

CHAPTER VIII

AUTOMATION, WORKERS' NEEDS AND
WORK CONTENT IN HUNGARY

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1. Some general characteristics of human needs and working conditions

In the past decade, both academic researchers and practical experts have paid great attention to the co-ordination of the structure of work demands and work expectations on the different levels of technological development of production. These specialists have generally come to the same or similar conclusions on the factors underlying the social and human aspects of performing a job.

Among the changes of a social nature which have taken place, emphasis has been placed first and foremost on the importance of changes in the internal composition of the structure of the labour force. In Hungary, for instance, the socialist industrialisation after the Second World War resulted in a basic change in the working class as a whole and in its composition. The number of industrial workers compared to all active wage earners rose from 37 per cent to 58 per cent between 1949 and 1973.¹ Important changes have taken place not only in the number of industrial workers but also in their distribution across industries. Table 31 clearly shows the changes in the composition of wage earners according to the different branches of the national economy.

The level of general and professional education of workers has also greatly increased. In the late forties, for instance, four-fifths of unskilled workers had not completed primary school, but this figure had decreased by half by the first half of the seventies.² Positive changes have also taken place as regards the qualifications of workers. The number of skilled workers and those who are in direct control of production has shown the most dramatical increase.

The overall changes taking place in the internal structure of manpower have had a significant influence on the economic activity of the sexes. While in the late forties, for instance, the ratio of male to female wage earners was 70:30, it today stands at 56:44. This means that the tension between work expectations and work demands, and the problems of co-ordinating them, have affected both male and female workers. As the level of education of each successive generation increases, so do human requirements. The increased desire to continue studying, which greatly influences people's ways of thinking and their needs, is clearly expressed in table 32. The number of younger and better educated workers has caused significant changes in work expectations: the number of workers under 30 exceeded 1 million for the first time in the early seventies.

The growth of human expectations of work obviously cannot be explained exclusively by increased general and professional education. Increases in the standard of living and in employment also make their influence felt. Most significantly, national income per head between 1950 and 1973 more than tripled, rising from US\$300 to US\$1,000.³ Besides an increase in national income, the improvement and stabilisation of the standard of living of working people have also been furthered by the achievement of full employment, general social insurance and a free health service.

Table 31: Hungary: composition of wage earners by economic sector, 1949 and 1981

Economic sector	1949		1981 ¹	
	No. of wage earners ('000s)	%	No. of wage earners ('000s)	%
Agriculture	2 100	53.1	1 030	20.3
Industry and building	856	21.7	2 090	41.2
Services	952	25.0	1 880	37.0

¹ Forecast.

Source: Gyorgy Pogany: *Munkaero es munkaero gazdalkodas a szocializmusbanj* [Manpower and manpower policy in socialism] (Budapest, Kossuth Könyvkiado, 1980), pp. 202-203.

Table 32: Hungary: educational level by age group (percentages)

Type of schooling	Age group		
	Born in 1940	Born in 1950	Born in 1960
Did not finish general (primary) school	34.0	13.0	9.0
Completed secondary school	24.0	39.0	40.0
Completed unfinished secondary school ¹	18.0	32.0	46.0
Did not continue studies	24.0	16.0	5.0

¹ The unfinished secondary school is a kind of vocational secondary school which does not give a final school certificate.

Source: Tamás Kozma: *Bevezetés az oktatásügyi szervezetelméletbe* [Introduction to the theory of educational organisation] (Budapest, Jegyzet a Pedagógustovábbképző intézet számára, 1980), p. 416.

In spite of these significant socio-political improvements, new social tensions have also developed in several areas, notably in the divergence between the health service as guaranteed free of charge by law and the actual conditions prevailing, and in the contradictions between the theoretical existence of full employment and so-called unemployment behind the factory gates. It is undeniable that these factors have an important and constant influence on the structure of human needs and expectations from work. We take it for granted that full employment does not reduce the need for safety at work, since in socialist industrial conditions this is guaranteed to every employee.

Having considered these factors influencing human expectations of work, the following question arises: How can the structure of work tasks and the structure of work demands meet such expectations? Unfortunately, the results of the division of labour and specialisation characteristic of Hungarian industrial organisations, such as the structure of work tasks, the levels of job hierarchy, and the decision-making processes, do not meet the needs of some groups of workers today, and this divergence can be expected to increase further in the future.

The internal development and functioning of Hungarian co-operatives and companies, as well as their organisational structure, are rather uniform. Large companies tend to dominate Hungarian industry, which means that negative effects are not directly apparent, but are manifested through excessive specialisation, formalisation and standardisation. These organisational characteristics impede development, making it more difficult to satisfy the varied human expectations of work and thus preventing the effective use of human resources. The structure of industrial work organisation makes it less possible (and often unnecessary) to make use of the individual and collective initiative of an educated workforce. This situation is well illustrated by the divergence between general and vocational education on the one hand, and the demand for work skills on the other. In 1977, for instance, among the 689,000 people with a final secondary school certificate, 83,000 were employed as skilled workers and 41,000 as semi-skilled workers.

2. Humanisation of working conditions: technological determinism and belief in organisational design

Work tasks and their structure, which play a decisive role in meeting human expectations in relation to work, have been formulated in Hungary according to Taylorist principles. In this field, the views of most academics and practical specialists are characterised by technological determinism. Work is divided into small discrete components which minimise the opportunity for individual or collective initiative. In their view, this can only be eliminated by automation and the spread of industrial robots.⁴ However, we contend that the idea that the conditions and circumstances of industrial work can be improved simply by automation is an idealistic and unrealistic view.

In spite of the fact that in the past decade most of the material means for industrial investment were employed in the mechanisation of productive processes, the number of people working in automated, even in mechanised, enterprises remains relatively low in Hungarian industry. It is also characteristic that the mechanisation of basic industries is higher and that manual work dominates in the other sectors of production. Table 33, which includes data selected among economic branches, clearly reflects the relatively low level⁵ of mechanisation of industrial work and the decisive role of manual work.

Not only is the overall level of mechanisation of production variable, but considerable divergences may also be found between branches of industry. Besides the general prevalence of manual work, for instance, important differences are to be found in transfer line production or in the ratio of people working on machines. Most people working on transfer lines, with the exception of workers in light industry, are engaged in manual work. With mechanised activities, machine work is characteristic, although - especially in the food industry - a high proportion of workers do manual work even when operating machines.

Besides these technological conditions of industrial production, we attach importance to those concepts which state that a change in the structure of work activities and the humanisation of work will not be brought about by the overall spread of automation and robotisation. These are the views of sociologists and psychologists who question the concept of leadership and management which considers the co-ordination of human needs and the demands of work organisation only through the adaptation of such needs to the conditions of work. The proponents of these views criticise the view that the machines and equipment, or the technology representing the level of production, can be used economically only in a certain type of work demand or work organisation. In other words, they reject the mechanical and deterministic approach according to which only a particular job structure or organisation can be optimum in industrial practice. Admitting the important role of the technological conditions of production, they call attention to the importance of socio-organisation factors and to the relative autonomy of production.⁶ Technological determinism is often refuted in practice by work organisation reforms which co-ordinate human needs and work demands without ignoring the consideration of productivity.

