable and flexible automation*. This latest period of innovation incorporates the achievements and know-how of the two previous phases (in automation of operational routines and as regards management and control of operations and processes) but adds the potential offered by the industrial use of micro-electronics to spawn a generation of computerised technologies. The paradigmatic innovation of this new period is the programmable robot. This latest generation of programmable technologies makes it possible for firms to respond at a relatively low cost to current market demands for product differentiation and variety.

The production flexibility required to cope with the current conditions of competition can thus, in part, be obtained thanks to the production technologies themselves and in part to the type of organisational routines made possible with the latest in workshop electronics. In economic terms, these new technologies often make it possible to combine the benefits of economies of scale, typical of the rigid automation of the first generation, with those of economies of scope which are increasingly required by the unpredictable character of the market.

These three major types of automation, it should be stressed, are not mutually exclusive, but operate in tandem and complement one another. Each sector of production, depending on its specific characteristics, opts for a particular mix of the available techniques.



Source: Berggren (1988).

Fig. 2. Socio-technical principles of work organisation: the diversity of patterns in the Swedish car industry

As noted previously, during the 1960s and 1970s, the Taylor-inspired techniques start to misfire and appear out of step with the new characteristics of the market and a better educated and organised and more demanding labour force.

As a response to these limits a new organisational school emerges, often called *socio-technical*, the most striking examples of which are Volvo's Kalmar factory and Fiat's factory at Termoli (see Berggren (1988) for a survey of the accomplishments of the 'Swedish School'). This school differs from the previous one in that it succeeds in designing original production engineering systems based on work in small 'autonomous' or 'semi-autonomous' groups, operating within complex circulation networks, and using wire-guided trolleys, in-process inventories, etc. These production engineering systems thus brought a degree of flexibility to the production line while in part *re-integrating the work divided up by decades of Taylor-type approaches* (Emery and Trist 1972).

As discussed by Berggren (1988), and as the above figure shows, many different experiments were undertaken along these lines. However, there is increasing evidence for the fact that around Taiichi Ohno (1988) and other Japanese theoreticians in production management (especially Shingo, Ishikawa and Imai) a third school is gaining ground. Although it is premature to offer a detailed assessment of the contributions of this Japanese school of production management, some of its more salient features can be described.

First, to interpret and correctly understand T. Ohno's principles of work organisation, one has to start from the point of view that for various historical reasons Japan embarked at a very early stage on a specific and original way of rationalising work. The main and distinctive feature of the Japanese approach, in comparison to the American Taylorist approach based on the breakdown of complex worker skills into highly fragmenting tasks, is that the Japanese approach *de-specialises* skilled workers and turns them not into narrowly specialised workers

but into versatile multi-skilled ones or, to use Monden's (1983)¹ expression, into 'multi-functional workers'.² The Japanese methods of production contribute to achieving within the workshop the constitution (or reconstitution if we relate to pre-Taylor organisational practices) of a *general manufacturing function*, the main characteristic of which is that it re-aggregates tasks that Taylor's approach recommended be carefully and systematically divided and kept apart.³

Secondly, economically speaking the Japanese way is characterised by the fact that productivity is sought 'internally', through multi-skilling and the mobilisation of workers' knowledge and 'savoir-faire', rather than 'hierarchically' in accordance with the methods of fragmentation and the repetition of tasks. The Japanese way thus succeeds in reconciling productivity and flexibility while basing productivity itself on the flexibility of tasks, men and operations.⁴ Therein lies the ultimate meaning of the *kan-ban* method and other related innovations. They form the basis of the 'virtuous circle'⁵ characteristic of the Japanese enterprise. The principle of efficiency that lies at its root ultimately consists in achieving *self-sustained internal flexibility*. The technical, organisational and social arrangements that form its basis allow for sustained learning and accumulation of competencies through a very special 'technology based on working relations' (see Shimada, 1991).

