

TECHNOLOGICAL CHANGE, RATIONALISATION AND INDUSTRIAL RELATIONS

Edited by
Otto Jacobi, Bob Jessop,
Hans Kastendiek and Marino Regini

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Volume 3

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**OTTO JACOBI, BOB JESSOP,
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PREFACE

This volume, like a parallel one on "Economic Crisis, Trade Unions and the State", is a result of a tri-national co-operation. Most of the contributions by British, Italian and West German colleagues were originally presented to two conferences at Cambridge and Torino in autumn 1983 which we organised in the course of a research project at the Institut fuer Sozialforschung, Frankfurt am Main. The "production" of both readers, i.e., the preparation and subsequent revision of the contributions as well as the editing, was itself a matter of concrete co-operation. We thank all those who took part in the whole "enterprise", especially Marino Regini who very effectively acted as co-editor for the Italian contributions and Ingrid Zierold who works with us in Frankfurt. Bob Jessop performed a key role in co-ordinating the editing and preparing the text for publication. We hope that both volumes prove our joint efforts to come to ends with some of the major problems discussed in the three countries.

The present volume demonstrates that comparative studies have to refer to similar or identical problems in the countries concerned but also have to take into account quite specific problem constellations. Thus the Introduction and Part 1 outline some of the general problems of "Technological Change and Labour Relations". Part 2 aims at a sectional comparison by discussing the politics of rationalisation and of industrial relations in the car industry. The "cases" of Volkswagen, British Leyland and FIAT are both: an exemplification of the general theme and a specification of national adjustments to economic crisis, technological change and rationalisation. Part 3 has a slightly different outline. Some of the

impacts present developments exert on trade unions can be identified to a same extent in all of the three countries and therefore are discussed simultaneously. Others get their weight from specific national conditions and constellations and therefore demanded specified consideration. What for Part 3 may be seen as a topical asymmetry is in fact a result of typical differences which we did not want to cover by a schematic presentation.

This argument, of course, does not relieve comparative research of further efforts to cope with substantial, theoretical and methodological problems of cross-national studies. Studies like these, however, depend even more than others on adequate resources. In our case, the Volkswagen Foundation granted the Frankfurt project mentioned above, and additional subsidies were given by the German Research Foundation and the Goethe-Institut at Torino.

June 1984

Otto Jacobi Hans Kastendiek
Institut fuer Sozialforschung
Frankfurt am Main.

ABBREVIATIONS

ACAS	Arbitration, Conciliation, and Advisory Service
BIW	Body in White
BL	British Leyland
BLMC	British Leyland Motor Company
CAD	Computer-aided Design
CAM	Computer-aided Manufacturing
CAP	Computer-aided Programming
CIR	Commission on Industrial Relations
CNC	Computer-aided Numerically Controlled
CO2	Carbon Dioxide
CPU	Central Processing Unit
CGIL	Italian General Confederation of Labour
CISL	Italian Confederation of Labour Unions
DNC	Directly Numerically Controlled
EDP	Electronic Data Processing
EEC	European Economic Community
FRG	Federal Republic of Germany
IG Metall	Industriegewerkschaft Metall (Metal Industry Trade Union)
ILO	International Labour Organisation
LODI	Lohndifferenzierung (wage differentiation)
MDW	Measured Day Work
NC	Numerically Controlled
NBPI	National Board on Prices and Incomes
R and D	Research and Development
T&GWU	Transport and General Workers' Union
UAW	United Automobile Workers
UIL	Italian Union of Labour