The modernisation of organisations which neglects economic aspects, however attractive and ambitious it may seem, is bound to fail sooner or later. In order to meet human needs at a higher level - generally by improving QWL - the criteria, characteristics and structure of the changes considered must be taken into account. Although in a socialist society efficiency does not always play a decisive role in programmes for the humanisation of work, the initiatives of company management to maintain the efficiency and the marketability of the company are largely influenced by such programmes. We would like to emphasise this, despite the fact that there is evidently no direct relationships between the economic efficiency of the company and the satisfaction of workers' needs. In the case of socialist industrial relations, even if the different indicators of the efficiency of the company are deteriorating, the needs of significant groups of workers may still be realised.

Table 33: Hungary: composition of manual workers according to mechanisation of work in principal branches of industry (percentages)

Branch of industry	Non-mechanised activities				Transfer line production		Other mechanised production ¹		Machine monitoring ¹	Other	Total	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)				(9)
Machine industry	7.9	19.8	22.5	7.5	2.6	10.9	19.4	2.4	7.0	100		
Heavy industry	7.2	19.7	22.2	5.3	2.0	12.5	19.1	4.3	7.7	100		
Light industry	6.5	19.9	11.0	7.8	17.1	11.9	19.1	1.9	5.8	100		
Food industry	5.9	30.0	11.2	9.4	2.9	11.4	14.2	4.5	10.5	100		
Total	7.0	20.8	18.3	6.1	4.1	12.5	18.5	3.9	8.1	100		

¹ The essential distinction between manual work and machine operation is that in manual work the dominant tasks are loading or discharging machines rather than directing or controlling the machine itself. This can take place either on a transfer line or in the case of isolated machines.

Source: Kozponti Statisztikai Hivatal: Ipar munkaügyi adatfelvétele [Representative data of industrial labour] (Budapest, 1979).

Before examining the opportunities for and limits to the satisfaction of human needs at the workplace, we briefly describe the main features of the socialist industrial relations system.

3. Industrial relations at company level: the organisational triad

The difference between socialist and capitalist industrial relations at company level lies in the fact that the traditional organisational structure of management and trade union is supplemented by the role of the political party (the Communist Party). However, we have relatively poor systematic knowledge of the connections formed between the political party and the management and trade union in the company. This insufficient knowledge is partially due to the fact that the majority of social scientists consider the study of the relations between management and trade union as sufficient to understand the social phenomena in the socialist company. It is beyond the scope of the present paper to describe the structure and dynamism of industrial relations in Hungary, but it is necessary to mention the most important events of the last 15 years.

The new economic reform introduced in Hungary at the end of the sixties made basic changes in the roles of the social partners in industrial relations - economic management, trade union and Communist Party). The tendency of these changes may be briefly characterised as the expansion of the sphere of decision making of the trade unions in the field of working and living conditions for the workers, parallel with growing autonomy of company management. The leading role played by the Communist Party in the economy also underwent a change (i.e. instead of concrete intervention at production level in the activities of company management, the indirect and more general elements of control were increasingly stressed). This new development in the role of the political party was based on the fact that the social conditions and consequences of the company's economic life are so complex that they can only be effectively dealt with by the mutual efforts of the economic and political entities and by the trade union. None of the partners in socialist industrial relations has the monopoly of knowledge and power concerning the social dynamics within the company. For instance, the structure and functions of the trade unions are more adapted than those of the political party to representing the interests of the workers concerning working conditions, wages, promotion, etc.

The world economic crisis in the mid-seventies made it necessary to go further in the direction of economic change. In the export-oriented Hungarian economy, improvements in the adaptability and flexibility of companies received high priority. With this new economic orientation it became obvious that company management could not cope along with the mobilisation of human resources. The only solution was to increase workers' participation through the active support of the trade unions and the Communist Party.⁷

In the late seventies the institutions of industrial democracy were expanded at company level. In spring 1977, the common decree of the Government and the National Council of Hungarian Trade Unions conferred an important power on workers' representatives (shop stewards) in industry. According to this decree, shop stewards elected directly by their workmates have the right to make decisions concerning such questions as collective agreements, wages, social funds, working conditions, etc.⁸ Beyond these traditional areas of trade union rights, shop stewards also participated in the evaluation of the annual activities of company management. In practice, shop stewards experienced the greatest difficulty in controlling management's annual activities. The Communist Party organisations at central and company level had to intervene repeatedly in favour of the trade unions.

The changes in industrial relations within companies may be briefly summarised as follows. As a result of the new economic reform introduced in 1968 in Hungary, not only did companies' autonomy increase a great deal, but the trade unions also gained important powers in representing workers' interest. Parallel with the increasing influence of the trade unions, indirect and non-operative control methods were given more importance in the activity of the political party in company life. The democratisation of industrial relations shows that economic reforms cannot be realised without initiating political reforms. Along with political and social changes, the division of labour among the social partners of Hungarian industrial relations was essentially modified, and principally in the direction of a more balanced power distribution.

4. Case study - Automation in a motor vehicle plant: workers' needs and work content

It is rewarding to study the possibilities for and limits to the co-ordination of human expectations of work and work demands. How far can company management go in a particular direction towards satisfying workers' needs without making the efficiency and marketability of the company suffer? This question is particularly important under the conditions of socialist industrial relations where the efficiency of the productive activities of the company is not regarded as an absolute aim in itself, but the demands connected with it should be fulfilled by satisfying human expectations of work on a higher level. To co-ordinate workers' needs and work demands, however, one has first to analyse their structure and content.

In the following case study, the characteristics of the content and structure of workers' needs will be presented in order to determine the relative importance of working conditions and work demands to workers. Besides workers' needs, we shall deal in detail with such dimensions of work activities as the level of automation (mechanisation), the method of production organisation and the types of job, all which determine the structure of work demands and the possible combinations.⁹

4.1 Background to the company

The company was founded at the end of the nineteenth century, at that time with about 1,200 workers, almost exclusively producing railway carriages. In the course of development, production became more and more diversified, and by the late thirties the proportion of railway carriage production had greatly decreased. As a new venture, motor industry products were introduced and took over an increasing part of production. The number of personnel in the company quadrupled. Serious damage was caused during the Second World War, but in spite of this the company quickly recovered and, following the need for reconstruction, it once again predominantly produced railway carriages. Apart from several organisational changes in the sixties, a most significant change was brought about by production development in the early seventies, which was also combined with an important technological development. According to the conception of company management, the mass production of new or adapted designs began using manufacturing system which had already proved economical on an international level. In order to ensure this strategy of production, the company bought a complete plant and manufacturing systems, mainly from western European firms. Table 34 clearly shows the change in the structure of products of the company.¹⁰

The reason for the changes in the composition of products was the drastically decreasing market for the production of passenger coaches in the sixties and the low level of the technology employed. On the other hand, the COMECON countries represented an almost unlimited market for the heavy-duty diesel engines and rear axles for buses and lorries and large agricultural tractors. Along with technological development (for instance, the company was the first motor vehicle factory in Hungary to set up an automated transfer line), the composition of products was changed. The production strategy of company management gave priority to the vertical development of the production system (i.e. the overwhelming majority of the components of products came from its own plants). The development of the production system of the company closely followed that of the Renault motor company.

