Technical Change and Industrial Relations
- A Theoretical Framework -

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Abstract
This paper presents a theoretical framework for the analysis of changing industrial relations using concepts mainly from the systems tradition in this field. It distinguishes between regimes of job regulation and the industrial relations system, which produces such regimes. The framework is then used for a brief discussion of the relations between technical change and changes in the industrial relations of the automobile industry in three countries.

Zusammenfassung
Technical Change and Industrial Relations
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This paper is an effort to deal with some theoretical problems arising from a comparative research project on the automobile industry. The project explored the implications of new production technologies for work organization in relation to international differences in industrial relations systems. Technical change was assumed to present options for work organization and the choice between these options was expected to be influenced by the prevailing system of industrial relations. Changes in work organization were investigated in comparable plants of three multi-national car manufacturers, located in three different countries (Great Britain, West Germany and the USA). Presumably, differences within one country would have to be explained by differences in the policies of the firms, whereas differences between countries would have to be explained by (among other things) differences in the organization of industrial relations of those countries. It was found that, indeed, differences in work organization between firms within one country, although certainly not to be neglected, were relatively small compared to differences between countries. On the part of each corporation, some efforts are visible to develop a more or less unified, corporation-wide approach to questions of automation and work organization, but these efforts are in their outcome strongly affected by existing national patterns of labor relations, labor market institutions, health and safety regulations, training systems, etc. Empirical findings thus seemed to conform to the expectations that went into the research design. A major theoretical problem appeared, however, because of the fact that during the period under investigation in all three countries industrial relations in the automobile industry were changing more or less rapidly. Especially for Great Britain and the USA several recent studies suggest that decisions concerning the application of new technologies had far-reaching consequences for the industrial relations system (IRS). A completely different perspective thus seems possible: not the IRS influencing the choice of work organization, but these choices influencing the IRS (Katz 1984, 1985; Katz/Sabel 1985; Marsden et al. 1985; Streeck 1985a; Willman 1982, 1986). To phrase it differently: whereas the research design had
proceeded on the assumption that decisions on work organization are taken within a time frame in which the industrial relations system can be taken to be unchanged, at least in the early eighties it was possible to argue that the IRS in some countries was changing as rapidly as work organization. That by itself doesn’t exclude the possibility that the IRS influences choices in work organization, but if the changes in the IRS are somehow caused by those in work organization the argument breaks down. Figure 1 offers a graphical representation of the argument. Work organization is depicted as the outcome of a process of selection and bargaining. The work organization that results from the process of selection and bargaining is called 'optimal' in the sense that it is supposed to be the best attainable compromise for all parties concerned under the given circumstances. The project research design was aimed at investigating relation (1) and hardly considered (2). If relation (2) is important, however, the meaning of relation (1) becomes unclear, because the IRS can no longer be treated as an independent variable.

Fig. 1 New technologies and work organisation: Industrial relations as determinant or determined
Thus, fundamental questions were raised concerning the relative stability of the IRS, the factors underlying its structure and the process of its construction. In order to deal with this type of questions, a conceptual framework is developed in the following sections. Our starting point is the notion, that the industrial relations system has the function of regulating the employment relation. Section 1 describes the employment relation as a relation of exchange. The industrial relations system is then presented in section 2 as the social system 'responsible' for the regulation of the employment relation. Section 3 then takes a closer look at management's role in the process of regulation. The fourth section considers some of the criticism of the systems approach with special attention for the problem of structural change in the IRS. Section 5 deals with technical change and the way it enters into the employment relation. A final section uses the conceptual framework in a brief analysis of recent developments in the industrial relations of the automobile industry in the three countries mentioned.

Those who are familiar with the industrial relations literature will no doubt recognize much of what follows. One source of inspiration has been John Dunlop's seminal work (1958) and especially its reception in British industrial relations literature (Goodman et al. 1975; Wood et al. 1975; also Poole 1981 for an interesting survey; Schienstock 1981). As a second source I should mention the recent work by Burns, Baumgartner and Deville on actor-system dynamics (1985), especially where it allows more clearly for (strategic) action in a rule-structured environment.

Finally, the following has also been inspired by the ongoing debate about the meaning of strategic choice for the relations between an organization and its environment in general and for industrial relations in particular. In this context, especially strategic decisions by management have recently been emphasized (Schreyögg 1980; Timperley 1980; Kochan et al. 1984).

This paper doesn't pretend to be a faithful exposition or interpretation of these sources of inspiration. It is just an effort to use some of the concepts found there, especially from the systems tradition in
industrial relations, to see if they can contribute to an understanding of the theoretical problems mentioned above.