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INTRODUCTION

BETWEEN EROSION AND TRANSFORMATION: INDUSTRIAL RELATIONS SYSTEMS UNDER THE IMPACT OF TECHNOLOGICAL CHANGE

Otto Jacobi, Hans Kastendiek, Bob Jessop

1. Technological change and rationalisation of production and/or the labour process have always accompanied periods of economic, social, and political development in capitalist societies. Crises have frequently been triggered or exacerbated by the obsolescence of long-established production and labour processes and its inhibitory effects on economic growth and capital accumulation. Conversely, recovery from a major economic crisis has often been accompanied by the introduction of a new technology, which creates new markets and facilitates increased productivity. Throughout its history, industrial development has seen cycles in which a phase of renewal brought about by dramatic technical advance is followed by a complementary phase of maturation in which the existing technical and social aspects of the labour process are improved and refined. In the period of innovation, particularly at plant and sectoral level but also in the economy as a whole, technological change and rationalisation have led to abrupt adaptation. Conversely, the longer periods of diffusion and maturation which follow have typically involved more gradual processes of modification.

Technological development has always been crucial for the dynamic of the relations between labour and capital and between the organisations which represent them. The development of industrial relations systems does not, however, appear to be fully determined by technological change. Indeed, there are only limited chronological parallels with its successive phases of innovation and maturation. Industrial relations systems as political, economic, and social phenomena are influenced by historical and cultural factors. Thus they tend to be more closely connected with the long-term economic

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situation and the more general balance of social and political forces than they are with short-term, cyclical fluctuations in the market. This implies a considerable degree of inertia in industrial relations systems and these do, indeed, differ widely across countries with similar technological bases. But one cannot ignore the effect of technological change on industrial relations in the longer term. The traditional structure of the labour force has been thrown into disarray with the demise and emergence of a variety of trades, the disappearance of traditional professions and qualifications as they are replaced by new ones, and the Taylorisation of labour. In response to new challenges, labour and trade union movements have adapted internally through continuing processes of education, politicisation, and mobilisation of the labour forces; and have reinforced their bargaining power externally through new forms and practices of solidarity and collective representation.

There is currently an obvious tendency towards industrial or craft unions which are not divided along political, religious, or other non-economic lines in all countries. They have established themselves as bargaining forces in relation to capital in the economic sphere and in relation to the state in the political realm. But this tendency cannot be explained satisfactorily without referring to the equalising effect of the adoption of new technology by industry. All advanced industrial societies now have access to essentially the same technology. Inevitably this results in some convergence among industrial relations structures. In part this erodes the historically and culturally coloured national character of the system in a particular country and in part it is absorbed by this national specificity in distinctive ways. If convergent tendencies result from the equalising effect of applied technology on social structure and labour organisation, then divergent responses and developmental patterns must be due to the socially constituted and mediated development and application of technology. Used or desired as an instrument of domination, therefore, technology will always be the subject of conflicts. How these conflicts are resolved will vary over time according to conjunctural changes in the balance of forces and fundamental struggles for power as well as across societies according to the historically- and culturally-based ideologies and objectives of the actors involved.

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2. Technological development in the first three decades of the postwar era was linked to a phase of expansion and maturation. It was characterised by a consistently broadening range of applications and the international diffusion of existing technology. This provides an excellent opportunity to observe the flexibility and inertia of industrial relations in the context of economic development and technological change. Comparison of some fundamental features of development in Great Britain, the Federal Republic of Germany, and Italy shows the following picture:

- In Great Britain, a low growth rate, a relatively retarded level of technological advance, and a largely unchanged system of industrial relations which had no political or social steering function, all fused into the vicious circle of an imperialist power in a protracted period of decline. The comparatively low rates of economic growth and technological progress show how ill-equipped the country was to adjust to the prevailing political and economic situation. Attempts to compensate for the loss of guaranteed markets within the Empire by forward thinking and adaptation to competitive international markets were largely unsuccessful. The inability to innovate - a failing which cannot be laid at the door of the unions alone - is also evident in industrial relations. The relatively under-institutionalised and only minimally legalised system of regulations, the fragmented collective bargaining system, the multiplicity of labour organisations, and the low level of centralisation - all inherited from the turn of the century or the period between the wars - proved extraordinarily resistant to attempts at change. Neither the wartime coalition government nor the many subsequent state-initiatives provided a lasting impetus for structural innovation. Since the historical continuum was less severely disrupted by the war in Great Britain than in Germany or Italy, inertia outweighed the capacity for renewal. The comparatively high level of social conflict was a result of the mutually reinforcing interaction of economic and technological retardation and the inherited defects of the political and social steering systems. Both Germany and Italy were forced by the inescapable facts of war and fascism to make a new start. A voluntary initiative was required, however, if Britain was to adapt to political and economic changes. At first, the need for change was ignored and, when the attempt was finally made, it