At the time of carrying out its project on automation and industrial workers in 1974, the company employed some 10,000 manual workers. Of the total production an insignificant proportion comprised the manufacture of railway vehicles, the main products being rear axles used for road vehicles, engines, heavy lorries and tractors. For the purpose of the investigation, we chose the mass production engine plant and rear-axle plant, and the single-unit productive tool plant. We paid attention to the effects of automation on work content, working conditions and workers' attitudes.

4.2 The structure and role of workers' needs

The questions we considered important in the project were as follows: the workers' relationship to new machines and new equipment; and how far they were satisfied with the types of industrial work which were introduced due to technological development (automation). In the course of studying workers' attitudes to work activities, we paid attention to the examination

Table 34: Motor vehicle plant: breakdown of total sales by product, 1965-77 (percentages)

Product	1965	1974	1977
Railway vehicles/passenger coaches	38.7	7.7	3.3
Road vehicles, of which:			
Rear axles	24.0	35.1	35.7
Diesel engines	.	34.6	32.6
Lorries	-	5.4	9.7
Agricultural tractors	-	5.9	10.9
Subtotal	24.0	81.0	89.2
Other products	37.3	11.3	7.5
Total	100.0	100.0	100.0

- = nil or negligible.

of their needs. The analysis of the structure and content of workers' needs was important for us from several aspects. First, it constituted a general orientation in considering the relative importance of the questions studied. Our aim was not to examine and assess the effects of automation on work content and working conditions, but to understand the concomitant circumstances and consequences of development through the features which are most important to workers. To do this, the best basis of comparison was the structure of workers' needs and demands. Thus we may discover which of them are of secondary importance, or even negligible.

The relative importance of the questions studied was based on the people concerned (i.e. on the judgement of the workers). We are aware of the fact that the needs formulated by the workers are not necessarily the same as their real needs. Our methods of investigation included first of all interviews with workers, to discover their views as they formulated them; 540 workers were questioned in this way. The distorting role of consciousness on observation was also considered.¹² Bearing in mind what has been said about the examination of workers' needs, this is an appropriate method on the one hand for assessing the effects of the socio-economic environment outside the workplace, and on the other for determining their orientation towards work.

Table 35 sets out the structure of workers' needs as discovered in our investigation. The importance to the workers of the following components of work activities were examined: work content; relationships with co-workers and superiors; pay; possibilities for promotion; physical working conditions; and work strain. We found that pay is considered to be the most important, followed by work content and relationships with co-workers and superiors. Physical working conditions and possibilities for promotion are at the end of the scale.

The introduction of new machines, equipment and technological processes thus appears to workers as a question of pay and requires a solution on the part of the company. In certain respects, the results of our investigations (e.g. regarding work satisfaction) are certainly determined by the fact that all the three plants examined belong to a productive field where wages are highest, and the company too is an establishment where wages are the highest in Hungary.

Apart from the workers' assessments of their own needs, we considered it was important to find out the opinions of their superiors on the needs of the workers they controlled. In this way we were able to carry out cross-checks on the structure of workers' needs. Interviews were held with 30 workshop supervisors (i.e. foremen) and 25 trade union representatives (i.e. shop stewards). Table 36 gives the results of this inquiry.

An overwhelming majority of the foremen (80 per cent) rated the financial aspect of greatest importance among workers' needs. In contrast to this, appropriate pay was considered most important only by approximately half of the workers, which means that their supervisors think the financial aspect of performing a job more important than do the workers themselves. Good work content was mentioned by both supervisors and workers as of secondary importance. Foremen and workers also shared the opinion as to the importance of opportunities for promotion within the organisation, which was mentioned as of least importance by nearly the same proportion of both groups. Divergences are noticeable, on the other hand, in judging the importance of relationships with one's superior and of physical working conditions: a good supervisor was mentioned in the third or fourth place by the workers, in contrast to the foremen's estimation, which ranked the importance of their activities and roles in fifth place. In judging the rôle of physical environment, the opinions of the supervisors differed to a large extent; one-third of them placed it in second place and another third in sixth (and last) place. Almost half of the workers interviewed mentioned the necessity of an appropriate physical environment in fifth place.

The evaluation of the trade union representatives in connection with workers' needs generally coincided with the workers' own judgements. One can, however, find a divergence in the estimation of needs in connection with work and pay. According to the shop stewards, appropriate work played a more important part in workers' needs than appropriate pay, whereas the workers interviewed rated appropriate pay as more important

Table 35: Motor vehicle plant: the structure of workers' needs

Factor	Percentage of workers who ranked the factor					
	1st	2nd	3rd	4th	5th	6th
Work content	26.7	28.2	13.6	20.8	8.3	2.4
Relationships with co-workers	10.5	13.8	26.2	29.2	15.1	5.2
Relationships with superiors	7.2	16.0	23.4	26.3	21.0	6.1
Pay	44.7	26.5	14.2	7.2	3.0	4.6
Possibilities for promotion	3.1	5.9	6.1	2.8	9.9	72.2
Work strain and physical working conditions	7.7	9.6	14.5	15.7	49.9	9.6

Table 36: Motor vehicle plant: superiors' opinions about the structure of workers' needs¹

Ranking of workers' needs	Foremen	Shop stewards
1st	Pay	Work content
2nd	Work content	Pay
3rd	Physical working conditions	Relationships with superiors
4th	Relationships with co-workers	Relationships with co-workers
5th	Relationships with superiors	Physical working conditions
6th	Promotion	Promotion

¹ The superiors questioned carried out activities that were exclusively managerial in relation to the workers involved in this survey.

than appropriate work. Otherwise, the judgements of shop stewards and workers generally coincided as to the importance of suitable co-workers and supervisors, physical working environment and opportunities for promotion.

The opinions of trade union representatives and workshop supervisors differ in judging the importance of appropriate pay and appropriate work for workers. The foremen consider their workers more money-minded than do the shop stewards. According to the overwhelming majority of foremen, appropriate pay is of greatest importance among workers' needs. In contrast to this, shop stewards considered appropriate work to be most important for workers, although they did not deny the importance of appropriate pay among workers' needs.