1. The Employment Relation

The employment relation is a relation of exchange. The employee is selling his or her capacity to work a number of hours per day to the employer, who pays a wage or salary in return. It is usually assumed that employees would prefer to work independently or rather not to work at all. The reason they enter into an employment relation is that they need the money to acquire the goods deemed necessary for an acceptable standard of living. Employers enter into an employment relation because they need workers to operate available production installations to produce products which then have to be sold in order to realize profits on the capital invested in the production installations. Employers thus take part in the employment relation as owners or agents of owners of capital that has been invested in machinery, buildings and raw materials, etc. Employers' rights in this relationship are derived from the rights of ownership. Consequently, employers or their agents (management) decide about the product to be produced, the organization of work, about the level of mechanization, the division of labor and the design of individual jobs. Employees apply for these individual jobs (sometimes through the offices of unions, subcontractors, etc.), corresponding to their individual capacities to do a certain kind of work.

Employees are expected to drive up their wages, i.e. the price of their capacity for work, whenever they get a chance to do so. Analysts of the labor market concentrate on the explanation of the price of labor and consequently speak of the employment relation as the wage relation. On the labor market we find not only individual workers and employers, but also unions and employers' associations who engage in collective bargaining. Bargaining on the labor market ends with the signing of a labor contract. Labor market research thus concentrates on one dimension of the exchange relation: on the money and other benefits flowing from employers to workers. We are here more interested in the other
half of the transaction: the flow of work efforts from workers to employers. What makes the employment relation different from any other exchange is the fact that the commodity sold, the capacity to work, cannot be detached from the person selling it. The continuing attachment of labor power to the worker limits the control of the buyer over this specific commodity. Any use the employer wants to make of the labor power depends on the consent and cooperation of the worker. Of course, it can be argued that the worker has given his/her consent by signing the labor contract, but that assumes that the contract can provide a complete and unequivocal definition of the efforts required. Labor contracts may be more or less specific about the jobs that have to be done, but it is only when the jobs are done, that workers find out what exactly is expected from them and that employers find out how good the workers are on the jobs they have applied for. If a contract is very specific about the work to be done, this has the advantage that few if any differences of interpretation will arise concerning the effort expected from the worker. The disadvantage is that every change in the job, however small, would require a change in contract. In fact, for virtually all jobs it is impossible to provide a job description which isn't open to various interpretations. If workers offer a different interpretation than employers, the latter are faced by a complex choice, either to agree to this interpretation (presumably incurring a loss of production relative to what they were hoping for), or to impose their own by strict control measures (incurring costs of control and maybe of a drawn-out conflict) or to fire the worker and search for another (incurring search costs and the chance of having similar problems with the new employee), or to start a new round of bargaining, this time over the interpretation of the labor contract (a contract may specify the procedures to be followed in case of disagreement).

Almost every employment relation is characterized by some implicit or (less often) explicit 'bargaining' over the effort that can be reasonably expected from the employee. Bargaining on the labor market ended with the signing of the contract, but then on-the-job bargaining
starts and remains a less visible, but certainly just as important element of the process of exchange.

2. The Industrial Relations System

The 'Industrial Relations System' consists of all activities, actors and procedures involved in regulating the process of exchange between employers and employees. Within the system we identify actors and procedural rules, a structure and a process. Actors in the IRS are the employer and the employed themselves, but also employers' associations and labor unions as well as government and its relevant agencies. Together and in interaction with each other, these actors produce a more or less coherent set of rules (a regime of job regulation) regulating the behavior of employers and workers in the employment relation. The production of rules governing the employment relation is itself a process regulated by rules: it is useful to distinguish between the procedural rules regulating the relations between the actors in the IRS and the substantive rules produced by them to regulate the employment relation. Armstrong et al. (1981) distinguish a third kind of rules, namely procedural rules pertaining to the administration and interpretation of substantive rules, e.g. procedures for dealing with grievances. Alternatively, one may consider such procedural rules as part of the rules internal to the IRS. In that way, it becomes clear, that the IRS is a multi-layered system in which higher levels may produce procedural rules for lower level actors. On the lowest level we find the individual worker and/or his or her representative on the shop floor (shop steward) interpreting and bargaining over the terms of his or her labor contract with the employer or rather with the agent of the employer (the supervisor) on the shop floor. Actors at that level are active in the execution of the labor contract, acting out the employment relation, guided by the rules established in the IRS and at the same time they contribute to the creation of new rules, customs and practices which eventually may even become part of labor contracts (this process of formalization of informally developed rules and regularities is called reinstitutionali-
zation by Goodman et al. 1975). Above the individual/shop floor level (actors: workers, shop stewards, supervisors) one may distinguish the level of the plant and/or firm (actors: works councils, shop steward committees, union locals, plant or firm management), the level of industry (actors: industrial unions, employers' associations) and the national level.

It should be noted that the industrial relations system is an analytical construction. Actors can be active in different systems at the same time. Workers and supervisors at the lowest level of the IRS e.g. are also active in a production system, in which they cooperate in the production of commodities, together with other actors who are not part of the (same) IRS.