2.3. Firm structure: from the 'M' to the 'N' form

There are still far-reaching changes in the pipeline in this context. A first historical switch, analysed in detail by Chandler, (1962 and 1977), came with the *transformation of the 'U' firm into the 'M' firm* (i.e., from the 'unitary' firm to a multi-divisional one, within a vertical and highly hierarchical organisation). An analysis in terms of transaction costs (Williamson 1975) shows that this period is

¹ This move to de-specialise skilled and qualified workers in order to turn them into multi-functional workers is entirely a move to *rationalise* work in the traditional sense of the term. Here too—as with the American Taylorist way—the point was to *tackle the problem of skilled workers' highly specialised know-how in order to loosen their grip on production and thus open up the way to substantial increases in work pace and productivity*. But the process of work rationalisation has operated in Japan with the objective of creating multi-functional workers rather than fragmented and narrowly specialised ones, as was the case in America. (On this point see our 1991A book and 1992 paper)

² In more detail, this process of de-specialisation and re-aggregation of tasks affects the production process in four respects: The first of these re-aggregations concerns the re-association of tasks within direct *manufacturing* itself. At this level, according to Ohno's (1988) recommendations, 'versatility' and multi-specialisation are the norm and stand in opposition to the principles of fragmentation and repetitively, a feature of the American Tayloristic way. The second consists of the *re-acquisition by direct operatives of the diagnostic tasks of repair and light maintenance*. The idea of implementing the '*jidoka*' principles (self-management and self-inspection: see below footnote 19) makes sense and proves effective only if the front-line operatives are also in charge of the routine maintenance of the plant and machinery. The third direction specific to the Japanese way is the *re-introduction of quality control at the level of working stations*. Here again, the be-all and end-all of the principle of '*jidoka*' is to tackle product quality at the level of the work station. Lastly, there is also a *re-aggregation of programming and manufacturing tasks*, already mentioned above, which constitutes the principle and *conditio sine qua non* of the *kan-ban* method. For a more complete analysis, see our (1991A) book.

³ In our view, this is finally what 'lean production model' is all about. Despite many debateable points, this thesis is clearly put forward in the recent MIT Motor Vehicle report. See Womack *et al.* (1990).

⁴ See Fig. 4.

⁵ In our last book, along with Taddei (see Taddei and Coriat 1993), we have systematically listed the different determinants affecting productivity performance. Many of them lie elsewhere than in labour costs.

marked by the primacy of internalisation and the growth of integration in all its forms, creating a move towards the constitution of very large integrated firms.

Japanese firms, on the contrary, developed at a very early stage multiple forms of externalisation within networks of sub-contracting (on this issue, see Asanuma 1989). If we take into consideration the other changes implemented by the Japanese firms as regards production management methods, we can postulate an original historical switch, namely the *transition from the 'M' firm to the 'J' firm* (on this issue, see Aoki's 1988 and 1990 works). This enterprise model is characterised by horizontal procedures for co-ordinating tasks, a high degree of decentralisation of decision-making authority and by intense inter-departmental information flows closely allied with the organisational changes taking place at the workshop level. Increasingly, firm structure may be characterised as a new 'N' form taken by modern corporation. ('N' is here for 'network').

These three waves of innovation (in technology, organisation and the structure of firms), which are closely related to one another, completely transform the traditional patterns of productivity and thus, also change the traditional patterns of management of human resources. They are key factors for understanding what is at stake in the new arrangements affecting the industrial relations system. The following sections explore some of the consequences of these changes.

3. The challenge: responding to variability and innovation through commitment and trust

The cumulative and cross effects of the changes we have just described chart a course that an increasing number of authors describe as a 'new technological trajectory' (Nelson and Winter, 1982; Dosi, 1984). This expression is used here to describe the formation and development of a *cumulative series of technological and/or organisational innovations* which steer the general direction of change along pre-defined guidelines, largely 'path-dependant'. As regards labour and labour relations issues, the challenges behind this new trajectory can be posed as follows:

3.1. *Reconciling productivity with flexibility and quality*

If we consider the norms of competition arising from the new economic environment, it appears that firms have to reconcile many different and often contradictory goals.

While the search for productivity and low costs still remains an issue (often crucial for simple standardised products), it is now admitted that the quest for saving time and improving efficiency can no longer be reduced to these factors. Broader and more complex issues have to be taken into account; the management of stocks and in-flow products and the maximising of installed capacity are now often the key bases of productivity gains.¹

In addition, it is obvious that *quality* is a growing factor in competitive success, requiring much greater attention to the process of *conceiving* the products and to *design* aspects (see Kline and Rosenberg, 1986 for the basic model and Clark and Fujimoto, 1992 for the main developments in that field). Again, this presupposes stronger links between research departments and manufacturing activities.

¹ For some data results from our own enquiry into the French auto industry, see Coriat (1993B).

Table 1. *Increase in the number of available variations of Toyota Crown*

Name of Item	The number of different kinds available as of April 1966	The number of different kinds available as of April 1978
Body type	2	4
Engine	2	4
Carburetor	2	2
Fuel to use	2	3
Transmission	3	7
Grade of luxury	4	8
Seat shape	2	5
Option	1	20
Color	14	13
Final Specification of the vehicle	322	101,088

Note: The number of orderable different final specifications of the vehicle is not equal to the number of all possible combinations of selectable items calculated by simple multiplication. This is because some combinations are not offered by the company as orderable.