Our examination of expectations in performing a job shows the same tendency from the point of view of the workers as from that of the workshop supervisors and trade union representatives. Although in some areas (e.g. the importance of appropriate work or appropriate pay) there is a slight divergence, the expectations in job performance are overwhelmingly judged in the same way by both superiors and workers. On the basis of this, one can assume that the structure of workers' needs is a suitable means of orientation to determine the importance and role of attitudes to work. This implies that, in studying workers' attitudes to work, we pay more attention to their opinions about pay and work content than, for instance, promotion within the organisation.

4.3 Technology, work organisation and work

After this investigation of workers' needs, we now analyse the nature of technical and technological development in the company, and the effects of automation on work and working conditions.

The productive units of the company examined clearly showed a development towards mass production and automation. We attempted to analyse them in this mixed stage of development, rejecting the possibility of abruptly removing transfer lines from their natural surroundings and comparing them to traditional machine tools. Instead, we tried to assess the state of technological development in the productive units as it existed in reality, and thus make it possible to examine the effects of automation on work. A technological scale with three dimensions¹³ was used to describe the productive units. This distinguishes those aspects of technological development that are closely linked but are also separable. The three dimensions are as follows:

- level of mechanisation and automation of production: this shows the level of mechanisation of different types of production in individual jobs;

- increase in volume of production: this shows the aspect of technological development which is characterised by a development from batch production of individual orders to manufacture of standardised products in serial or mass production;
- development from single-unit organisation of production to flow production: the basis of traditional single-unit production is that the operations are uniform, whereas in flow production the emphasis lies on the uniformity of the product or products.

This approach attempted to analyse the three angles of technological development described above, which are partially interdependent, and the importance they may have for work and working conditions. We wished to go beyond the narrow approach which considers the consequences of technological development exclusively as a concomitant of the mechanisation and automation of production. In our approach we drew on the sociological theory which argues that the impact of technological development on work can only be understood in the context of the entire development of the production system. In the present study we deal with the consequences of the mechanisation (automation) of production on work organisation, work content and working conditions.

We were not able to make comparisons at the level of productive units due to the fact that most of them combined automated, semi-automated and traditional machines, so that the character of production was mixed. We therefore compared instead groups of automated with non-automated jobs. The analysis is based on observations at work, questionnaires given to workers, interviews with management, company data and other sources of information.

4.3.1 Comparison of work performed on automated and traditional machines

Regarding the impact of automation on skills, one can find at least three different schools of thought. According to the first school, which judges the impact of automation optimistically, both a vertical and horizontal increase in skills may be noticed. In the case of a horizontal increase, there is no change in overall level of skill, but rather a significant enlargement of the job content or sphere of activity, which results in quantitatively more skills than before and therefore implies an increase in skill level. The investigations carried out in socialist countries show this kind of process first of all.¹⁴ The observation of automated transfer lines in Czechoslovak and Soviet plants showed a 15-40 per cent increase in skill for machine operators, machine adjusters and locksmith maintenance jobs.¹⁵

The second school is pessimistic. In the course of studying the production processes of the motor industry and the metal industry in general at company level, several researchers were surprised to find that the demand for expertise and ability on the part of manpower was decreasing. In important posts where long training and experience were necessary until the introduction of automation, the work demands became reduced to easily and quickly acquired activities. According to those who view the impact of automation in a pessimistic way, the need for manual skills is decreasing rather than increasing. The tasks formerly performed by machine operators and adjusters now belong to the spheres of activity of tool designers, technicians, engineers, etc. The relationship of worker to machine has changed considerably, the skilled machine operator being promoted to machine supervisor.¹⁶

Finally, in the view of the third school, automation does not exercise a significant effect on qualifications, or rather its impact is not homogeneous. In the opinion of the supporters of this view, important changes do not occur in the level of expertise, not even with those who perform maintenance jobs. Some also take a slightly more differentiated view according to which automation increases the demand for expertise in some cases and decreases it in others (polarisation). Automation introduced in the same branch of industry (e.g. motor vehicles) may also have a heterogeneous impact on expertise. For instance, the investigation dealing with the impact of automation at Renault showed an 11 per cent increase in skilled jobs, while a decrease in expertise was experienced in the remaining skilled jobs. At the same time, the need for expertise in maintenance jobs had considerably increased owing to the installation of automated machines and equipment.¹⁷

All the jobs included in our comparative analysis belong to mass production of flow organisation. They were performed on transfer lines or on automated machines of other types, on semi-automated machines, or on traditional machines linked closely or loosely with automated machines.

The demographic characteristics of the workers in the productive units of rear-axle manufacturing are summarised in table 37; 48 operators of automated machines were compared with 115 operators of traditional machines in flow mass production.

The demographic composition of the workers, whether they worked on transfer lines or revolving turning lathes, showed very slight differences. The operators of transfer machinery and automated machines were superior neither in education nor in professional qualifications to the workers on traditional machines. One way in which the operators of automated machines differ from the others was that most of them were male workers aged between 20 and 30. This is also borne out by the time they had spent at the company, nearly half of them having worked less than seven years there. In contrast to this, four-fifths of the workers in the productive units of rear-axle manufacturing equipped with traditional machines had length of service of more than six years with the company. This is primarily due to

Table 37: Motor vehicle plant: demographic characteristics of workforce in rear-axle manufacturing (flow mass production) (percentages)

Demographic characteristics	Operators of automated machines	Operators of traditional machines
Sex:		
Male	91.8	86.1
Female	8.2	13.9
Workers with elementary school certificates and skilled workers' diplomas	30.6	38.3
Skilled workers	56.2	57.4
Technicians	8.4	-
Seniority (more than five years in the job)	14.3	59.2
Age (below 30 years)	69.4	44.3
Married workers	67.3	70.4
Workers with own flat	46.9	65.2
<u>Source:</u> Lajos Héthy and Csaba Makó: <i>Az automatizáció és a munkastudat</i> [Automation and workers' perception] (Budapest, Hungarian Academy of Science, Institute of Sociology, 1975).		

the attempt of company management to employ workers who are open to the new machines and equipment.

One may find a similar personnel policy regarding the organisation of the so-called autonomous work groups representing a new structure of job tasks and work demands. The measure of autonomy of action and responsibility for the workers has considerably increased, and job content has changed in these work groups as compared to former types of work organisation. According to experience in workshops, people are reluctant to change the jobs they have had for decades or have grown accustomed to, even for a more interesting job which carries more responsibility. This increased responsibility is a characteristic feature of autonomous work groups. In the development of posts characteristic of the new type of work organisation, company management tries to choose workers from the following three groups: firstly, from the young, who are only slightly tied down by routine and habit; then from the newly employed; and lastly from those who volunteer.

