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work

vol.25/#4

Celebrating 25 Years of work

human's work tomorrow

25 Years: Looking Back and Forward

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Guide for the *fast reader*

This issue of work is dedicated to it's 25th anniversary under the title "*hu*mans work tomorrow", so you will find that most articles are in fact contributions to this theme.

The first article, "at the turning point" (p. 5), analyzes today's economical situation and gives advice on how current problems could probably be solved in the near future. In this expert comment you will also find an overview on new group based organisationforms like Intrapreneurial Groups (see also p. 14 and 44) , study circles (see also p. 18), peer groups (see also p. 21) and workers' health assurance groups.

To look in to the future you also have to look into the past. On p.10 you can find a reprint of an exceptional analysis of 1995 employment situation from the first issue of work. Read it carefully, and you can find striving parallels with todays situation.

The *close view* of this issue takes a look at Intrapreneurial Groups at Opteam. work visited this recently founded R&D center and describes their implementation of this collaborative approach. An in-depth theoretical analysis of Intrapreneurial Groups and their framework can be found at p.14.

Starting at p. 21 is an interview with Carol Change about peer care, an amazing social caretaking mechanism that became quite popular lately.

The major part of this issue, however, is dedicated to "parallel worlds" (p. 25-43), a six-scenario fictional writing about possible development of work organisation, feminisation of work, and culture.

In the essay "Working towards the noosphere" we try to get a grasp on history and future of work from a philosophical point of view (p. 49).

Because it kind of fits into "*hu*man's work tomorrow", we also decided to print a letter from A. Mehrmann as a comment to current development in military organization. See p. 56.

Last but not least you can, as usual, find News from Science and Technologies at p.57.

As always, let us thank the sponsor of this issue, Barningtons, who's insert can be found at p.14.

Enjoy reading.

letters to work

Digital Workspace

I just received my work vol. 25/#3 yesterday and was curious about some of the ideas set forth in your cover story ("Towards the Digital Workplace - a Flashlight on Current Development").

Even though the golden age of the digital revolution is over, it seems that many of its promises are still not fulfilled. As thearticle shows, the digital worplace was probably just another of those phrases that were used to sell machines, not solutions.

Fred Lacomte,
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Conspiracy of Heretics

Would someone please ask the author of "Conspiracy of Heretics" (work vol. 25/#1, page 34) to get up off his knees and wash what must be a very bad taste from his mouth? The tone of this article goes beyond sycopatntic and enters the realm of the pathetic. This kind of worshipful self-promotion is too much for even my hardened sensibilities to endure.

As I drew toward the end of this *amazingly* uncritical article, the most *amazing* thing I noticed how really *amazing* everything about GBN seems to be to the starry-eyed author. Nothing seems to inspire so much awe in this man as the fact that this "conspiracy of heretics" has been of service to Really Important People doing Really Important Things. Tell me, for every valuable scenario they concocted, how many wound up in the recycling bin? Surely Garreau doesn't mean to imply that they have a perfect success rate, although one would be hard-pressed to determine otherwise given the information presented here.

The biggest laugh in the whole mess comes in the final few paragraphs, in which the author compares being "chosen" by GBM to being selected for a Mike Cooley Foundation "genius" grant. Better not show him this letter. The bigger the bubble, the louder the pop.

Leicter Francis,
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Learning by Doing

In the article "Learning by Doing" (work vol. 25/#2, page 51) the author sonuds like a man who had a rough time with - indeed a real hatred for - the social sciences when he was a kid. I do agree, for once, with him that learning involves passion and that a child's intellect must be stretched with creative pursuits as much as possible. But hecan't be serious when he intimates that facts aren't important for them to know.

He states, "Most Japanese children do not know the difference between the Baltics and the Balkan. So what!?" So what??! I found it ironic that he should pick those two regions, countries which largely disapperared as distinct entities from the world map for the better part of the 20th century and which are back today with a vengeance. It would certainly behoove a child to look at a map from 1905 as compared to one from 1995 and a current one and see that for the price of two world wars (the first started in the Balkans and the second gobbled up the Baltics), a cold war, several smaller hot ones, several totalitarian regimes, and many tens of millions of dead in the intervening century, European boundaries haven't changed very much. But what does the author see as the alternative to requiring children to remember names like Verdun, Stalingrad, Da Nang, Buchenwald, Selma, Sarajevo, Novi Sad and their corresponding dates and geographical locations, to serve as a reference of what not to do when the times are handed over to them? What will the coming generations do without being taught the facts to learn and live by? Repeat all our stupid mistakes because learning by doing was more fund and what went on before was deemed irrelevant or too much bother to learn? Perhaps they'll simply get bored with society and create a virtual paradise on a computer with newly designed frogs to inhabit it.

