

TECHNOLOGICAL CHANGES AND WORKERS' ATTITUDES

(A Hungarian Case Study)

by

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From machine-wrecking to the differentiated approach to
technological changes: a brief survey of the history of
workers' attitudes

Research on workers' reactions and attitudes toward mechanization and new technologies started a long time ago. Labour protest and action against mechanization, like machine-wrecking, started in Europe as early as the 17th century. The Luddites, named after their leader, Ludd, have become the best-known among the several movements. In terms of strength and activity, labour action culminated in 1811-12, when armed workers destroyed over one thousand textile machines. Violent labour protest of that kind disappeared in capitalism's later stages.

Machine-wrecking was not common in either the first or the second half of the 19th century. True, occasionally, organized-labour protest against mechanization that worsened their working and employment conditions resulted in serious social conflicts, which also claimed lives.¹ In England in 1843, for instance, a strike in Pauling and Henfrey's Manchester brick factory ended in violence. The employer increased the size of the bricks but failed to pay higher wages, and asked a greater price for the new product. The trade union initiated a strike, and the labourers issued a warning for the strikebreakers, who the management brought from outside. The warning went unheeded. Then the union prompted the workforce forcibly to occupy the factory during the night shift. The armed workers shot at the blacklegs and destroyed much of the factory equipment.² Similar incidents occurred elsewhere, for instance, in France. The Luddites struck

last in a brick and tile factory at Fumay: the Labourers wrecked a newly installed sawing-machine.³

Labour action against technological development has heavily changed in form over the past two centuries. Today in the advanced capitalist countries labour does not protest by destroying the modern machines and equipment. The advent of the high-capacity production lines of automated plants has rendered machine-wrecking obsolete. Even a temporary stoppage of the line may disrupt the output total and hit hard at profitability and the company's stance in the competition. It is impossible, for instance, to find and punish the culprits behind an estimated 75 per cent of the production disorders in automated rolling mills. The maintenance men usually arrive too late; and it is hardly ever possible to tell intentional damage from the unintentional.⁴

Today it is more difficult than ever to assess labour reactions against technological changes, like automation. Industrial and labour sociology has produced few longitudinal studies, the static ones preponderate. This shortcoming of method should not be forgotten.

Research on technological changes met anti-technology attitudes and views only in a minority of cases. It is worth stressing this fact for, in the late 1960s and early 70s the scientific establishment of the advanced capitalist countries paid keen attention to anti-technology and anti-science movements that dramatized technological and economic disfunctions and questioned progress itself.

"...In our county they pulverize everything in their path: the landscape, the natural environment, history and tradition, the amenities and civilities, the privacy and spaciousness of life, beauty, and the fragile, slowgrowing social structure which bind us together. Organization and bureaucracy, which are applications of technology to social institutions, increasingly dictate how we shall live our lives, with the logic of organization taking precedence over any other values."⁵

On the other hand, sociological research and public opinion polls inquiring into people's attitudes toward technological changes arrived at the following conclusion: "The studies revealed that, whatever their discontents with what might be called 'the quality of life', most people do not hold technology responsible. On the contrary.... they see technology as generally more beneficial than harmful. They rejected the view that technology has made life too complicated and expressed little desire to return to nature.⁶ It can be inferred on the basis of the above findings that the critical attitude to technological advance originates in the fact that scientific-technological developments have achieved more than governments have done in handling human problems: comparatively little attention has been paid to solving the man-related problems of technological advance.

In advanced capitalist countries, the people's attitude towards the technological changes has assumed a new character over the past few decades. Though the media suggest the opposite, the opposite, the public has not been found to be set against technology and the sciences. Yet many have reservations about or an ambiguous approach to the technological changes. An earlier unconditional optimism about technological advance has been replaced by more realistic and differentiated views. We are going to give a somewhat more detailed discussion to this issue—which has considerable scientific and ideological significance—for similar changes have been experienced in the worker attitudes to technological changes.

WORKERS' ATTITUDES AND THE INTRODUCTION OF AUTOMATION

We concentrate on the analyses of those attitudes, norms, and values which exert influence on the picture the workers construct about technological change. We base our conclusions on the findings of an international research project.⁷

We examined worker attitudes to technological changes on the basis of the effects automation has exerted on the working conditions, the content of job and the workers' attitudes.

In examining workers' attitudes to technological changes we found that the workers gave a favourable and positive appreciation of the consequences of technological advances. It is certainly not by chance, for over three quarters of the workers believe that the introduction of new machinery and equipment has brought about a general improvement in the conditions of the work force of their plant.