The (internal) procedural rules define the structure of the industrial relations system by circumscribing the roles and responsibilities and the interactions of the actors at the different levels. The structure is a property of the system as a whole, an expression of the relations between all actors as a result of all rules, and as such it is relatively robust. Individual actors may change (governments e.g.), grow or amalgamate (unions, firms) and individual procedural rules may be amended without greatly affecting the structure of the system. It should be noted that the rules of procedure have been created by the actors themselves. This is the main reason why government is commonly identified as one actor within the system, because government and its agencies intrude into the IRS procedures at all levels. One could also think of an IRS with the government as an outside influence, but that would make the system very open.

The structure of the IRS gets reflected in the regime of job regulation produced by the system. However, just as in a game the rules do not determine which player will win (though they might limit the losses of any player), so in the industrial relations system the procedural rules alone do not fully determine the actual process of job regulation and the substantive rules (the regime) coming out of this system. The process (or game) of job regulation is an ongoing process in historical time. The procedural rules and the structure of the system may be more or less favorable to any of the actors, but the relative strength of
the actors and the strategies followed by them also play an important role. Specific rules of job regulation therefore also reflect the relative strength of the actors at the time of their coming into existence. It isn't easy to define relative strength independently from the outcome of the process of regulation, but it is fairly obvious that such factors as the situation on the labor market; the political color of government; and even the individual shrewdness of labor leaders or employers can affect the relative strength of the actors in the IRS. Complete knowledge of the structure of the IRS, therefore, doesn't enable us to predict precisely the rules of job regulation produced in this system. The explanation of any specific rule or any specific set of rules (regime) requires knowledge of a larger set of variables in the context of the IRS, which influence strength, perceptions and strategies of the different actors. Where state legislation provides clear definitions of the roles of the actors in the IRS, the resulting regime of job regulation is less dependent on cyclical changes in the relative strength of the actors than in systems where legal rules are less prominent (Streeck 1986b).

Figure 2 provides a graphical representation of the conceptual framework outlined above. In the center of the figure is the employment relation. Workers exchange efforts against wages with employers who employ them within the framework of a competitive strategy. The terms of exchange are regulated by the prevailing regime of job regulation—a set of 'rules of the game', some of which are firm-specific whereas others have a wider applicability. The actual exchange going on in a firm is not only dependent on the prevailing set of rules, but also on the strategies and attitudes of the individual employer and the workers concerned. These actual terms of exchange are one of the determinants of the competitive performance of the firm, which on the one hand feeds back into competitive strategy and on the other hand influences demand for labor. Demand for labor by all firms determines the level of employment, which in turn is a major factor in the explanation of
Fig. 2 The Industrial Relations System and the regulation of the employment relation

IRS

national level
actors: employers' associations, unions, government

industry level
actors: employers' associations, unions, government agencies

firm/plant level
actors: employer, management, works council, government inspectors

workplace level
actors: managers, shop steward, workers

Management workers' strategies in industrial relations

Employers' strategies in industrial relations

Regime of job regulation

Wages

Employment relation

Effort

Competitive performance

Employment rate

Demand for labour

Macro-economic performance

Government policies in industrial relations

Unions' strategies in industrial relations

Management strategies in production

Management competitive strategy

Area of individual firm

--- --- area of individual firm

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workers' attitudes and unions' strategies (and their strength vis-a-vis the employers). The rate of unemployment and other macro-economic criteria are an important input into government policy making concerning industrial relations. In the figure, a clear distinction is made between rule-guided, (strategic) behavior within a specific employment relation, which is naturally mainly a concern of local management, (groups of) individual workers, shop stewards, works councils, etc. and (strategic) actions within the industrial relations system aimed at formulating rules for the employment relation. Such actions within the industrial relations system are also guided by a set of (procedural) rules, which constitute the structure of the IRS. Behavior within the IRS may also be aimed at changing these internal rules of procedure—usually in connection with a desired change in the regime of job regulation.