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was not exactly successful.

- The postwar years in the Federal Republic of Germany, on the other hand, saw economic growth and expansion, rapid technological development, and dynamic industrial relations. These factors merged into what might be called a "virtuous circle" for a country which was staking its very survival on the new start. The strength of the West German model lies in the orientation of the national production apparatus towards international markets and in the determination to make good technological deficits with other advanced industrial economies. Together these secured a competitive advantage via technological superiority. With continuing economic expansion and political consolidation, the labour movement gradually shrugged off all remnants of class struggle militancy and allied itself with the traditions of reformism and economic democracy.

The export- and modernisation-orientated growth model was accepted by the trade unions. They believed it would produce high levels of employment and productivity. In turn this would strengthen their bargaining power and create a sufficiently large economic surplus to raise the individual and collective living standard of the labour force. The tripartite consensus produced a growth alliance which was greatly reinforced by the development of negotiating structures which were functional for system maintenance. The high level of centralisation, legal recognition and institutionalisation of the West German industrial relations system are a legacy of German social history. Government legislation, together with case law and management-workforce agreements gradually moulded the industrial relations system to the requirements of a national economy dependent on world markets and committed to technological progress. The dual structure of collective representation, the limited and equally (paritaetisch) distributed means of struggle, and the concentration of internal and external authority at the top of the unions all contributed to a flexible approach to problem-solving, the ability to absorb conflicts, and a readiness to compromise. The manner in which agreements between management and workforce applied at plant, trade, and national levels, combined with the fact that the workforce shared in the resulting wealth, provided West German capitalism with the necessary degree of effectiveness and legitimacy. Thus the comparatively low incidence of conflict results not only from the

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German labour movement's tradition of social partnership or its willingness to be bribed through the dynamic of market forces, but also derives from institutionalisation of the class struggle.

- Of the three countries under consideration, the most enduring changes have occurred in Italy. Almost explosive economic growth, industrialisation and mechanisation fundamentally altered the structure of industrial relations. The process was beset by conflict, and produced the type of "virulent" circle which is typical of late developers. At the end of the war, Italy was what economists would now term a "country on the point of take-off", and it rapidly caught up the greater part of the deficit. This process was accompanied by a revolution in social structure: the traditional skilled labour force of the classical northern industrial centres was joined by a mass unskilled labour force - a generation of workers new to industry and recruited through internal migration.

The labour force and its political and trades union organisation had emerged from the war as a powerful, self-contained entity, a product of its stance of resistance to the fascist regime. Yet the organised labour movement was condemned to oblivion for a considerable period. This occurred for various reasons, including the exclusion of the Communist party from the centres of power as the Cold War set in, the politically motivated split of a unified trade union movement into rival unions aligned to different political groupings, the development of the economic miracle, and the fact that the unskilled labour force was constantly replenished by the proletarianisation of the agricultural population. There was in fact one unique opportunity for revival, and this was taken up. The unwillingness of capital and the inability of the state to promote social equality and to modernise the institutions of collective bargaining combined to produce a dramatic change in social relations in the "hot autumn" (autunno caldo) of 1969. The essentially new system of industrial relations which resulted can only be understood in the context of the rich theoretical, cultural and class-struggle tradition of the Italian labour movement. The trade unions embarked on important processes of reunification and established themselves as a bargaining force which could no longer be ignored on political, economic or plant level.