The fact that the technological changes got a favourable reception can also be substantiated by the fact that the majority of workers declared that they would not oppose further technological changes. The answers given to questions relative to their reaction to the introduction of labour-saving machines well illustrate that approach.

LABOUR REACTION TO LABOURSAVING MACHINERY

n: 543

Question: What would be your reaction to the introduction of laboursaving machines and equipment in your plant?

Silent approval or active support: 89.7 %

Active opposition or silent disapproval: 10.3 %

Since the question concerning the introduction of labour-saving machinery and equipment is a concrete one, it helps us to learn about workers' views and values concerning technological changes. In the course of our research we also examined the impact of production organization and the character of the various jobs on the workers' assessment of the technological changes.

Under socialist industrial conditions we cannot speak of the emergence and tangible spread of anti-technology or antisience views. On the other hand, our survey of the social impact of automation has indicated certain changes in the views. When asked about the consequences of the introduction of labour-saving machinery and equipment, the workers of the mid-1970s speak not only in the spirit of the positive and publicly-endorsed values and norms. The predominant majority of respondents express their views on the basis of their own personal experiences. A few workers, however, do not speak on the basis of their personal impressions. Either because they do not have personal experiences or because they are unable to reach adequate conclusions from their experience, they identify themselves with the values and ideologies that are widespread around them or which are accepted officially. The workers who speak of the technological advance in line with generally-accepted and proclaimed values, instead of personal experience, do not formulate their opinion on the basis of the specifics of their own work. Their remarks and comments cover issues broader in scope than their concrete working conditions. They comment on, for instance, the characteristics of the socialist social conditions and the general development of living standards. When speaking of the social impact of technological changes they relate their assessment to the above factors as well. The following passages, taken from interviews, are good illustrations of the views of such workers:

"Though automation could endanger the safety of employment. I do not think I would lose my job because everyone has the right to work under socialism."

"The application of laboursaving machinery makes working conditions better, there is less waste, and the modernized plants can turn out more products. It can have a positive effect on the living standars."

"I would favour the introduction of new machines and equipment for that would eliminate the shortage of manpower and make labour easier. The introduction of new machinery would rouse keener interst in technology. Provided the advanced machinery required higher qualifications, for fear of the loss of their jobs, the workers would be interested in extending their education".

Most of the respondents form their opinion about the impact of technological change on the basis of individual or collective experience. An analysis of the answers has shown that the norms and values that determine the worker attitudes are fundamentally determined by the impact of automation on the working conditions.

The norms and values favouring the technological changes originate in the real or imaginary result of automation: the elimination of the present burdensome overwork and constantly lengthened shifts. Emphasis is laid here on "bordensome" and "constant", not on overwork in general, since overtime is important not only for the management but also for the workers: it can be turned into a regular source of extra income. The management finds it difficult to "sell" it to the workers if it heavily excends what individual workers wish to tackle. Repeated overtime work on Saturdays and Sundays is a good example. Workers engaged in mass production expect technological modernization to eliminate or, at least, to reduce recurrent overtime. This is how the workers reacted to this question:

"The laboursaving machinery and equipment would help us a great deal since we have been working in extended shifts for months. In the beginning we were willing to work overtime because we badly need more money. But that cannot go on indefinitely. I think that only the installation of new machines can solve the problems caused by the shortage of manpower."

"The laboursaving machinery could partly make up for the shortage of manpower and therefore less overtime work would be needed. Now and then we welcome the change to work overtime, but the months long race has exhausted us. Anyone who is unable or not willing to report for work on two occasions is served a written disciplinary note, which means the loss of part of the incentive wage. For years now the increase in the staff lags behind the ever higher plan targets."

Predominant as the above-shown affirmative attitudes toward technological changes are, we also have to call attention to the workers' concerns and reservations. The objective basis for that is the righteous fear of a fall in the salaries. Let us examine the factory where the interviews were made. The average daily pay of the workers who mass produce engines and rear axles were lower than of those who turn out machine tools with traditional technology, despite all the efforts of the factory management to compensate for the losses (special wage rates and various bonuses). The following table illustrates it:

Development of average daily wages

(%)

	Production linex		Machine-tool
	Rear axle plant	Engine plant	Production plant ^{xx}
1968	95	103	100
1969	96	101	100
1970	102	102	100
1971	102	100	100
1972	101	89	100
1973	95	89	100
1974	85	92	100
1975	91	88	100
1976	93	90	100
1977	93	92	100
1978	94	96	100

^x Mostly automated production

^{xx} Non-automated machinery and hand-operated machine tools dominate

Another source of the reservations is that the workers think that the technological changes deteriorate the team spirit. Remarks by workers who work on traditional machines show such attitudes:

"The introduction of laboursaving machines and equipment would result in a decrease in our pay."