3. Unilateral regulation or joint regulation?
Under capitalist conditions the possession of capital (to pay wages) and capital goods confers upon the owners or management the right to organize the process of production (including designing the jobs and planning the efforts of workers). The basic meaning of the labor contract under capitalist conditions is that the worker gives up his/her autonomy in exchange for a wage and allows the employer to decide what he or she has to do (heteronomy). Management therefore usually takes the initiative in designing rules and standards for the execution of jobs. As long as the workers do not object to the efforts demanded from them by management, the rules guiding the efforts side of the employment relation are simply rules made by management. Armstrong et al. (1981) express this quite strongly: "...the 'normal' mode of rule-making is by management decision, not by anything conventionally recognized as a bargaining process. (...) (R)ule-making begins as a management process and (...) it becomes material for 'industrial relations' only as an 'exception' and by way of reaction to the background process of management rule-making." (64) It seems to me that Armstrong et al. are making an important point here, but they are going
too far. It is correct to emphasize that management usually has the initiative in rule-making, but management is not operating in a vacuum: it cannot make rules at will. In the course of time many of the rules and standards developed by management have been challenged by the workers and have become an object of bargaining and conflict, some of it at the workplace, some of it more explicitly at higher levels of the industrial relations system. As a result, there limits to the rule-making rights of management, some of them imposed by government (the so-called status rights of employees), other agreed to after bargaining with unions or other representatives of the workers (the contractual rights of employees). Firms, industries and countries differ in the extent to which contents and intensity of the work effort have become object of bargaining between management and workers or their representatives. Industrial relations scholars have a tendency to concentrate on these bargaining and legislative processes, which have led to rules limiting the rights of the buyers of labor power and specifying the rights of the owners of labor power. Many of the employers' rights-managerial prerogatives - however, have not been seriously questioned and in every employment relation there are many parts of the effort bargain that are virtually uncontested.

If we take a closer look at any regime of job regulation, we find that there are in fact always two kinds of rules making up a regime. On the one hand there are the rules that have been produced jointly by employers, workers and/or government. On the other hand there are rules that have been made by only one of the actors, without without being contested by and without any explicit involvement of the other actors. Most of the unilateral rules come from employers as part of their efforts to organize production. These are usually the more specific rules for specific jobs, subject to the limits set by more general rules generated by the IRS as a whole. Of course, whatever decision an employer takes concerning job regulation, it will take the possible reactions of workers and their representatives into account. In that sense, any rule-making is a process of joint regulation and it is entirely correct to call the regime of job regulation a product of the industrial relations system.
A regime of job regulation will not prescribe behavior of the employer and employees in all detail; it will usually leave many things to be decided by the actual participants in the course of developing their relation. In practice, some actors may want to deviate from the rules and if they are not hindered to do so they may contribute to the creation of new rules (customs and practice).

When actors are dissatisfied with the practices that eventually prevail or rather with the results of these practices in terms of their goals (income, productivity), this will have repercussions on their activities in the industrial relations system. They may change their strategies, try to gain strength or find allies or try to change the procedural rules or any combination of these. Employers for instance may unilaterally lower wages, whereas traditionally they had negotiated with unions. In that case, they are violating procedural rules as well as changing substantive rules (concerning wages). Unions may be opposed to the latter, but they can be expected to be at least as much if not more opposed to their elimination from the process of wage determination. They may even be prepared to accept lower wages, if that means that procedural rules, in this case recognition of them as negotiators for workers, can be kept intact.

If performance of the firm is satisfactory, there will normally be little incentive for management to change the terms of exchange prevailing in the firm or more generally, to attack the regime of job regulation. In fact, efforts to change the rules may have direct negative effects on performance, if the new rules are opposed by workers and unions. However, if the firm is doing badly in a competitive market, it will consider changes in its mode of operation. Depending on what are considered the reasons for the bad performance, the rules governing the employment relation may come under attack. At first, management will try to achieve a better performance without changing the established rules. Control of workers will probably increase, as management tries to impose more vigorously its interpretation of the rules. If that is not enough, management will try to change the substantive rules of job regulation in the process of bargaining.
over wages, job evaluations, job descriptions, etc. Eventually, all rules impinging on the utilization of workers and in some way limiting the freedom of management to act as it desires, will come under attack. The attack doesn't always succeed, however. Especially if there are other firms in the industry with a better performance, it is unlikely that an unsuccessful firm will be able to change the regime of job regulation beyond its own walls. Only the rules created in-house may come under pressure, but if workers have the possibility of moving to the more successful firms, even internally generated rules may remain unchanged. On the other hand, if a whole branch of industry is experiencing difficulties against foreign competitors, all actors in the industry's industrial relations system may be willing to participate in the construction of a new regime of job regulation. But again, if the industry is going down in an otherwise buoyant economy, employers may not be able to gather enough strength on their own, or to enlist support from other industries or government, in order to change more than the rules constructed within their own industry.

And even then, workers may prefer to leave the industry if they can, rather than agreeing to change the rules of job regulation. If on the other hand, employers in a wide variety of industries are facing economic problems and if they are also convinced that a change in the regimes of job regulation is a necessary part of their recovery strategies, workers and unions may have to agree to changes in the regime of job regulation, which they would have opposed in better days. If they do not agree or cooperate in such changes, employers and/or government may take the initiative in changing the whole structure of the industrial relations system, changing the rules of the game or even the the identity of the unions with whom they are dealing. Thus, a general economic crisis and structural economic change may provoke initiatives for structural change in the industrial relations system, if the prevailing structure is not flexible enough to react to the new environment in terms of producing a regime of job regulation that enables firms to survive.