3. Regardless of these national variations, the relative states of retardation and successful

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efforts to make up the deficits have produced essentially identical technological situations. In all cases socioeconomic structures have undergone a simultaneous process of adaptation. This can be seen in three significant trends: state intervention in the economy; the development of welfare state systems; and well-established unions which mediate between the labour force, capital and the state have managed to increase the share of national income which goes to labour. These have been the major social innovations of the post-war years, largely initiated by Great Britain (Berger, 1983). Since the mid-seventies, however, their validity has been fundamentally challenged by the onset of an international economic crisis and the end of the product cycle, which, based on the technology of the 1930s and the 1940s, was finally exhausted after a long phase of maturation (Mensch, 1979; Freeman, 1983). All advanced West European states thus saw themselves confronted with a dilemma. The search for a new developmental model was under way.

By far the most important development in this respect is the advent of microelectronic technology. For the first time since electricity was introduced into the industrial process, a new basic technology has arrived. This has such a broad range of applications that substantial changes in the technological basis of the economy and society as a whole are inevitable. A characteristic feature of the new technology is the fact that the attendant economic growth is not associated with increased employment levels. Indeed the colossal potential for rationalisation means mass worker redundancy. This has shifted the balance of social forces to the disadvantage of the unions and forced them onto the defensive everywhere. But more than the straightforward loss of economic and political powers of bargaining and assertion is involved: there is also a strong tendency towards erosion of industrial relations systems. Because the advent of microelectronics can be viewed as the start of a third industrial revolution, changes can be predicted in the political as well as social decision-making and steering systems. Traditional political and social actors could lose their hold if they fail to regenerate themselves. So far the main product has been the dissolution of outdated forms of organisation and representation, and no politically, economically and socially viable transformation model for a new stage in social development has yet emerged.

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4. None the less alternative developmental models are beginning to take shape:

- The liberal-conservative scenario chills the spines of classical reformers and in particular the trade unions, because it denies them a future. This scenario is a product of the alliance (holy or unholy, depending on the political standpoint of the observer) of "social" conservatives and "economic" conservatives. Social conservatives are keen to re-establish a strong state which would keep the unions at a distance from the political market. Economic conservatives would like to steer the economy by means of the most unregulated market mechanisms possible and, above all, to eliminate the trade unions as obstacles to the free market. For this doctrine, authoritarian solutions enacted by the state and the market take precedence over co-operation and intervention.

A leading conservative theorist predicts that the new dynamics of high technology will trigger an international, world-market-orientated phase of industrialisation. This in turn will give rise to a superindustrial society which, by the beginning of the 21st century, will be able to control its problems. This is the point at which the real transition to the post-industrial economy will begin (Kahn, 1983). According to this viewpoint, the coming boom, which is expected to bring growth but no appreciable reduction in the current level of unemployment, can only come about if the old Keynesian model and its entire ideological basis are discarded in favour of a relatively non-interventionist system. In his opinion, the coalition of "economic" and "defence, national security and foreign policy" conservatives with "social" conservatives has the opportunity, for the first time in 50 years, of challenging the political and economic leadership of the old alliance of interventionists and "have-nots" with their constant refrain of social justice.

- But it is not only conservatives who view the future of the trade unions with scepticism (cf. Mueller-Jentsch in this volume). It is predicted that the dynamics of technical and organisational innovation in the production process will proceed without significant opportunities for intervention or control by the unions. Continuing high levels of unemployment are permanently undermining their bargaining position. Loss of jobs in the classical industries, where union density is traditionally highest, means reduced union membership. The unions,

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already threatened with losing their position as the recognised representative of the labour force, cannot offer a positive policy for the future, and will increasingly lose importance as a social movement. It is assumed that the identity of the unions is fundamentally wasting away, and that they have by and large already surrendered their capacity for renewal. In other words, it is suggested, time has run out for the unions. The most they could hope for would be to survive in a "dual economy" as representatives of workers who have relatively secure jobs. They would no longer carry any political or social weight in the development of society more generally.