This phenomenon can be explained not only by the fact that the groups mentioned would be intellectually or psychologically more open than their co-workers who have been in the workshop for a longer period of time. The "openness" is certainly a common characteristic of the young, of the newly employed and of volunteers. However, these groups are also characterised by rather underdeveloped social relationships among themselves, and this is the reason why they are ready to accept initiatives coming from the company. In contrast to this, if company management can rely only on workers of long standing, where social connections are already developed and common interests have matured, then it is more difficult for the company and requires long negotiations to have a more advanced productive technology, or different working methods accepted.

The operators of automated and traditional machines, despite the fact that they worked in the same productive unit and their working conditions were therefore identical, had differing views on the development of their employment conditions (table 38). Workers were asked the question: How characteristic of your job are the following opportunities in connection with your work? The operators of automated machines had a more favourable opinion about both pay and opportunities for improvement of their professional knowledge and general education than their co-workers on traditional machines. Furthermore, a larger proportion of them expressed a favourable opinion about the possibilities of promotion - which is generally considered rare - and about employment safety.

Before describing the workers' opinions, we must emphasise the fact that those on automated, semi-automated and traditional machines work on the same transfer line. They put the same workpieces into their machines and they move or carry away the finished pieces with the same subsidiary equipment, such as moving stores and fork-lifts, roller lines and upper conveyors, etc. The equipment for removing turnings from machines is also the same. Furthermore, the recurrence and frequency of the work tasks is identical, and since there is flow production, workers depend on each other in the tempo of their work as well. It is not therefore by chance that the two types of operator notice relatively slight difference when comparing their jobs.

It is not by chance that the operators of automated machines and equipment spoke more favourably about their wages, since they earn more than the average. This is due to company policy which, by offering favourable wages, aimed to prevent any problems that might cause stoppages on the part of operators of machines and equipment with a large output and with a key role in production. The extent of loss due to a stoppage of this machinery would be far greater than the damage occurring from stoppages of traditional machines.

Workers on both automated and traditional machines were paid on a piece-rate system, the basic wage on machines with large output being supplemented by considerable bonuses, according to the quantity produced. The most common wage system for operators of automated machines was based on group piece-work (this applied to two-thirds of workers on automated machines). For operators of non-automated machinery, the typical wage system was based on individual piece-work, although even here one-third of

Table 38: Motor vehicle plant: views on employment conditions of workers on automated and traditional machines (flow mass production)

Item	Workers answering positively (%) ¹	
	Operators of automated machines	Operators of traditional machines
Good pay	53.0	28.7
Guaranteed employment	81.6	65.2
Opportunities for promotion ²	10.2	3.5
Chances for improving professional knowledge	46.9	27.8
Opportunities for acquiring more general education	42.9	25.2

¹ Percentages of workers in whose opinion the item is characteristic of their jobs to a large extent (points 7-9 on a nine-point scale).

² i.e. appointment as group leader or foreman.

Source: Héthy and Makó. op. cit.

the workers were paid according to group piece-work. One may also find individual piece-work wages paid to workers on automated machines, although to a lesser extent than workers on traditional machines. For instance, among the automated productive units in the motor industry, the basis of wage payment was individual performance, rather than group achievement, as might have been expected. The use of this kind of wage system is, of course, provisional. The reason for its introduction was to maximise the possibilities of individual machinery and posts.¹⁸

In the long run, the use of piece-work wages may have several unfavourable effects. The individual competition between workers may increase in such a way that it may hinder the total output of transfer lines, when co-operation and mutual assistance is needed to ensure undisturbed production. That is the explanation for the fact that wages based on individual performance were paid to only 10 per cent of operators of automated machines.

Regarding mental and physical work strain, job descriptions show slight differences between, for instance, the structure and method of implementing information and the structure of work activities, etc., of operators working on automated and traditional machines, but one cannot conclude that there is an unambiguous tendency. Working conditions can be classified in

several ways. From the point of view of our study, we aim to show the changes that occur in the major physical and mental demands of industrial work. Due to their importance, it is necessary to mention the development of physical and mental work strain, expertise and responsibility. Although these are analysed separately in most cases, we are aware of the fact that there is interaction between them. In reality they do not occur in isolation but jointly, and an individual description can only be useful for the purpose of analysis.

In the field of physical and mental work demands, similar tendencies have been found by researchers in different countries. In the development of physical strain, there is an inverse relationship between the different levels of automation and increasing physical demands. The physical strain demanded of workers at low levels of automation are high. In contrast to this, physical strain and fatigue do not occur at all in posts using automated equipment.

The situation regarding mental strain and automation is not so simple: one can find instances of both decreasing and increasing mental work strain in research studies. The contradictory relations between mental work strain and automation are apparent. In the strict sense of the term, mental strain which is connected with the supervision of the functioning of machines has decreased. However, one can agree with those who state that automated jobs involve repetitive tasks and require close attention from the worker, but lack any form of stimulation.¹⁹

As an illustration, we would like to present our data on observations at work concerning mental strain. In the course of our observations on the information processing activities necessary to perform the job in individual posts, we distinguished the three following stages:

(1) Collection and recording of information is the simplest form of information processing. In this field we did not find any important differences between the work on automated and traditional machines. One-third of working hours are spent on these kinds of activities.

(2) Classification, systematisation and combination of information require greater independence and more differentiated qualifications. These types of activities are more frequent with operators of automated than of traditional machines. The former spent 21 per cent of their working hours and the latter only 12 per cent on this kind of work.

(3) Evaluation and application of information requires the greatest creative abilities. Such activities are more characteristic of those working on traditional rather than on automated machines. The creative processing of information (e.g. determination of new parameters and their use) is not only possible in the case of traditional machine tools with a less rigid job structure, but is also a basic work demand. Workers in such jobs must undertake the greater part of evaluation and use of information, besides its registration and arrangement in connection with work processes.

Table 39 summarises the proportion of information processes at different levels of mechanisation.

Table 39: Motor vehicle plant: level of mechanisation and stages of information processing

Level of mechanisation	Occurrence of information processing activities (%)		
	Collection and registration	Classification and combination	Evaluation, comparison and application
Automated and semi-automated machines	36	21	29
Traditional machines	31	12	48

Workers' opinions about work strain and physical working conditions (table 40) follow the same tendency as job descriptions. Workers on automated and traditional machines who were asked to describe their working conditions had more or less similar opinions about the measure of being overloaded with tasks, the extent of physical work strain and the probability of occupational accidents and diseases.²⁰ The measure of mental strain and the time of starting and finishing work is more favourable to operators of traditional machines, though there is a relatively slight divergence. Workers on automated machines had a more favourable opinion only about the circumstances of physical work (e.g. lighting, vibration, etc.). Here, too, the difference was minimal, because there were many complaints about such factors as the pollution of the atmosphere, noise level, temperature and cleanliness of workshops, and crowdedness, even among operators of automated machinery. In short, the main finding was that there were only slight differences between workers on automated and traditional machines.