Of course, an economic downturn usually also changes the relations of forces between capital and labor. If firms go bankrupt and unemployment
4. Consensus and Change

It is important to see what the systems approach as outlined above does and does not do. What it does is to identify and describe the mechanisms behind a functioning employment relation. It argues that actors in the employment relation behave in accordance with certain rules and shows where these rules come from and under what circumstances they may change. It does not show why actors might be willing to engage in regulatory activities and to stick to the rules thus produced. In fact, it is a basic assumption of the theory that all actors are willing to accept the employment relation as a fact of social life, that can and has to be regulated, but in its essence remains unchanged.

This basic assumption has earned the systems approach a lot of criticism. Because it took a fundamental aspect of capitalist society as given, the systems approach was accused of 'accepting' capitalist property and power relations. Moreover, these power relations were said to be presented in a distorted fashion: the notion of joint regulation seemed to suggest that the two parties in the employment relation were of equal stature, whereas in reality the employers are obviously more powerful (Fox 1974; Dimmock/Sethi 1986). Similarly, in his recent critique of Dunlop's systems approach, Roche (1986) says that Dunlop is assuming a 'value consensus' among workers and employers, which doesn't exist.

A lot of this criticism is missing the points that the systems approach is trying to make. Obviously, the systems approach is 'accepting' that the capitalist system is a viable social system, but it doesn't really
say anything about the (moral, social) acceptability of that system. It
does not assume that workers and employers are equal in strength - one
could even imagine an industrial relations system without unions -, nor
that all workers are staunch supporters of capitalism. The assumption
of a 'value consensus' is no doubt fundamental to the approach, but it
is of a much more limited nature than is often thought. The only
consensus necessary is, that all parties agree that there will continue
to be employment relations in the future, with different roles for
employers and employees. No consensus is required on the exact contents
of these roles, nor on the desirability of this social arrangement. The
systems approach assumes that all actors, as actors in the IRS, gladly
or not, accept the existence of capitalist property rights and the
limits these put on any substantive job regulation. Unions may be
opposed to capitalism and still engage in collective bargaining with
employers. The latter only makes sense, if they agree to accept
employers' rights for the time being. Expressed differently: only those
activities of the actors that are concerned with regulating the
employment relation, make up part of the industrial relations system.
The IRS is an analytical construct connected to a specific social
relation. Outside the IRS, actors may play different roles in different
games, some of them unconnected to the employment relation (actors are
also mothers, neighbors, supporters of a football team), others on the
contrary actively concerned with changing, supporting or undermining
capitalist property rights and the employment relation (actors can be
members of political parties). The systems approach doesn't assume that
workers accept capitalist relations as unchanging and unchangeable. It
considers it useful, though, to differentiate between worker behavior
within the framework of the employment relation and that outside the
IRS - a differentiation with some interesting antecedents in the
marxian tradition, that distinguishes between trade union consciousness
and revolutionary class consciousness. The latter does not arise from
the former in any simple way and a revolutionary working in a union
discovers that in the final analysis unions are based on the acceptance
of the employment relation. More than any other actor in the IRS,
unions have been specifically created to serve their members' interests
exclusively in the regulation of the employment relation (maybe it is for that reason that unions have been the favorite subject of students of industrial relations).

If workers and unions do not accept the employment relation as a - for the time being - unchanging fact of social life, there would be no reason to expect a more or less orderly functioning of the employment relation. Workers would feel no obligation to keep to the terms of their labor contracts - i.e. to stick to the rules of the game - as long as the employer wouldn't notice it. Of course, this is exactly what some of the critics of the systems approach would consider a more realistic representation of employment relations. Authors like Fox (1975) and Hyman (1978) have contended that the inequalities prevailing in capitalist economies imply that any labor contract is in fact signed under duress and cannot be considered for the employees. The latter have a moral right to neglect the obligations flowing from those contracts. Of course, if all employees would feel this way, management control would have to be a very predominant aspect of any employment relation, and in fact regular production would be virtually impossible under those circumstances. The intensity of management control in most employment relations suggests that workers regard many of management's expectations as legitimate. Control efforts by management are no doubt a permanent feature of the employment relation and so are workers' efforts to escape control. Such efforts, however, relate to the level of exertion that employers can rightfully ask from their workers and are based on a shared understanding that a process of exchange is going on in which both parties have obligations to fulfill.\(^1\)

In his interpretation of Dunlop, Roche (1986) distinguishes a minor and a major theory. The minor theory would refer to the position that "the features of a given set of contractual rules depend on the technological, market and power (by which Dunlop meant 'legal') situations of actors in industrial relations" (Roche 1986, p.8). The major theory

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\(^1\) It should be noted that managers are usually also employees and may have to be controlled. Lack of control over lower management may result in the development of practices in the workplace that have no relation to the intentions of the employer.
would be that "rules are created in order to 'satisfy' the 'need' for order in industry" (idem, p.10). Roche considers the minor theory as more or less self-evident, whereas he criticizes the major theory, because it suggests a value consensus among the actors which does not exist and is not even necessary for the validity of the minor theory.