Source: Asunuma (1992).

Moreover, since markets have become more volatile and unpredictable, more stress is placed on flexibility designed to ensure quick adaptation to market needs. In some industries, a quite unmanageable degree of product variety exists. In the auto industry, for instance, Asanuma, (1992) has recently established that 100 000 'variations' per basic model are produced and sold on the same calendar year.¹

Finally the situation is marked by a rapid obsolescence of products and by a dramatic shortening of product lifecycles. The situation has reached such a state that manufactures are now seriously thinking of reducing the intensity of the race. Japanese auto manufacturers are trying to establish longer product lifecycles (5 years instead of four), whilst reducing the number of variations offered per basic model (a cut of 20% in the number of variations offered, and of 30% for parts and components).²

If we try to identify the theoretical content of the above developments, we can summarise them by saying that two essential determinants have to be contended with. Firstly, the old model of productivity has run out of steam. In order to achieve further gains in productivity the organisation of the firm has to be changed so as to closely connect the manufacturing process with the *management of quality, product variety and product design*. As we shall see (section 3, these challenges clearly presuppose a substantially wider range of workers skills and capabilities. As

¹ Interview with Toyota managers, conducted on November 1992 by the author.

² It is true that economic theory says very little about productive arrangements and concentrates more on 'conventions' and alternative modes of coordination between *existing tasks* than on the division of labour and organisational issues. This link between recent organisational innovations at the factory level and new trends in economic theory is explored in my (1993A) paper.

a consequence, new patterns of work organisation and production management adapted to the new conditions are required.

Secondly, in addition to the question of the sources of productivity gains, there is the fact that we are witnessing *changes in the norms of competition*. The competitiveness of an enterprise (or a nation) now depends on a set of new attributes. The quality and variety of the product range, and more generally speaking the capacity to keep ahead of, or at least abreast of, changing conditions of demand, are now as decisive as prices and costs in determining competitiveness.

3.2. *Achieving commitment and trust*

These changes in the sources of productivity gains and the norms of competition have three types of consequences for work and labour relations issues.

If we concentrate on *manufacturing tasks* at the workshop level, a complete revolution is in process. We are definitely leaving behind the old Taylorist regime of efficiency based on the idea that productivity growth depends on organising work into repetitive fragmented tasks. In opposition to this view, it is easy to argue that productivity now crucially depends on the many and largely unpredictable micro-regulations assured by direct workers at the shop level. Different elements are converging to bring about this metamorphosis. Firstly, with the new electronic-based equipment the cost of fixed capital is growing enormously and its lead time weighs heavily in overhead costs. In order to prevent potential disruptions to productive flows, a certain level of commitment by direct workers is required, something implied in the permanent control over the productive process by shop-level workers. Secondly, the ordinary regime of integrated electronic technology (CAD/CAM systems) is a regime of unpredictable events, requiring unpredictable tasks as to their nature and time. Again, without a certain level of commitment of the workers, it is simply impossible to operate this type of complex integrated technology efficiently. Thirdly, workers often have to perform some elementary tasks of economic calculus. This is the case when they have to decide how and when they have to start (or stop) a process so that the consumption of energy and of in-process products can be reduced. Again, this cannot be efficiently accomplished without a certain degree of worker involvement. Thus, even the so-called direct work performed at the shop level is becoming more and more 'abstract'. In a concrete sense the old intuition of Marx has become increasingly relevant. What is required is the availability of labour power, ready to be used to accomplish any unpredictable task necessitated by the machinery or changing market conditions.

Turning to the question of the *process or product innovation*, analogous remarks can be made. First, reconsider the so-called process of 'continuous improvement', as it is achieved in the typical Japanese firm. To conduct such a process efficiently, something that mainly concerns shop-floor workers, a high level of formal and informal co-operation is required, not only among workers themselves but also between blue-collar workers and those white-collar workers concerned with this kind of incremental innovation. At a more complex and abstract level, if we consider the process of *product development* (as described in Clark and Fujimoto, 1992), the same features can be observed. Both processes involve closer relations among

technicians, engineers and 'direct' workers. What is required is a continuous flow of information, and organised feed-back between work teams at the shop floor level and the white-collar employees of different departments and services concerned with innovation.