Regarding work content itself, workers on automated machines saw slightly more opportunities to improve their abilities and considered it more necessary to acquire new skills, which is understandable since they were using new machines and had to learn how to operate them. They considered their work more varied and more interesting. Their independence, on the other hand, was seen to be less, which is probably due to the fact that automated machines perform jobs of especially high quality. The attention of management and of those workers whose jobs depend on them is focused upon operators of automated machines. Responsibility was considered to be very great, but workers saw no possibilities for developing new methods of work. Indeed, company management preferred technological discipline and exact observation of the processes prescribed to initiatives by workers. It is a generally held opinion, among both workers and management, that the processes of production on automated machines are worked out in such a way that improving them is not possible and that an arbitrary change might make them much worse.

Table 40: Motor vehicle plant: views on work strain and physical working conditions of workers on automated and traditional machines (flow mass production)

Item	Workers answering positively (%)	
	Operators of automated machines	Operators of traditional machines
Overloaded with tasks	30.6	29.6
Physically tiring tasks	42.8	40.9
Mentally tiring tasks	16.3	9.6
Probability of accidents and diseases in connection with work	24.4	24.4
Adequate working hours (time of starting and finishing work)	65.3	81.7
Good physical circumstances (lighting, temperature, cleanliness, low noise level, etc.)	22.5	34.6

Concerning the impossibility of developing new methods of work, the operators of automated machines made the following statements:

Automated equipment is totally different from traditional machines. There is a strict technological programme. Here the worker must meet the demands and must attend to the machine; there is no other task of possibility. Our knowledge is not enough to carry out new methods of work.

. . .

This equipment is an accurately designed unit which functions according to a strict technology. There is virtually no possibility for change or innovation.

. . .

The technology itself can't be changed very much, but there are unsolved problems. For instance, a greater precision of sizes could be used when forging, so that it would not be necessary to chip half the workpiece away.

The fact that the operators of automated machines do not have the power to intervene in work processes was confirmed by data deriving from the descriptions of individual jobs as well. Data gained from observation

of the structures of job activities indicate the measure in which the worker performing his job can depart from instructions and rules; the measure of freedom of action for workers is determined by the particular characteristics of work, the method of execution and other properties of the work process. The degree to which the work is rigidly specified by the machine is a key element of the job content.²¹

According to the data derived from observation, in the overwhelming majority (91-98 per cent) of jobs operating automated and semi-automated machines and equipment, work activities are very exactly defined, in other words programmed. In contrast to this, in the majority (68 per cent) of machine jobs on traditional machines, there is a considerable opportunity to deviate from the previously recorded course of work activities. Thus, in the latter case, the workers have a greater possibility of action during the course of job performance.

Regarding the amount of human contacts during work, one can say on the basis of workers' opinions that they are not greatly influenced by automation. In the content of such contacts, however, there are more significant differences: people working on automated machines show more interest not only in work matters but also in one another's personal concerns than their co-workers on traditional machines.

Besides contacts with co-workers during job performance, one must consider the relationships which develop between workers and their immediate superiors (foremen or supervisors). This has been measured by the following five factors regarding supervisors:

- provides workers with appropriate instructions;
- does not "molest" workers without a reason;
- if workers have problems, he or she listens to them;
- arranges bonuses according to merit; and
- possesses the necessary expertise to perform the job.

The differing levels of mechanisation do not have an immediate influence on such areas of supervision as helping or listening to workers, or giving just recognition to their work according to merit. In spite of this fact, it is worth mentioning that workers, particularly those operating traditional machines, have condemned the methods of assessment employed by their immediate superiors. This aspect of management was stressed above others, which ties up with the fact that pay took first place in the structure of workers' requirements. Meeting this need depends to a great extent on the development of incentives as practised by the immediate superior in the workshop.

Workers on traditional machines were more satisfied than those on automated machines with the expertise of their immediate superiors and the instructions given to them during work performance. This divergence not only reflects the differences in professional skills and supervisory abilities between foremen, but indirectly it also draws attention to the fact that with the use of traditional machines, the reliability of machines

and equipment, the quality of the product, the pace of job performance, etc., largely depend on the level of technical knowledge, skill and expertise of the immediate superiors. In contrast to this, with automated machines and equipment - as a result of precise regulation of production and a highly programmed work performance - the instruction and professional help of supervisors is in general less necessary.

Besides the divergences among automated, semi-automated and traditional jobs, there are much more important ones found within individual groups of other dimensions of technology, for instance, among traditional machine jobs. This means that in judging such characteristics of work content as variety, independence, responsibility, the possibility of making use of knowledge, etc., one does not necessarily find important divergences in every case between the opinions of workers on automated and traditional machines. Thus, the fact that a job is performed on automated machines does not necessarily imply that it is more independent and responsible, and that it develops abilities in contrast to a job performed on traditional machines. At the same time, regarding certain work characteristics, the activities performed on automated machines are more positive, for instance in respect to the interest of work or the necessity for acquiring new knowledge.²²

However, in our research we have not experienced as great an effect of automation as we originally presumed.

The experiences described in this paper do not seem to confirm either the extreme optimistic or pessimistic views of how technical and technological advance transforms work content. This in itself is a very important scientific finding, since it means that our current theories are inadequate and that more comprehensive research is necessary. Thus, for the purposes of analysis and description, technical conceptions embracing the whole of the system of production are needed, in particular those which pay close attention to the characteristics of job organisation as well as to the level of mechanisation of production. In our view, the conditions for co-ordinating workers' needs and work demands cannot be fulfilled merely by examining one dimension of technology, the level of mechanisation. Rather, examination must be extended to the system of production as a whole, and to the technical, technological and social concerns of job organisation.

5. Co-ordination of workers' needs and work demands: opportunities and limitations

The results of the research dealing with the social effects of automation draw attention first and foremost to the differentiation of human needs. Workers claim varied needs in such aspects of work performance as work content, level of pay, contacts with co-workers and superiors, physical working conditions and opportunities for promotion. In the light of the experience of our own investigation and of other national research projects on workers' needs, one can say that workers consider pay as

most important,²³ followed by need for meaningful work content. The need for satisfactory contacts with co-workers and immediate superiors come in third and fourth places. This is followed by the need for good physical working conditions, and finally by opportunities for promotion within the job organisation. Of course the structure of human needs as revealed by research may alter considerably, not only according to differing groups of workers, but in time as well; in spite of the fact that the overwhelming majority of workers place their need for pay in first place, there are others for whom work content and contacts with co-workers are of paramount importance.