Let me use this critique of Dunlop for a further clarification of my conceptual framework (without indulging in the rather fruitless exercise of giving a 'correct' interpretation of Dunlop). Firstly, it is necessary to point out that the rules (the regime of job regulation) which are produced by the actors in the IRS cannot be explained only by factors ('situations') in the context of the system (which influence relative strength, perceptions of actors, etc.), but also by the actions and strategic choices of the actors, guided by the rules of the IRS, i.e. by the historical process of regulation. The IRS is not a mechanical device, which translates technological, market and power 'situations' into substantive rules, but a 'game' in which actors may or may not use the opportunities available to them to create rules in favor of their interests. Secondly, the rules (the regime) produced by the IRS can be expected to ensure some order in industry (in the production system). If they wouldn't do that, either the rules or the industry wouldn't survive very long. None of the actors may be completely satisfied by the prevailing order, and it is indeed doubtful that consensus can be reached about the properties of a desirable order in industry. Still, there may very well be a measure of consensus on the desirability of order as such, if that refers to a situation in which the industry and its employment relations continue to exist. In that sense, there is no great role in the IRS for actors who consistently prefer disorder over order in industry. This is the real meaning of the so-called consensus assumption: there is no alternative for the employment relation in sight and therefore all actors have an interest in its continuation. Interests diverge, however, as soon as the specifics of the relation - the terms of exchange - come into the picture. Thirdly, what I would consider to be a "major theory" would be a theory explaining the internal rules of the IRS, i.e. the structure of the system. Roche points out that Dunlop in his chapter 8 is trying
to do just that and considers this to be a forgotten, but much more solid basis for general theory. Dunlop there tries to explain structural differences between national systems of industrial relations by reference to the historical process of political, economic and national cultural development. Now, contrary to what Roche seems to think, this explanation is nothing less than a special application of the theories he identifies to a situation where an IRS has not yet been established - underlining the importance of the distinction between the rules of the IRS and the rules coming out of the IRS.

The structure of a national industrial relations system, i.e. the rules regulating the relations between the different actors in this system, has come into existence in order to satisfy industry's "need" for order in a specific phase of national political and economic development. A national IRS is first structured in the process of regulating specific employment relations probably during the period of national industrialization and is consequently influenced by the organization and type of the economic activities as well as by the characteristics of the political system of that period. This proposition is closely connected to the following:

1. Once an IRS has been structured, it is difficult to change the structure again, because it has meanwhile led to role definitions and identification with those roles; interests are interpreted and coalitions are formed on the basis of these roles and many participants consequently take an interest in preserving the structure as it is.

2. Major changes in the structure of the IRS can only be expected if there are also major structural changes going on in the economic, political or cultural context of the system. If the conditions and institutions that in the past assisted in structuring the IRS no longer exist, the forces in the IRS pushing for a continuation of that structure will be correspondingly weaker. This proposition doesn't exclude incremental change. Individual rules of the IRS may change, but the general structure - the outcome of the combined impact of all procedural rules on the roles of and relations between the actors - can be expected to remain relatively stable.
3. Structural change outside the IRS is a necessary, but not a sufficient condition for change in the structure of the IRS. In addition it is necessary that the IRS turns out to be incapable of producing a regime of job regulation that can adequately deal with problems arising out of the employment relation under the new economic and/or political circumstances (the 'need' for 'order').

This raises the question of the flexibility of the IRS. As noted above, Streeck (1986 a,b) has proposed that the IRS in West Germany, although it is much more formally structured than the IRS in Great Britain, has a greater flexibility. Flexibility is not concerned with the formal character of the rules, but with the capacity of the system, structured by these rules, to regulate changing employment relations in a changing industry. One major 'contextual' change is of course technological change and it is to its consequences that we now turn.