In broader terms it can be argued that industrial work now needs a much more 'horizontal' structure of information flow among the different categories of employees, and much more direct as opposed to hierarchical coordination (see Aoki, 1988, 1990). Without building involvement and trust into these 'human networks', the enterprise is in real danger of being unable stay abreast of the new requirements of competitiveness.

Before concluding, let's note that economic theory has been affected by these changes. If we try to look for the rationale behind the new 'contract theory', it can easily be shown that the (re)discovery of the 'imperfect' character of labour contracts from Azariadis, 1975 to Akerloff, 1982, 1984), the new concern with 'adverse selection' and 'moral hazard', the focus on finding the right incentives (so-called 'Agency Theory'), or the need to establish mutual 'fair relations' between partners (Solow, 1989), are directly related to the changes we have pointed to at the level of the production process and the norms of competition.

Similarly, the focus on the notion of 'trust' observable in many industrial relations studies can easily be interpreted as a sub- or joint-product of the ongoing revolution in management practices. Clearly the search for new 'rules' and manufacturing 'routines', as *practical issues* raised by the three interrelated waves of innovation previously described, are increasingly affecting important fields of economic theory.¹

In concluding this section, observe that if the achievement of worker commitment is certainly a key issue for the future of firms, *many different paths can be followed* to achieve it, with very different effects and consequences for the design of work and for the content of industrial relations arrangements. Moreover, the building of 'trust' is only one possible way for promoting commitment. As the following sections will argue, both trust and commitment require very specific and sophisticated techniques.

4. Alternative scenarios: three models of achieving commitment and trust

We have chosen to focus here on three basic 'models' (i.e., three alternative ways of achieving commitment and in one case, trust). A few comments are appropriate concerning the underlying hypothesis and the way these 'scenarios' have been constructed:

In each case, it is assumed that productivity, flexibility and quality are crucial goals pursued by the firm. But a key underlying hypothesis is that these common goals are pursued by placing a different emphasis on the tools available to achieve worker commitment. Macroeconomic context and enterprise culture play a major role in determining the strategies followed by individual firms.

¹ For a more detailed analysis of this 'computerised Taylorism', see my (1990) book.

Each scenario can be tied to a 'real' situation but once again, working with stylised facts, we have chosen to focus more on the logical coherence of each model rather than on the many concrete variations that can be observed in reality. This accounts for the fact that each scenario is built on *one fundamental factor*: direct control (for the first scenario), implicit incentives (for the second), and explicit bargaining (for the third).

No doubt reality is much more complex than what we have sketched in these three scenarios. However, our contention is that even an account based on simplified stylised facts can improve our understanding of what is at stake behind the many changes that one can actually observe.

4.1. Commitment through reinforced selection and control

This scenario is built around the basic hypothesis that the 'new tools' (technological and organisational innovations) are used much more to reinvigorate the classical Taylorist, 'hierarchical' paradigm than to secure a transition towards a new model. Nonetheless, commitment is pursued and this scenario implies an effort to restructure the classical techniques of social control of labour and work. One could characterise this scenario as being based on *computerised Taylorism*.¹

4.1.1. *Productivity, flexibility and quality.* These three are achieved mainly through reinforced control. A clear emphasis is put on technology and technical arrangements. The challenges posed by the new characteristics of markets are faced much more through investments in technology (whether soft or hard) than through investments in social arrangements, the division of labour and modes of co-ordinating tasks. Hierarchical coordination still plays a central role. According to Fiat's top managers, many of the sophisticated technical arrangements introduced during the late 1970s and the early 1980s were very costly and of questionable worth if evaluated in terms of financial payoff. But they were nevertheless introduced to cut down on worker's control over some key points in the productive flow and more generally speaking to cope with workers 'rigidity' on work stations.²

Organisational techniques such as 'quality circles' may figure in this scenario. In this case they are implemented so as to facilitate more 'direct' control. In small groups it is easy for the group leader to evaluate each person and maintain in this manner a tight control. More generally, 'just in time' techniques may be efficiently implemented to put workers under high pressure. Market needs and changes directly command their activities.

Through combining technological and organisational techniques it is possible to introduce what unions often call 'management by stress'.³ Even in such arrangements, involvement and commitment of the workers is required. To understand how they are achieved, we need to consider some related elements regarding the management of the labour force.

¹ This is the case for the Digitron electronic system and to some extent the Robogate itself (see Santilli 1984).

² See the various experiments reported in Parker and Slaughter (1988). Many of them are quite convincing.

³ For a systematic evaluation of this kind of policy for the US case, see Blinder (1990). For the French case, see Reynaud (1992).