Our aim in examining workers' needs in one or more companies was not only to reveal the exact structure and importance of human needs, but to clarify the assumption that workers had not only one, but several needs in their work. Thus, the view of "economic man", where the most important factor is the satisfaction of material needs, or that of "psychological man", where non-material needs are emphasised, are both erroneous, although these concepts can often be found in the practice of industrial relations. If company management does not take into account the differentiation of workers' needs, then a situation is produced in which workers, instead of varied needs at work, set up one single but rather strong claim. One can witness this phenomenon when "in exchange for" poor contacts with co-workers or immediate superiors, workers prefer to gain compensation in the form of higher pay and to compensate for their unsatisfied needs at work with outside activities.²⁴

We also found a good example of a fortunate coincidence between workers' needs and work demands at the company examined. The female workers in the workshop, who performed simple semi-skilled jobs producing binding elements in the engine plant, were more satisfied with their work than the skilled male workers in the tool plant, who performed more complicated and exacting tasks. Of the workers in the tool plant, 13.1 per cent said that they were very satisfied, 44.5 per cent were fairly satisfied and 39.4 per cent only partly satisfied with their jobs. The respective proportions of the semi-skilled female workers in the above-mentioned workshop were 12.7 per cent, 55.5 per cent and 30.9 per cent. Management's attention should be drawn to the fact that it is worthwhile following workers' needs systematically. By doing this it is easier to fulfil the principle of placing the appropriate worker in the appropriate place.

Company management has certain possibilities for action in singling out appropriate workers (e.g. through examination of workers' needs, aptitude examination, etc. Furthermore, experiences abroad and the results of our own investigations alike showed that the "appropriate place" - the structure of job tasks - need not be taken as an unquestionable given, as an unchangeable factor. Within certain limits it is possible to change the structure of work stations and posts, for instance by choosing the method of organisation of production, or by combining jobs of differing character.²⁵ We also encountered possibilities for enriching the content of jobs in the workshops of the motor vehicle plant we examined. In the engine plant, on the other hand, this was made impossible by separating the jobs of machine operators and machine adjusters, and by filling them with workers who were specialised in these jobs separately. This shows that

the impoverishment of a large number of machine operators' jobs was by no means a consequence of technology, but rather a result of the ignorance and inexperience of managerial decisions resulting from an underdeveloped state of awareness regarding workers' needs in connection with work content. As these conditions change, the unification of machine operators' and machine adjusters' tasks will obviously become possible, thus changing the content of semi-skilled jobs prevailing in the field of engine production today.

By means of similar solutions, one can counterbalance the harmful effects of organisational methods of production which, due to their constraint and rigidity, ensure only minimal possibilities of action for workers. Jobs performed within a flexible production organisation objectively ensure more favourable conditions of work so that workers can make use of their knowledge to develop their individual abilities and to formulate new work methods. In contrast to this, the running of automated machines within a rigid production organisation has a negative influence on the particularities of work content described above. Company management can influence the job, which is considerably simplified by this type of production organisation, in both positive and negative directions. One may speak about a positive organisational change if management enlarges the activities of the workers operating machines on transfer lines with rigid organisation of production by introducing adjusting, regulating or perhaps maintenance activities.

This once again concerns the unification of the work of machine operators and machine adjusters. The unfavourable effects of the rigid organisation of production is increased by management if the task of adjusting and regulating machines is not allocated to machine operators, but to workers specialised in this one particular job (i.e. machine adjusters), even where their professional qualifications and practical experiences are appropriate.

Management also has the means to compensate for certain negative effects of automation without introducing organisational changes. Monotonous jobs or other unfavourable working conditions can be made more attractive to workers by offering higher pay. In connection with this, we draw attention once again to the limited trade-off and constant changes in human needs. Thus, the solution of offering higher pay mentioned above will relatively quickly (generally within five years) lose any stimulating and motivating effects. Once higher pay becomes an accepted part of the job and of the workers' existence, any former incentive effect will come to an end. Management is therefore faced with the need for a further rise in wages or for an improvement in working conditions.²⁶

Apart from the possibility of co-ordinating workers' needs and work demands presented above, one should also mention those obstacles which limit the possibility of action by management. Firstly, the question of available and economically applicable technology arises. Among the conditions of socialist industrial relations, the relatively limited material resources available to companies, and the possibility of obtaining central material resources basically determine the technical, technological and qualitative level of machines and equipment to be introduced, the measure of planned capacity, etc.

Secondly, besides the economic and technical aspect, one must pay more attention today, and especially in the future, to the sociological characteristics of manpower. The appropriate use of decreasing manpower resources will make it necessary to acquire a more thorough knowledge of workers' needs as regards work than we have today. The successful co-ordination of workers' needs and work demands can only be possible through a simultaneous consideration of the technical, economic and social aspects of production.

Notes

¹ Sándor Benedek: "Változások a magyar munkásosztály belső strukturájában" [Changes in the inner structure of the Hungarian working class], in Társadalomtudományi Közlemények, 1977, No. 4.

² Központi Statisztikai Hivatal: Munkaügyi adatgyűjtemény a szocialista iparban foglalkoztatottakról [Labour data on workers employed in socialist industry] (Budapest, 1974), pp. 20-21.

³ Hungary, Central Office of Statistics: Nemzetközi Statisztikai Evkönyv, 1970 [International Bulletin of Statistics, 1970] (Budapest); idem: Statisztikai Evkönyv, 1973 [Statistical Bulletin, 1973] (Budapest). National income per head was calculated at 1968 US\$ values.

⁴ Andor Berei (ed.): A szocializmus politikai gazdaságtana [The political economy of socialism] (Budapest, Kossuth Könyvkiadó, 1976).

⁵ In this chapter, a distinction is made between mechanisation (or a low level of automation) and automation proper, since much of the discussion is centred on the former category (editors).

⁶ L.E. Davis and J.C. Taylor: "Technology, organisation and job structure", in R. Dubin (ed.): Handbook of work, organisation and society (Chicago, Rand McNally, 1976), pp. 379-419.

⁷ See the following paper on the conditions of workers' direct participation: Csaba Makó and Lajos Héthy: "Worker participation and the socialist enterprise: A Hungarian case study", in Cary L. Cooper and Enid Mumford (eds.): The quality of working life in Western and Eastern Europe (London, Associated Business Press, 1979), pp. 296-326.

⁸ Lajos Héthy: "Trade unions, shop stewards and participation in Hungary", in International Labour Review, July-Aug. 1981, pp. 491-503.

⁹ In the course of presenting this case study of one company, we rely mainly on the results of the international project in Hungary entitled "Automation and industrial workers". A comprehensive account is contained in Lajos Héthy and Csaba Makó: Technika, munkaszervezet, ipari munka [Technology, job organisation and industrial work] (Budapest, Közgazdasági és Jogi Könyvkiadó, 1981).

¹⁰ Károly Fazekas: "Teljesítményhiány" és teljesítménybérezés a vállalati gazdálkodásban [Lack of performance and the piece-rate system in company management] (Budapest, Marx Károly Közgazdasagtudományi Egyetem, 1980; mimeographed doctoral dissertation), pp. 21-22.

¹¹ Patrick Fridenson: Histoire des usines Renault: Naissance de la grande entreprise, 1898-1939 (Paris, Editions du Seuil, 1972).