5. Technical change and the organization of work

In organizing production the employer has other concerns than just dealing with the workers and their unions. One of them is the presence of technical change, both as a potential source of profits and - if adopted by competitors - as a threat to the competitiveness of the firm. Efficiency and smoothness of production always depend on the ability and willingness of the employed to carry out the tasks assigned to them, but they depend also on many other factors: the availability of raw materials and intermediate products, the functioning of machinery and the presence of capable maintenance and repair personnel if machinery breaks down, the quality of parts and tools, the overall planning of the flow of production, etc. Even if all of this has been taken care of, the firm may still perform dismally, if other firms have found cheaper ways of doing it, or have developed products that consumers find more attractive. It is the task of management to ensure that a firm is approaching current best practice in all parts of its operations - at least in terms of overall costs - and to develop marketable products.
If we look at the history of industrial production organization, workers' willingness to carry out their tasks was always considered to be an important management problem, but it was also seen as relatively easy to solve. On the one hand, wages and disciplinary action, carrots and the stick, were and are seen as the basic means of solving the willingness problem. On the other hand, it was always recognized that willingness can be enhanced by such job design that work becomes satisfying and meaningful to the worker. With the growing size and complexity of industrial production systems, the organization of all the other factors mentioned above became the main preoccupation of management. Regulating the employment relation became a function which often wasn't even represented at the highest management level of the enterprise. Wickham Skinner (1986) observes that a main assumption underlying the development and selection of equipment and process technologies has always been, that "otherwise successful and profitable equipment and production technologies may present personnel problems, but such problems can be overcome." (p. 161) In other words: labor power is traditionally considered to be the most flexible and most adaptable part of the production system: after technology has been chosen, workers and work organization can somehow always be added on later. It is therefore understandable that many analysts and also management itself have tended to look at technology, at the hardware, as a determinant of work organization, the division of labor and all other rules that management tries to impose in the employment relation. Recent research in the field of work organization and job design, however, has made clear that even if technology is taken as given, even if machinery is already in place, there are still options available for the organization of work and the design of jobs. This means that one type of production technology can be made to work profitably with different regimes of job regulation. Apparently, here lies a potential terrain of contest and of bargaining between employers and workers. This is more than the on-the-job bargaining we considered above, which is concerned with the intensity of effort required on a given job. Here we are also talking about bargaining about the (re)design of jobs, taking place for instance in talks between works councils and manage-
ment on the occasion of a new investment project or between unions and employers' associations concerning the contents and organization of occupational training. Of course, such bargaining would remain of limited importance, if the various potential types of work organization showed large differences in productivity and profitability. In that case, economic mechanisms would ensure the eventual selection of the most profitable. In fact, international comparisons show that different types of work organization with clear differences in the quality of work coexist for an extended period of time, apparently without a clear relation to the relative performance of the firms concerned. This discussion becomes further complicated if dynamic arguments are introduced, for instance that it is advantageous to choose a less profitable type of work organization now, because it has a greater potential for further development than others that would be more profitable in the short run.

Such debate and the research based on it have a tendency to move away very quickly from the old viewpoint that technology basically determines work organization and job design; i.e. major parts of the regime of job regulation. A cautious remark therefore seems appropriate (see also Wood 1987). Technology provides options, but the range of options is not unlimited. It is probably more appropriate to say that a specific type of equipment and production technology determines the outer limits of the 'terrain of contest', i.e. of the possibilities for job design and work organization. If this is true, major changes in production technology, whatever their precise cause, will redefine the field of options concerning work organization and job design. Such changes will then quite often lead to management initiatives for changes in the regime of job regulation along with the introduction of the new technologies.²

² As noted above, management initiatives for changes in work organization often come as an afterthought after new equipment has been chosen. New machinery is often approved because it eliminates labor and it is then left up to lower management levels to propose a new work organization for the remaining workers, on the assumption that this will always work out somehow (with curiously little attention for potential savings in this area of action).
Technical change thus enters the employment relation mainly through management initiative. Technical change is usually associated with new products or new process equipment. From an economic point of view, however, technical change has a wider meaning, referring to any shift in an industry's best practice, regardless of any connection to new 'hardware'. A new organization of work requiring fewer workers for the operation of the same equipment, or one resulting in better quality with the same number of workers, are just as much technical change in this sense as the introduction of a new piece of machinery.

The introduction of new techniques is part of a competitive strategy which reflects management's interpretation of the environment in which the firm is operating. In the automobile industry for instance, the interpretation of the successes of the Japanese producers has touched almost all dimensions of the production process over the past decade. New machinery (robots), new materials, new design methods (CAD), new models and new product features, but also new types of work organization, new job definitions, quality circles and just-in-time logistics have all been considered as contributing to these successes. The world's best practice, in other words, had changed fundamentally, not just in relation to hardware, but also to 'humanware'. Ultimately, any competitive strategy in the automobile industry would have to deal with questions of work organization and job design in a straightforward manner - not just as an afterthought to decisions concerning hardware.