4.1.2. Manpower policy and the sharing of productivity gains. At this level a clear policy of internal segmentation among the labour force is pursued. A small group of workers receive a high level of attention from management reflected in their permanent training, good wages and professional careers. Being in a position of command, these skilled and well-trained workers constitute the 'technical core' and the technical 'memory' of the factory. They have responsibility for responding to any unpredictable events and they guarantee the smooth functioning of the factory.

With this guaranteed, it is then possible for management to pursue a policy of hiring low-skilled and low-paid workers to fill the remaining positions. This secondary group can be thought of as human 'captors' who are prepared to perform entirely routinised tasks. In the event of a disruption to the productive process, their task is to call on the qualified workers or the technicians of the first group. In this way, this second group of workers is permanently under the control and 'eye' of the more qualified ones.

In relation to this manpower policy, a systematic individualisation of wages (between and within each group) is implemented. Individual premiums, bonuses and lump-sum payments are used as incentives to encourage worker participation and to reward their commitment.¹

4.1.3. Limits. There is no doubt that in the short run this model can deliver good and even spectacular results. If we consider recent case studies from countries deeply involved in such strategies (FIAT and the cases already referred to of 'management by stress' in the US), we have to admit that productivity has often been spurred. In the longer run, however (and the same examples can be invoked), the limits are clearly apparent. Given that these firms concentrate on quality performance and on other dimensions of non-price competitiveness, such as time to market, there is a basic contradiction in this scenario in that it creates a situation of a high level of competition among workers for jobs and employment while the new norms of competitiveness clearly require open-ended and effective cooperation.

4.2. Commitment through long term incentives

This second scenario is largely inspired by Japanese techniques. Since these techniques are the most innovative and stimulating ones, I shall dedicate more space to them.

4.2.1. How productivity, flexibility and quality are achieved in the Japanese model. It is generally argued that the Japanese contribution to production management mainly lies in the so-called just-in-time protocols. They are often presented as the *alpha and omega* of Japanese-specific organisational know-how. I don't share this view. The reason is, while this view of the contribution of the Japanese school does bring out aspects that are central to our subject, they unfortunately focus on only one of the key innovations. The Japanese experts themselves (see Ohno, 1988 and for a

¹ *Jidoka* is a specific technique introduced by Ohno, at the workshop level. It consists in giving to the worker the practical possibility and the right (in fact the duty) to stop the line anytime he thinks it needs to be stopped, especially if the speed of the line is too high to guarantee the perfect quality of the product. This requires new lay-outs based on different concepts from the classical Fordist ones. For a detailed presentation of these original techniques, see Monden (1983), and for a commentary on the meaning of these organisational innovations, see my (1991) book and (1992) article.

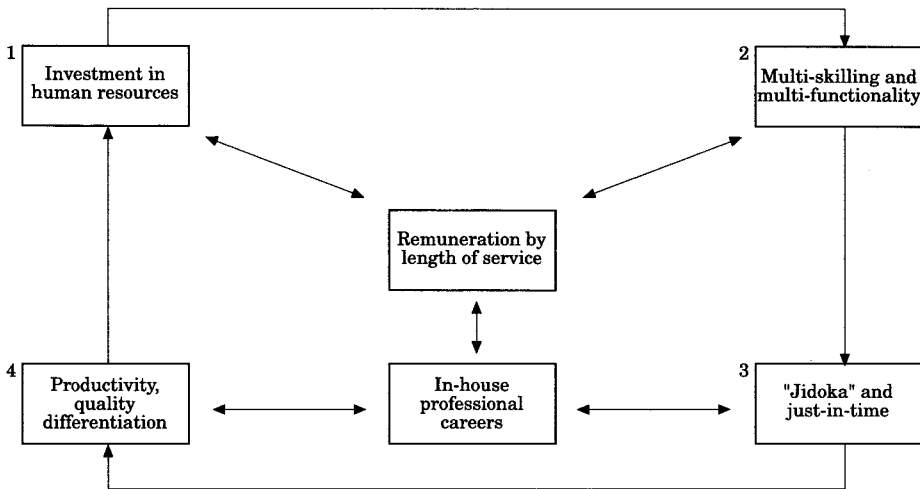


Fig. 3. 'The virtuous circle' in the Japanese enterprise

commentary my 1991A book) make a point of stressing that the crux of the method lies not in one but in *two* innovations: just-in-time techniques and *jidoka*.¹ Ohno (1988) even explains that *jidoka* *preceded* the development of the just-in-time approach and is an essential precondition for the latter. This point is capital, in as much as *jidoka* refers to the process we described above by which operatives are transformed into versatile and multi-functional workers.² Only on the basis of this type of work pattern, which is versatile and multi-functional, can *quality* be managed at the shopfloor itself. One of the key elements of *jidoka* is that the worker has the *competence and time* needed to complete his task and pass on a flawless product to his fellow worker for the next stage. Similarly, it is the achievement of self-management that permits downstream-upstream scheduling as a function of the market and of actual sales (the ebb and flow of orders can be catered for by the internal flexibility and versatility of the operatives).³