"I would lose many of my colleagues who I have worked with for several years, which would be an unpleasant experience."

Finally, we have to speak of the workers' reactions that carry conflicting values and requirements. On the one hand, they welcome the new machines which will make their work easier, on the other, they express concern over a possible fall in their pay as caused by the new machines.

The following remark gives expression to that anxiety:

"I would silently approve the introduction in the factory of new machines and equipment. My work would become easier, but my pay would be less. We work in a norm system, and those working on automated machines earn less."

We found a diversity in worker attitudes towards technological changes. Surprisingly uniform are, however, the managers' reactions to the worker attitudes. Foremen, who have daily contacts with the workers are unable to understand that their subordinates consider the consequences of the introduction of new machinery not in themselves but in relation to its socio-economic conditions. Senseless or uniform as the worker attitudes may seem for the foremen, they express rational strivings to assert individual or group interests. The critical remark by a lower-level manager in a plant producing under-carriages well illustrates the one-sided managerial approach. He discusses interest if it were solely a matter of mentality:

"The workers are somewhat narrowminded in their reception of the new machines and equipment. All they recognize in the beginning is that they can produce, say, 120 pieces on the new machine, instead of 60 on the old one. They everlook the fact that it is easier for them to produce 120 pieces on the new one than 60 on the old."

To sum up what we have said of the workers' attitudes to the technological changes: positive and affirmative reactions dominate. Hungarian research has also established, however, that some workers have reservations relative to the socio-economic impact of technological advance. Below we shall review the influence of automation on working conditions and note that those concerns are justifiable and cannot simply be described as expression of "conservatism".

THE INFLUENCE OF AUTOMATION ON WORKING CONDITIONS: FOCUS ON THE AUTO AND STEEL INDUSTRY

To enrich the information used for the analysis of the interrelationship of the working conditions and automation we shall consult our findings in the (auto) industry with those in the steel industry.⁸ (The methods and technique used are identical.) Instead of examining the social consequences of automation in general terms, we shall concentrate on concrete issues which directly affect the workers, for instance, the content of work and the physical conditions of work.

It is impossible to realize the significance of the workers' opinions about the above-mentioned specifics of work, unless we can have some knowledge about the requirements of the workers. Experience has shown that there are marked differences between the expectations of work of the workers engaged in auto production or steel-making. The following table shows that there is a difference in the structure of worker requirements:

The structure of workers' needs

Q: What importance you attach to these factors?		Ranking of workers' needs factors mentioned in this order					
		(1)	(2)	(3)	(4)	(5)	(6)
a.	Work-content	A: 26.7	23.2	13.6	20.8	8.3	2.4
		S: 37.0	16.8	6.0	14.3	10.4	5.5
b.	Work-mates	A: 10.5	13.8	26.2	29.2	15.1	5.2
		S: 8.4	31.5	22.7	14.3	16.3	6.8
c.	Supervisor	A: 7.2	16.0	23.4	26.3	21.0	6.1
		S: 5.9	9.9	16.3	29.5	24.1	14.3
d.	Earnings (money)	A: 44.7	26.5	14.2	7.0	3.0	4.6
		S: 28.6	26.6	20.7	13.3	5.9	4.9
e.	Promotion	A: 3.1	5.9	6.1	2.8	9.9	72.9
		S: 7.4	3.9	7.9	13.3	18.2	49.3
f.	Physical working conditions	A: 7.7	9.6	14.5	15.7	49.9	9.6
		S: 12.8	11.3	16.3	15.3	25.1	19.2

Note: A: auto industry (n: 543)
 S: steel industry (n: 202)

There are marked differences between the requirements of the workers in the auto and steel industry. As far as the first mentioned are concerned, material needs dominate, followed by those concerning the content of work, the workmates, the supervisors, and the working conditions. The requirements concerning the content of work and the physical conditions of work—demands which have relevance in this paper—can be found in the second and fifth places. In steel industry the needs concerning the content of job are in first place, those relative to earnings are second, to be immediately followed by those concerning the conditions of labour.

The steel industry workers attach special significance to job content, the earnings and the physical working conditions. On the other hand, those in the auto

industry concentrate their attention to their earnings and pay less attention to the content of job.