The first scenario fails to take serious account of the inherent problems of the liberal-conservative strategy and grossly overstates the discernible developmental trends. In particular, it overlooks the fact that, while the technological, economic, political and social transformation process may well change the framework within which the unions have to function, it also opens up new room for bargaining. A model for the future which is based on the classical values of freedom, equality, justice and humanity is not merely a political dream: it can take strength from the knowledge that the conservative alliance will not be able to maintain the stability of its current hegemony, and when it eventually fails, alternative political models will be called for. A typical feature of social and economic conservative strategies is that they are based on the unequal distribution of political, economic and social burdens, to the disadvantage of the workers. The longer this process continues, the less convincing the liberal-conservative arguments will be. New processes of political education and mobilisation will be welcomed, preparing fertile ground for unions, classical reformers and new social movements.

In the context of the second, alternative scenario, the unions must first perform their traditional, protective role more consistently than in the recent past. The field of action here is broad. For the so-called "post-industrial economy" is still a long way off, and will presumably be preceded by a phase of total industrialisation of society. But the current union strategy of trying to resist the social consequences of technological change can be viewed as no more than a defensive response. Similarly, the goal of a more equitable social distribution of the wealth created by the new

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technology is not good enough. However important it may be to develop traditional union policy forms in line with modern demands, this does not meet the need to confront inevitable social change with alternative models of development and political forms (cf. contributions of Butera/Della Rocca, and Accornero). This is an intellectual task which the unions, classical reformers, and new social movements cannot perform alone. They must be involved in it, none the less, if the search for a future model of society is to be politically effective. Just as conservatives traditionally attempt to justify crises in terms of their purgative effect, so radicals are constantly searching for opportunities to renew and advance a humane society based on the solidarity of its members. Since the coalition of social and economic conservatives automatically generates opposition, a coalition of old and new social movements could well become the dominant political force.

5. Reviewing the past five years, it is easy to see - and the contributions in this volume provide a wealth of examples - that economic crisis and technological change have realigned the balance of social forces. The unions are at a disadvantage in the plant-level, economic, and political markets, while the leading liberal-conservative strategies, which are also executed in a diluted form by social democratic parties in government, make every effort to prolong the crisis and thereby promote its purgative effects. The division between the Keynesian model of state intervention and social consensus, and new developmental models is becoming increasingly apparent. Clearly the process of social transformation is only in its infancy. For industrial relations systems are almost exclusively displaying erosion tendencies, with barely any evidence of a new structural, functional or institutional order.

The following developmental trends are discernible in Great Britain, Italy and the Federal Republic of Germany:

- In Great Britain the trade unions have largely been excluded from the macropolitical arena because they lack economic market power and are subject to a government which opposes them. Both state and capital are now directing their efforts towards destroying the formerly strong power base of the unions at plant level. Whatever the importance of state economic policies and trade union legislation, in this context, the economic crisis, unemployment,

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and world market pressures to adopt the new technology give management the chance to regain control of the production and labour process. The changes in production technology, labour organisation and industrial relations at British Leyland were admittedly exceptionally radical. None the less they provide a prime example of the capitalist strategy of engineering exemplary defeats of the unions in general, and the institution of shop stewards in particular, by means of authentic power struggles as opposed to simple reliance on legislation or spontaneous, "molecular" changes. The strategy of re-establishing the plant as the power base of the management is executed in various ways: the traditional organs of collective representation within the plant may be destroyed, excluded, bypassed or substituted by new forms of consultation. That there is currently considerable competition and conflict among and within the unions in Britain is more than a simple example of the divisiveness of union competition: it also reflects the way in which areas of conflict which were traditionally located outside the unions can be transformed into potentially self-destructive internal conflicts.