In my view the efficiency of the Japanese firm lies in a complex series of factors related one to another through strong and sophisticated links. From this perspective it is clear that the whole efficiency of the system is based around the creation of a trained and versatile group capable of catering through *internal flexibility* for the market-imposed demands of quality and differentiation at the same time. Finally something like a 'virtuous circle' of the Japanese firm can be sketched, (see Fig. 3).

At the heart of this virtuous circle one finds a combination of on- and off-the-job training and a mutually reinforcing wage system based on the length of service. They lead to an original set-up where the multi-functionality of the workers can serve as a solid support for both 'just-in-time' and 'jidoka'. On this basis productivity,

¹ Significantly, even the authors who advocate the 'lean production model' (see Womack *et al.*, 1990) remain very evasive on this series of innovations connected with 'just-in-time', but which remain the only ones *capable of ensuring its effective implementation*.

² It is also this versatility that permits '*linearisation*' of manufacturing processes, another capital innovation from the Japanese school which makes a clear break with the Ford-type production engineering and layout patterns.

³ This, at least, is the thesis that I defend in my (1991A) book.

quality and flexibility are efficiently achieved. The benefits of this efficiency can then be reinvested in human resources (on- and off-the-job training). . . .

4.2.2. *Manpower policy and the sharing of the productivity gains.* If we take a further step and consider the social compromises behind the mechanics of the system, among the Japanese authors who have concentrated on this problem, Koike (1988) in particular stresses the fact that once the appropriate organisational base is secured, economic efficiency above all hinges on the *involvement of the employees* in the production process. This involvement, rendered possible by an organisation built around the internal flexibility of the operatives, presupposes *quid pro quo concessions* for the employees. In his view, these social concessions and arrangements must revolve around the following: quasi-permanent intensive *training* (both on-the-job and off-the-job); enlisting the efforts of virtually the whole of the workforce; the principle of a grading structure giving recognition to acquired skills and know-how; and rules over career structures that are clear and respected by one and all. Koike also maintains that the real key to Japanese efficiency is that organisational innovations are backed up and sustained by a systematic policy of *internal deals* within the enterprise, what he qualifies as a process of 'white-collarisation of the blue collars'. In effect, this means that Japanese industrial enterprises treat their manual workers the way European enterprises treat their white-collar employees.

To clearly understand what this model is about, two critical points must be added. The first is that all these arrangements *are long-term ones*. The evaluation of the level of commitment of the workers is a long process, involving many different criteria. The benefits of commitment are only reaped by the worker after a relatively long time of service. During the first years, the wage is rather low and the work (often on the assembly line) not very satisfying. In the long run everything changes: the level of wages, responsibility, and one's professional position.

The second critical point is that this whole structure *is not explicitly bargained by the social partners*. Most arrangements remains informal. Clear, written and explicit contracts are not drawn-up.

4.2.3. *Strengths and limits.* Even if this model is very powerful, the fact that essential interest are not explicitly bargained but consist of 'implicit contracts' clearly is a weak point and to some extent constitutes the 'Achilles' heel' of the system. Since the contract is not part of the game, discretionary practices can inhibit efficiency. Pursuing this line of thought, it can be argued that the arrangements underlying the Japanese model can easily be analysed as reposing on ostracising techniques. Either you are in and you share some of the benefits or you are out. But we have to admit that it is a *powerful machine to build commitment and, in this case, trust*¹ at the heart of the factory.

¹ The implicit definition of 'trust' posed here is derived from the one given by Lorenz (1993). According to Lorenz, 'The action of placing trust (by the trustor) allows another (the trustee) to undertake actions that would not have been possible otherwise, possibly because resources are put at the trustee's disposal . . . The situation is of risk for the trustor, because the new possibilities of action are made available without any binding commitment from the trustee on how he will make use of them, and because of the existence of a time lag, which precludes monitoring the trustee's behaviour as a condition for making them available'. The relation between trustor and trustee as described in this quotation is perfectly appropriate to characterise key elements of the Japanese industrial relations system.