¹² We should like to mention the following example to illustrate the relatively independent movement of consciousness (distortion of observations). In the course of an American survey on working conditions in 1973, the researchers had several unexpected results as compared with a survey carried out using the same methods in 1969. The presumption of the researchers in 1973 was that the people concerned would have been less satisfied with their incomes. This was based on the fact that, due to considerable inflation since 1969, a 5 per cent decrease in the purchasing power of incomes had taken place. In spite of this fact, the number of people dissatisfied with their incomes did not increase. Contrary to this, another phenomenon was found in which people were completely unaware of any favourable changes in their living standards when they had actually improved.

In the course of the 1969 survey, only 8 per cent of the women gave accounts of discrimination at work. In contrast, in 1973, 13% per cent of women interviewed spoke of discrimination. The proportion of women who complained about discrimination increased in spite of the fact that several measures were introduced to improve the equality of the sexes between the two periods. In this case we may witness a phenomenon in which, due to the rapid development of women's consciousness, they reacted more sensitively to how they were being treated at work. See G. Roustang: "Enquêtes sur la satisfaction au travail: Analyse directe des conditions de travail", in Revue internationale du travail, May-June 1977, p. 297.

¹³ For the theoretical basis of the technological scale, see Héthy and Makó: Technika, munkaszervezet, ipari munka, op. cit.

¹⁴ L. Rzsiga: "Vlijányije naucsno-technicseszkoivo progressza na roszt kvalifikácii rabocsevo klassza" [Influence of scientific and technical progress and increasing qualification levels within the working class], in Insztityut Filozofii i Szociologii: Naucsno-technicseszkoivo revoljucija i rabocsij klassz v uszlovijah szocializma [The working class and the scientific-technical revolution in socialism] (Prague, CsSzAn, 1979), pp. 28-30; and V.V. Krevnevic: Avtomatizácija v szocialiszticsezskom obsesztve kak uszlovije provüsenyija szogyerzsatyelnosztyi truda i udovletvorenosztyi trudom [Automation as a tool for enrichment of the content of industrial work in Socialist Society], *ibid.*, p. 54.

¹⁵ J. Auerhan: Technika, kvalificace, vzdelani [Technology, qualifications and education] (Prague, Czechoslovak Academy of Sciences, 1965). p. 147.

¹⁶ C.R. Walker: "Changing character of human work under the impact of the technological change", in United States, National Commission on Technology, Automation and Economic Progress: Technology and the American Economy, Vol. II (Washington, 1966), pp. 293-315; H. Braverman: Labor and monopoly capitalism: The degradation of work in the twentieth century (New York, Monthly Review Press, 1974).

¹⁷ M. Freyssenet: Le processus de déqualification-surqualification de la force de travail: Elements pour une problématique de l'évolution des rapports sociaux (Paris, Centre de Sociologie Urbaine, 1974).

¹⁸ In connection with this, attention must be drawn to the fact that the character of production activities and job organisation created objectively a co-operative type of work relationship in the motor industry. Following the logic of this kind of organisation, the jobs performed here would have required a wage system based on group work or time. In contrast to this, the need to draw on effectual and organisation reserves - at least temporarily - led to wages based on individual work performance. This phenomenon also shows that company management may select from several alternatives when choosing or introducing a wage system.

¹⁹ L. Levin: "Effects of technological changes on the content of semi-skilled machine operators' jobs", in OECD: Manpower aspects of automation and technical change (Paris, 1966), p. 48.

²⁰ In connection with this, we should like to mention the widely held view that with the development of technology (e.g. appearance of automated transfer lines in automotive industry), healthy and safe working conditions will "automatically" increase. According to experts dealing with automation and the protection of the worker, there is no positive relationship between them. Admitting the fact that automation decreases certain kinds of physical strain (e.g. lifting, carrying, etc.), at the same time it increases other types of work strain (e.g. higher level of attention and greater proportion of routine jobs).

The new technological processes have an important impact on occupational diseases as well. In the past ten years in Hungary, the proportion of such occupational diseases as skin disorders, lead or mercury poisoning has decreased. On the other hand, the proportion of people falling ill due to harmful vibration and noise, and those suffering from occupational infections, has greatly increased. For a more detailed analysis see National Council of Trade Unions, Labour Safety Department: A munkavédelmi helyzet alakulása a számok és tények tükrében, 1966-77 között [Development of the protection of the worker as reflected in statistics between 1966 and 1977] (Budapest, 1977); and Gyorgy Horváth: Automatizáció és munkavédelem [Automation and labour safety] (Budapest, National Council of Trade Unions, Scientific Research Institute of Labour Safety, 1975; mimeographed).

²¹ One must, however, also realise that the character of "compulsion" of work activity cannot be exclusively explained by the nature and peculiarities of the work process. It can develop as a result of factors which are outside work activities, such as the irregular supply of

materials and tools, methods of leadership and other disturbances (e.g. lack of time because of stoppages of machines caused by irregular and poor quality maintenance).

²² F. Charvat et al.: The worker in the progress of changing technology, Czechoslovak National Report (Prague, Institute of Philosophy and Sociology, 1977), p. 17; F. Adler et al.: Scientific and technological progress and social activity, National Research Report (Berlin, Academy of Social Sciences, Institute of Sociology, 1976), p. 52.

²³ In connection with this, we would like to mention that according to the findings of sociological surveys dealing with managers' needs, pay is also at the top of the list. See István Kemény and Ottilia Solt: A vezetői magatartások szociológiai vizsgálata [A sociological survey of managers' attitudes] (Budapest, Gazdaságkutató Intézet, 1973); (mimeographed); and Teréz Laky: Erdekviszonyok a vállalati döntésekben [Relations of interests in company decisions] (Budapest, Közgazdasági és Jogi Könyvkiadó, 1977), p. 98.

²⁴ The so-called "compensational" and "segmentational" interpretations are worth mentioning in connection with job performance and activities besides work. According to the supporters of the compensational view, workers who are discontented in the course of job performance try to find compensation in outside activities - for instance, they take on a greater role in family life and political activities. In support of this, the representatives of the segmentational view emphasise that the different fields of human activities - job, family life, political activities, etc. - result in different and autonomous attitudes, which are more or less independent from one another.

²⁵ Csaba Makó: "Une expérience d'enrichissement du travail dans l'industrie hongroise", in Sociologie du travail, 1980, No. 4, pp. 390-407.

²⁶ In the course of enrichment and enlargement of work tasks, the so-called "abrasion" effect appears. The increased opportunities for making decisions and the positive effects of responsibility given to workers in order to increase efficiency "become worn out" in a few years. A further decentralisation of responsibility is necessary to maintain the efficiency that company management considers desirable. See J.R. Maher (ed.): New perspectives in job enrichment (New York, Van Nostrand-Reinhold, 1971).