- Although less dramatic, developments in Italy are similar. The disputes at Fiat are a clear example of how modernisation of the labour process in its technical and social moments can also be used as a lever to restrict the broad powers implicit in the form of union representation within the plant which had been hammered out in previous disputes. Not only do the unions now have less power, they are also more willing to compromise, since they have a vested interest in maintaining a modern, internationally competitive enterprise in order to protect jobs. The Italian situation differs from that in Britain or West Germany. For the fact that the Italian unions are willing to compromise also characterises the very intensive tripartite discussions in the political arena. Arguments centre on the "scala mobile" (an index-linked mechanism to balance wage and price increases) is incompatible with the current economic system and the prevailing situation of international competition. The fewer concessions the unions gain in return for the compromises they make, and the more effort the state and capital put into reducing the effectiveness of the scala mobile, the more apparent becomes the mutual obstructiveness of dissent among and within the three union confederations. Erosion of industrial relations threatens to destroy the

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previously complementary effectiveness of decentralised and centralised union power from both ends.

- The erosion process in the Federal Republic of Germany is more insidious. Institutionalisation and legalisation of the social conflict of interests and the incorporation of the unions have been largely successful. Thus the state and capital have little reason to implement corrective or regulatory measures in a system of industrial relations which is already endowed with the capacity for self-regulation. The manner in which labour relations at Volkswagen have developed is unique in some respects but is by no means an exception. The almost imperceptible erosion of industrial relations might flare into open crisis if the state and capital are encouraged by the current weakness of the unions to renounce traditional co-operative relations with the unions and attempt to defeat them. With the alienation of labour force and union consciousness, and the first open split of the unions into two fractions, signs are growing that such a change in strategy is taking place. Thus management is now far less willing to offer concessions in order to preserve the social consensus. Likewise the conservative-liberal coalition has begun to intervene in current wage disputes to an unprecedented extent. The government is refusing to accept the demand for a shorter working week, on the grounds that it would be detrimental to the national economy, despite the fact that the demand comes from the fraction which includes the metal workers' union, the largest and strongest labour organisation in the country. And at the same time, the policies of the other fraction are being favoured under the terms of a new law which provides state funds for early retirement. Distinguished management representatives, however, are warning against an all-out attack on the unions. For they believe that it is in the interest of all to preserve trade union organisations which have external bargaining authority and internal authority over their members. Thus industrial relations in the Federal Republic of Germany could be said to be at a point of make or break.

6. In essence, the shift in the balance of social forces has run parallel to economic crisis and technological change. The state and capital have cemented their political and economic leadership and re-established their virtual monopoly of control over industry. This illustrates the degree to which

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state and capital have successfully modified the positions of power which the unions had carved out for themselves in the post-war years. What is remarkable is the paucity of functional, structural and institutional innovation. While encouraging erosion in industrial relations systems, the prevailing liberal-conservative strategies fail to provide the basis for a new model of interaction. This is a characteristic feature of the first stage of the transformation process governed by the alliance of social and economic conservatives. It also demonstrates the problems of a model of political, economic, and social restructuring which attempts to return to the pre-Keynesian developmental stage of capitalist democracies. Discussion of the form of the future social development has only just begun, and the outcome is still open. It would be criminal to ignore the dominant tendencies emerging today; but it would be equally wrong to treat them as irreversible changes already inscribed in the new technologies.

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part One

TECHNOLOGICAL CHANGE AND LABOUR RELATIONS



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Chapter One

TECHNOLOGICAL INNOVATION, ORGANISATION OF WORK, AND UNIONS

Federico Butera and Giuseppe Della Rocca

This paper presents some hypotheses and data on technological innovation and its effects on the labour market and industrial relations. We believe that it is too early to present a definitive account of these issues for three main reasons: the nature of technological innovation has not been sufficiently explored; traditional categories of analysis do not deal adequately with the relationship between technological innovation and the labour market; and, thirdly, there is insufficient knowledge about the expectations and claims of new social strata and professional groups and/or their implications for industrial relations and union bargaining. Accordingly this paper draws on our earlier work to illustrate some of the trends at work (for details, see bibliography).