4.3. *Commitment through bargaining*

This third scenario shares some important features with the 'Japanese' one. In particular the same emphasis is placed on *internal flexibility*, skills and the building of systematic internal labour markets¹ as key for economic efficiency. But a crucial difference is that commitment, in this case, is a result of an *explicit bargaining process*. A useful reference here is the German or the Swedish model. On this scenario I shall be brief and merely try to indicate some of the main differences from the previous one.

4.3.1. *Productivity, flexibility and quality.* As in the previous scenario, productivity and quality are built at the shop floor level through high investments in training and organisation. But in this case formal education through public institutions prevails over 'on-the-job' or 'off-the-job training' inside the factory. As a result, the recognition of credentials and skills acquired by the workers are key issues in formal industrial relations agreements. Another difference lies in the fact that, as regards organisational innovations, productivity and flexibility depend mainly on '*socio-technical principles*' and the use of sophisticated machinery (CAD/CAM). Just-in-time and other 'clean production' techniques don't play a crucial role.

4.3.2. *Manpower policy and wages and payment system.* With regards to manpower policy and wages and payment systems, a crucial difference lies in the fact that relevant contingencies are anticipated and formally negotiated in so far as possible. (See, for example, Fig. 4 which gives some details of the agreement for the Volvo group. One can also refer to the content of the wages agreements in the German industry). In short, incentives are never implicit as in the 'Japanese' style of management; they are largely embedded in formal agreements.

One very important point is that, apart from the traditional issues of collective bargaining, such as wages, recognition of skills, professional careers and internal labour markets, novel issues are pursued. During the 1980s German agreements about *work hours* provided an illustration of the new areas that can be covered in contracts when productivity and quality are oriented to face the challenges posed by massive unemployment.

4.3.3. *Limitations.* The limits of this model mainly lie in the fact it requires very strong unions capable of mustering a sufficient level of bargaining power in their relations with employers.

5. Conclusion: what are the choices for European industry?²

The three scenarios presented above are in fact deeply rooted in national cultures and traditions. Therefore, one can very well argue that the exercise is in vain. What kind of lessons can we draw, if the conclusion is, finally, that 'culture' decides all?

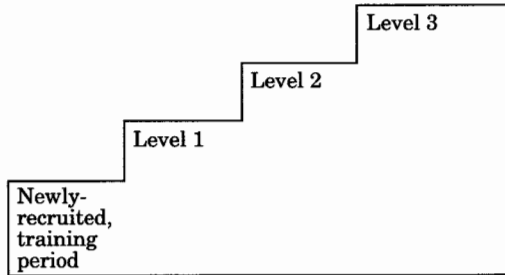
¹ See Doenringer and Piore (1971).

² The following pages draw heavily on an unpublished joint paper written with my colleague Robert Boyer. See Boyer and Coriat (1990).

Work in groups:
Study of changes in work organisation at Volvo

Remuneration system in plant LB

1. Individual pay structure



Level 1: ability to perform one task

Level 2: ability to perform 50% of the tasks of the group

Level 3: ability to perform 50% of the tasks of the group and to act as group leader

2. Group bonuses

Personnel	Points
-training	6
-participation in the recruitment of members of the group	6
-development of the group	30
Production techniques	
-modifications to order	8
-division of labour	14
-development of production methods	32
Maintenance	
-orders for repairs	4
-tubes and clutches	6
-manual machines and special tools	10
Planning	
-absenteeism	4
-planning of model variants	8
-group planning	16
Accounting	
-recording of working time	6
-drafting of a budget	8
-budgeting of indirect working time	16
	26
Source: Bergren (1988).	200

Fig. 4. Joint development of the organisation of work, job content and pay structure: a Swedish example

Even if this kind of argument can be made, I propose to conclude in a very different manner. If we focus on the theoretical level and search for the most promising common elements in the different models, it is my conviction that

something useful can be said. From such a perspective, one can observe that at the heart of the new efficiency required by the present character of the norms of competition there are some intimate and deep-rooted links among, at least, three elements: *organisational innovations centred on employee multi-skilling and 'internal flexibility'; internal labour markets policies built upon professional careers; and employee involvement based on explicit contracts or implicit conventions.* At the same time, one has to admit that there is no exclusive, pre-ordained route to an efficient combination of the three elements. On the contrary, it can be shown that efficiency can be achieved by following different paths, depending on the national culture and traditions and on the associated constraints arising from employer/employee relations.