5. technical change and industrial relations in the auto industry

Let us now return to the questions raised in the beginning of this paper. Since the early 1970s the international automobile industry has been going through a process of crisis and change. Although this is a multifarious and complex process, two main elements can be easily distinguished: on the one hand there has been a sharp increase in competition because of the combination of stagnating demand and the appearance of several new producers on the world market. On the other hand a wave of new technological opportunities has swept over the industry, changing the product as well as the production process. The
new (Japanese) producers moreover, turned out to be well posed to adopt these new technologies. The interaction between these two elements, between the more quantitative and the qualitative aspects of the crisis, has further complicated strategic decision making for all firms. The implications for management's policies toward work organization and the employment relation have been equally complex and sometimes even contradictory. Some aspects of the crisis, especially the combined arrival of stagnating demand and new producers, seemed to point to straightforward rationalization policies, mechanization and automation, shedding of overcapacities, dismissals and tough wage policies. Other aspects, like the renewed emphasis on design and quality, and the new models of work organization and industrial relations presented by the Japanese industry, seemed to call for a more encompassing policy of 'modernization', emphasizing not just product and process renewal, but also a better use of 'human resources', training and retaining personnel, motivating workers to take an interest in product quality, etc.. It is in the introduction of new techniques that both kinds of policies overlap. For instance, if robots are introduced in the body shop, they will replace a large number of welders and the tasks of the workers on the new line will have to be (re)defined.

In fact, all automobile manufacturers in North America and Europe had to combine cost-cutting measures with efforts at 'human resource management', but the combinations were different in different countries, depending (among other things) on industrial relations. In an admittedly very rough generalization, it may be said that the prevailing regime of job regulation as well as the structure of the IRS in West Germany encouraged managements from the start to introduce new techniques in a 'modernization mode', emphasizing the reorganization of work and the utilization of human skills rather than the elimination of workers. In the USA and Great Britain on the other hand, managements found it more attractive, at least originally, to introduce the new techniques in a 'rationalization mode', emphasizing the cost-effectiveness of new technologies, eliminating workers where possible.
In Great Britain and the USA, the prevailing regime of job regulation tied workers' rights and rewards closely to the existing 'Fordist' system of work organization. In the USA for instance, job security depended on seniority, which was tied to a carefully defined system of job classifications. In Great Britain too, job descriptions were closely tied to manning levels, with the additional complication, that workers with different jobs were often represented by different unions. Using new technologies in a 'modernization mode', redefining jobs and the division of labor between direct and indirect, skilled and semi-skilled work, would involve major changes in the regimes of job regulation that had been produced in years of collective bargaining. In West Germany on the contrary, job security and wages were not based on this 'job control' approach. Consequently, workers and unions had less reason to consider management's initiatives concerning work organization as a direct attack on their positions. The changes in work organization that management considered necessary, could either be introduced unilaterally or formally agreed to without much upheaval through the existing bargaining mechanisms.

In the course of time, the firms in the USA and Great Britain found out that cost cutting, dismissals, mechanization and automation were necessary, but not sufficient elements of a revitalizing strategy in the car industry. They had to 'modernize' and modernization implied a departure from the Fordist patterns of work organization. Modernization, 'learning from Japan', now meant a new approach to the combination of hardware and 'humanware'. Even automation had become different: flexible automation instead of single-purpose mechanization required a different work organization, new training and new attitudes. Thus, eventually American and British manufacturers had to face the problem that a thorough modernization of their operations called for a major change in their regimes of job regulation. Here the two countries show different patterns. In the US, car manufacturers negotiated with the UAW and achieved major changes in the regime of job regulation (wage concessions, a major reduction of job classifications). In Great Britain, management unilaterally imposed major changes in the regime of job regulation, insisting on management prerogatives in a whole series
of issues, and introduced changes in the structure of the industrial relations system with support from the government (new rules for picketing, strike ballots, union elections; only one union recognized in the new Nissan plant). In West Germany, after a period of successful modernization, continuing competition is now forcing the industry to undertake rationalization measures. This will not be easy, especially not if the reduction of personnel cannot be achieved on a voluntary basis (a major element of the German regime of job regulation), but the firms may find it advantageous that rationalization is taking place on the basis of a modernized production process, after many of the difficulties with new technologies that have bothered the car manufacturers in the other two countries, have been straightened out.

Fig. 3 Rationalisation, modernisation and industrial relations in the car industry, FRG, USA, UK around 1980

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The relations between work organization and the industrial relations system in the process of introducing new production techniques in the car industry around 1980 can then be summarized as follows:

1. The prevailing regime of job regulation determined in the early stages the 'mode of introduction': rationalization or modernization.
2. Eventually, because of competitive pressures, all firms had to switch to a 'modernization mode' and the structure of the IRS determined whether it was possible to achieve a corresponding new regime of job regulation (where necessary) through regular bargaining or through unilateral action by management.
3. The unilateral imposition of a new regime of job regulation automatically implied management initiatives, with and without government support, to change the structure of the industrial relations system.

Figure 3 provides a schematic summary of the (schematic) argument. The role of government turns out to be important throughout. Government is not just important where employers try to impose a new regime unilaterally. It appears that legal (status) rights of employees, enforced by the state, in countries like West Germany (or Sweden) make it easier for workers and unions to negotiate changes in the regime of job regulation. The absence of such status rights for workers—especially in the field of codetermination—seems to have caused at least initially major competitive disadvantages for the car manufacturers in Great Britain and the USA.
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