The next question to be answered is to what extent the concrete working conditions allow the workers to satisfy their human expectations towards work. In the auto industry the working conditions can satisfy the demands concerning neither the earnings nor the circumstance of work. For instance, taking the average over several years, the workers in mass production with automated machinery do not earn more than those working on a non-automated production system. The workers' needs concerning the working conditions rank rather low among the various expectations. Still, there is discrepancy between reality and what the workers would expect in terms of job safety, the physical working conditions, and the difficulty of the work to be done. Almost without exception, the respondents attach major importance to accident-free, safe, and healthy working conditions, yet the employer fails to fully satisfy those demands. Only one third of the workers is convinced that the danger of job-related accidents and diseases is held at minimum. Forty-four per cent of the respondents answered that the danger is pretty great, and 23 per cent said that it is high. Similar tension may be experienced in connection with what is and what is demanded to be in terms of the physical working conditions like lighting, heating, noise, etc. The workers' overburdening with tasks is inseparable from the danger of accidents: two fifths of the workers complained of being overburdened by labour assignments.⁹ Automation of manufacture in the auto industry has not produced substantial improvement in these fields.

The workers' needs are different in the steel industry: those relative to the content of job are placed first, followed by those concerning the earnings and the physical working conditions; let us examine to what extent these requirements concerning the content of labour are better met than in workshops of automated

continuous steel production. In the first case, the job contains more variety, is independent, and requires a high sense of responsibility. Furthermore, it offers opportunities for the attainment and utilization of new skills, thereby of developing individual faculties. As far as these specifics of labour are concerned, the traditional steel-making jobs outdo the modern ones: instead of facilitating, automation hinders the satisfaction of the all-important workers' needs, relative to job content.

In steel making, automation has had an unfavourable effect on the efforts to meet the workers' needs relative to the content of labour. It has, however, helped meet the demand for better working conditions, with the exception of the physical circumstances of work. A glance at the ranking of worker requirements reminds us that those aimed at work content are at the top of the list. It is steel-making with the traditional technology which better facilitates their job satisfaction. It can largely be attributed to this aspect of the question, that a change of job is considered by one third of the labour force involved in traditional steel-making, and nearly two thirds of that in automated steel production.

The evaluation of the workers' opinions on working conditions was made easier by knowledge of the ranking of the workers' needs. Requirements relative to work content are highly evaluated both in the steel and auto industry, though not quite identically. Contrary to expectations, the spread of automation has not had a positive impact on the workers' job satisfaction. It has however had a favourable effect on the satisfaction of the workers' needs toward the physical working environment. In both industries this is a low-key requirement, though it is more important for the steel-maker than the auto-makers. The favourable effect of automation is felt best in steel-making.

These findings remind us that automation - a concrete form of technological development - exerts various influences on the various branches of industry, depending on the very characteristics of work. Excessively generalized interpretation of automation is unacceptable even in the analysis of such relatively homogeneous phenomena as work content of working conditions.

THE APPEARANCE OF NEW PRODUCTION TECHNOLOGIES:
INCREASED DEMAND FOR RESEARCH ON SOCIO-ECONOMIC
CONDITIONS

Research on worker attitudes to technological changes has recently generated a demand for new approaches. Research experiences at home and abroad warn us that the time factor has also to be reckoned with in our research methodology. The international comparative research projects have proved to be instrumental in enriching the wealth of scientific knowledge. But they cannot explore and describe the content of the examined variables unless they relate them to the socio-economic system. The large-scale international project on social conditions and consequences of automation has a methodological weakness: it is static and can not describe the mechanism of changes.

In the 1980s automation is no longer expected to be a central challenge for social scientists. Automation will mean diverse technological alternatives, which have only recently appeared in the industrialized capitalist countries. The latest forms of automation are represented by the new generations of microprocessors, older ones by the numerical control machines. Computer numerical control machines and computer aided design also come under this heading. Industrial robots, which employ several of these technologies, also belong here. Robots are employed to save human work chiefly in assembly, welding, and painting.¹⁰ These jobs are highly hazardous to workers' health in the auto industry and,

therefore, the demand for adequate men for those jobs exceeds the supply. The above-outlined new production technologies have become widespread not only in production and management, but also in clerical and administrative work and in the services. These new technologies qualitatively differ from automation. Their social and organizational relevance can be found not in the fact that they miniaturize the devices but that they require comparatively low input expenditure and can be flexibly applied, and have few economic organizational limitations. Unlike automation, their technological and economic specifics harmonize with diverse social and organizational conditions. Enterprise managements have found it inevitable to collect information about and to shape the social conditions that form the medium for the application of new production technologies. So far the analysis of the social conditions meant the examination of the structure of worker qualifications and employment to the management. In the future, they should also examine the working conditions and workers' ways of life. Otherwise we shall have to consider the new production technologies as independent variables that have a determining influence on the intra-plant relations, the working conditions and the workers' ways of life. A similar situation was seen in the 1950s and 1960s in connection with automation. Most of the experts examining the social conditions and consequences of automation held either optimistic or pessimistic views and treated automation as an independent variable. Thereby they represented technological determinism.¹¹ It can be inferred that both the excessively optimistic and pessimistic views are unacceptable. Research has established that, generally speaking, workers in the socialist countries gave a better reception to technological changes. However, the preponderating positive worker attitudes are also accompanied by critical attitudes from a considerable number of workers.