Thus, by concentrating on the new forms that have arisen in the past decade and by focusing on the most promising among them, it is possible, by stylising the facts to some extent, to highlight different 'models' which all amount to national variations of the introduction of innovation patterns of production management (cf. Table 2 where the different models are presented).

These variations may be regarded as alternative options and as constituting alternative choices open to firms (and nations) in the process of catching up with the new economic realities.

Focusing first of all on two series of 'determinants', the result is portrayed in Table 2. One possibility is that productivity and flexibility are sought primarily through technological advance and its incorporation in machine-based systems and by persuading employees to accept the changes by various means. This conjures up the *Saturn* model used by General Motors. When the same quest for productivity and flexibility is achieved primarily by controlling information flows and mobilising the operatives themselves and when technical innovation is introduced on this basis, we have the *J firm* model as exemplified in particular by Aoki (1988 and 1990).

Another possibility is that 'contractualisation' can develop along the familiar lines of a bimodal pattern of salary and enhanced job security (a feature shared by both the *Saturn* and the *J models*). But these models of production organisation can be associated with another type of compromise: co-determination and consultation on technological options (the *German model*) or co-determination in the major macro-economic policy choices (the *Scandinavian model*).

If we look at other complementary aspects of these configurations on the basis of a different dual criterion (viz. employee training arrangements and wage and salary scales), the relevant distinction then is the internalised/externalised nature of the procedures involved. Moreover, a distinction can be drawn according to whether the corresponding negotiations are conducted at sector level or company level and whether the public authorities are invited to mediate or not. This results in the following four typical configurations (Table 2):

(1) *Model J* combines internalisation of the effects of experience and decentralisation of pay formation. Aoki (1988) contrasts the A (American) firm with the J (Japanese) firm. In the latter, the permanent employees who form the core of the enterprise maintain horizontal communications and are the focus of an on-going training campaign. In return they offer a similarly intensive mobilisation of their

Table 2. *Variations of new organisational models*

Overall presentation		
How productivity and quality are achieved Characteristics of the labour contract	Technological flexibility + Organisational flexibility	Technological flexibility + Organisational flexibility + In-house contracts, training results and the repercussions on training of work organisation
Pay, index-linked but binomial Enhanced job security and status	Saturn (American Saturn model)	'J' (Japanese) firm
Binomial pay + Meso/macro regulation (working hours, salary schemes, managed institutional flexibility and mobility, negotiated technical changes)	Scandinavian model	German model
Focus on training and the effects of training		
Training and skilling How compromises are reached	Internalised	Externalised
Decentralised	Model J (Japanese)	Saturn (USA) Model
Centralised	Scandinavian model (Participation)	German model (Co-management)

Source: Boyer and Coriat (1990).

know-how and drive. It is in this way that career and pay structures are internalised within the enterprise.

(2) The *Saturn model*, named after the agreement between the trade unions of the automotive sector and General Motors in the US (cf. Coriat, 1988), also corresponds to a decentralised way of reaching compromise. Unlike Model J, it is based on skilled workers, whose professional status has been achieved outside the plant but is subsequently recognised by the enterprise and appropriately incorporated in the pay agreement.

(3) In terms of training, the *German model* resembles the Saturn model in one respect. It relies on a largely externalised system of initial training of skilled workers and technicians (Streek, 1988). It differs, however, in that negotiations tend to be centralised and based on established and powerful trade unions participating in

co-determination. Agreements are signed at the sector level and often contain provision on innovation (e.g., negotiations on technical changes, a field in which the Federal Republic of Germany has played a pioneering role).

(4) Lastly, the *Scandinavian model* combines centralisation of pay bargaining with strong enterprise policies when it comes to training and career structures. Furthermore, these agreements do have a bearing on general economic policy management, reflected in co-determination over the use made of productivity gains. Other typologies could naturally be established using different criteria. The one just proposed was intended only to show how different variations of new production models are already with us and can be found in very different national contexts. These include the presence of powerful and well-established trade unionism (Scandinavian countries) versus weak trade unions (Japan); extensive public intervention (Sweden) versus an absence of public involvement (the US); and the internalisation of vocational training within the firm (Japan) versus its externalisation (Germany).

No model is ever transferable as such. However, a new approach is emerging as regards pay structure which is common to a large variety of situations at the enterprise, sector and country levels. Systematic research on this theme should substantially enhance the models that European industry could emulate in order to ensure its transformation. With or without Maastricht and the perspective it has given rise to, this clearly is a crucial issue for the people of the old continent.

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