Industrial Automation: the Objective and Conceptual Revolution

There is much discussion in all industrial countries on the impact of microelectronics and information technology on employment, work organisation, and society. Indeed this is seen as one of the major economic and social issues of the 1980s.

As a result of low costs and widespread application in both productive and nonproductive areas, new technology has developed with an unprecedented speed. Some scholars maintain that new technology involves a rupture in technical development because of its "intelligent" function, science-based technology, and global application (Rada, 1980). But when the social effects of the wide variety of applications of microelectronics in information processing are examined, it is

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impossible to decide whether these result from the technology itself, its various spheres of application, or other related changes in production and society. Thus the idea of new technology should be incorporated into a more complex analysis which could account not only for the conversion techniques but also for the purpose inherent in the technology itself.

For the purposes of understanding changes in work and organisation, new technologies are best studied when they are components of a composite, higher level phenomenon called automation. Not all cases of new technology are employed in automation. Electrical, mechanical, hydropneumatic (etc.) technologies as well as information technology, are included in automation, and not all information technologies are used in automation.

We have evidence from various sources that automation is the continuation of an historical process in which human work is incorporated into machines, taking human work to be the mental and physical effort required to transform physical objects and information from one state to another, while at the same time exercising control over the technical and social conditions involved in achieving this transformation.

Automation is, however, a rupture in the historical process because the extent and speed at which work is incorporated into machines produces a qualitative change in the elements of the industrial unit, in the structure of industrial work, and even of society itself. Novelty does not lie in new control systems, computer technologies, integration of production flow and integration of business functions taken individually, but in all of these taken together.

We think automation is an appropriate word to describe a specific phenomenon. It is the displacement - within the physical system itself - of goals, models, procedures and languages for controlling and integrating meaningful conversion processes. Thus not only work but typical social processes/structures enter the machines: decision making, values, languages, power structures, co-operation and so on.

We are faced with a revolution. Almost any sort of work content can now be performed by automatic devices, any production process can be automated, firms of any size and in any sector can be involved in automation because of the availability of microprocessors and the sophistication of EDP

Technological Innovation, Work, and Unions

(Electronic Data Processing) applications. Automation never consists of "production systems without men", but involves production systems where men choose, implement, modify and run a highly formalised joint technical and social system.

Automation is a new phenomenon; thus the analytical categories for forecasting and evaluating the social effects of technical change must be reviewed. Certain basic social characteristics of the present industrial system could also be challenged, such as full employment, preservation of trade skills, grade differentiation, blue and white collar differentiation, apprenticeship training, career, long working days; some traditional elements of work design and negotiation procedures might also prove to be ineffective.

This scenario will change the rules of work design and industrial relations. Yet it is impossible to forecast the impact of new technology until new concepts and categories of industrial organisation and industrial relations have been established. This involves conceptualising a large variety of project areas or game-tables dispersed along a macro-micro continuum. Due to the rate of innovation, such "project areas/game-tables" display different features:

- Each of them has different objects, techniques, goals.

- They are not hierarchically ordered from macro to micro but have systemic relationships: innovation in one area may change the rules of the game for the others: a new design for the rules governing the labour market may alter, for instance, the policy of technological design; likewise, the development of a new micro-chip in a small laboratory may alter the international division of labour.

- Subjects strong in one area/table may be weak or absent in others: technicians as social subjects are strong only at the plant level, employers' confederations are strong in employment regulations but not in the design of new plants, etc.

Most of the paradigms and models offered for interpreting relationships among labour market, production techniques and industrial relations fail to recognise the new features of the present industrial revolution. These include: the increase of relevant structural elements of the socioeconomic system, their nature as project areas, their interdependent systemic relationships, the increased opportunities of choice for a growing number of subjects organised not only within corporatist