Workers' reservations are due, most importantly, to the socio-organizational conditions of work: the organization of labour, co-participation in decision making, the physical conditions of labour, etc. Employment safety -- a known

feature of socialist society -- is a key factor behind the positive worker attitudes towards technological changes. As far as the critical worker reactions are concerned, they originate in concrete social and organizational circumstances.

We should draw the practical conclusion that both the optimistic and pessimistic views should be turned down where any form of technological advance comes into being (for instance, automation, the spread of the CNC machines, or the application of industrial robots). An unreserved approval of technological advances would divert our attention from the concrete socio-organizational conditions which serve the real medium for technological progress. Such an outlook would mean the giving up of any initiative, any influence on human behaviour. Naturally, knowledge of the workers' attitudes shown in this paper are merely the first, though inevitable, step towards shaping the socio-organizational conditions, the medium of technological changes. The examination of human attitudes will enable us to learn more of the strivings of the social strata and groups that are affected by the technological changes, and to adjust these endeavours. When striving to know and adjust worker's efforts, the managements wish simultaneously to serve the demands of technological and socio-economic progress. Consideration of these often conflicting strivings has had a major impact on the process of the automation of production. But its significance will become even greater in the course of the introduction and use of the abover-described new production technologies.

Footnotes

1 It would be beyond the scope of this paper to say that, either connected with or independently of mechanization, rationalization of labour organization was met with heated worker opposition.

- 2 Engels: The Condition of Working Class in England In: Marx-Engels Művei, vol. 2. Kossuth Könyvkiadó, Budapest 1958. pp. 553-564.
- 3 Le sabotage dans l'industrie by Pierre Dubois (Paris, Calman-Lévy, 1976) offers an excellent survey of the history industrial sabotage.
- 4 L. Taylor-P. Walton: "Industrial Sabotage: Motives and Meanings", in: S. Cohen, ed.: Images of Deviance, Penguin Books, London 1971. pp. 219-245.
- 5 See the well-known The Greening of America by Ch. Reich. Furthermore: Alternative Technology and Politics of Technical Change. Fontana-Collins, 1974. p. 14. A. Toffier: La Troisième Vague, Denoel, 1980.
- 6 I. Taviss: "A Survey of Popular Attitudes toward Technology", in: Technology and Culture, Harvard University Press, Cambridge, 1972. p. 607.
- 7 The "Automation and the Industrial Workers" international comparative research project was co-ordinated by the Vienna Centre for Social Sciences and Documentation. In 1972, in the Moscow Plenary Session, a Hungarian panel joined the participating ten capitalist and five socialist countries. The surveys in the vehicle industry (1974) and steel industry (1975) were co-ordinated by Lajos Hethy and Csaba Mako. The project was also assisted by the Trade Unions' Labour Safety and Scientific Research Institute and the Central Council of Trade Unions, chiefly to explore the interrelationships of automation and the trade union activities.
- 8 Research in the steel industry was taking place a year after the completion of that in the vehicle industry (1975). We considered as automated jobs in steel-making the continuous-operation workshops.
- 9 See more details: Lajos Hethy-Csaba Mako: Automation -- What the Worker think about it, publication of the Sociological Research Institute of the Hungarian Academy of Sciences and the Labour Safety Institute, Budapest 1975.

- ¹⁰ A. Fillion: Microprocesseurs et robotique, deux atouts maîtres du Japon, *Economie et Humanisme*, 1980, septembre-octobre, no 255, pp. 80-83.
- ¹¹ The works of the internationally-known Czechoslovak panel, formed to examine the social conditions and consequences of the scientific-technological revolution, are marked by optimism with regard to their treatment of the social and human consequences of technical-technological progress. See in more detail: R. Richta and panel: *Választon a civilizáció* (Civilization at the Crossroad). Kossuth Könyvkiadó, Budapest 1968. For the pessimistic views, see: J.R. Bright and M. Freyssenet's works. (J.R. Bright: *Automation and Management*, Harvard University Press, Boston 1958. M. Freyssenet: *Le processus de déqualification -- surqualification de la force de travail*, Paris, CSU offset, 1974.)