The Visigoths are back. They've been called Technocrats yesterday. Today we call them Mediamonks. God help us if the batteries run out and the power goes off.

Elizabeth Frost
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Safety

The scenes described in "The safe place to work" in work vol. 25/#2 (page 18) are, to put it short, mostly fascinating, but partly cynical. Of course personal security is one of the major problems for almost everybody with a good job, but describing the solution in a better fence and some guards around the company, like in "Solution #4" is certainly the wrong way. Perhaps a view like that is even what brought us into the current, terrifying situation, and it would be a better way to promote new and innovative forms of cooperation like peer care or social fraternity groups.

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Fighting the Dark Side *of the Market:* At the Turning Point

The sober diagnosis for Europe, 2020, in a word: A wealthy but shaken giant. An abundance of money in the elegant and luxurious metropolitan centers, surrounded by the ugly faces of misery and crime. Twenty years after the millennium, the paradise promised by eloquent politicians has not yet arrived. How has it come to this? Why can the wealthiest region of the world not rid itself of poverty and unemployment? Can anything be done to resolve the roiling conflicts now prevailing?

Let us look closer. Over the last 25 years, three factors led to the doubling of labor productivity, and thus of available wealth: more efficient technologies within individual firms; increased electronically mediated communication between them; and accompanying organizational changes. EDI (Electronic Data Interchange), CSCW (Computer-Supported Cooperative Work), and to some extent TC (Tele-Conferencing) have become common methods to overcome differences in space and

time. Euronet, the European broadband electronic network, connects more than 95 percent of the enterprises and about two-thirds of the homes. Human resources are mobilized and integrated into a worldwide network of production and distribution - from nearly every point of the earth - whenever they are needed. And this is the crucial point. The demand for workers in relation to supply is met only by chance. And here the dark side of the market appears. The competitive striving for increased market share and higher profits, for new products and production processes, split the enterprises and their workers and employees into winners and losers. Although labor productivity rises, and the efficiency of production is increased, by the very process the number of redundant individuals is also growing. Although growth is flourishing, wealth produced is not available to all to more or less the same extent. Well paid and long-lasting jobs have become increasingly scarce. Those who still have jobs must work harder and harder, while a growing fraction of the population is forced to enjoy leisure time.

In our Europe of 2020, the situation has become even worse than in the other two regions of the „Triad", NAFTA and the Far East. The opening of the former socialist countries resulted in a tremendously increased cheap labor supply in the immediate neighborhood of the high-wage economies of Western Europe. More and more jobs in the West have been moved to the East, and for the remaining ones in the West wages and salaries have been eroded through the pressure of competition. Although these events could be evaluated positively from a theoretical point of view of social equality (to even out disparities inside Europe), the trend towards convergence of wages has not been evaluated positively by government or labor of the rich countries. Unemployment has become high everywhere, although it should have been lower for demographic reasons. Every cyclical economic crisis has added to the level of unemployed. Any increase in unemployment has produced the next crisis. Thus an awkward vicious circle has arisen. The result: about one third of the labor force in Europe is now without jobs.

The demise of the socialist bloc not only had effects on the economy and politics. An additional consequence could be seen in the level of social commitment: the erosion of holistic views, and the rejection of responsibility for all members of society by individuals, groups, political parties, and all other social institutions. After the Second World War, Western Europe was facing young socialist states at its Eastern border. As a defense strategy against communism, efforts were made to try to control the dark side of capitalism: the welfare state was invented. The walls constructed by the communists could not only be used for political propaganda against them; in fact the iron curtain had a beneficial effect on the Western economies, for the workers in particular. To a large extent, they were shielded from the poor masses of the East and their competitive power on the labor market. The wage level rose considerably, and social security systems boomed. In the nineties, when the socialist countries had disappeared, the only force remaining to control and to shape the economy was the market. The religious communities, traditionally in favor of cooperation, struggled hard for change, but their influence was limited to the inside of the churches or temples. In the streets, „catch as catch can" became the terrorist rule.

The frustration and despair of the outcasts grew as much as did the economy between the down-swings. After violence was experienced in the capitals of the US, it infected Europe's cities as well. Theft and murder, drugs and sects spread everywhere. The Third World knocked at the doors of Europe, but the European Union remained silent in the face of the demands of the people located in Eastern and Southern regions. The police and armed forces represented virtually the only sectors with growing employment. Right wing parties came into power, with the promise of right and order, but they soon failed when it become evident that they, too, could not solve the chronic crises within society. At some places, pogroms and massacres broke out. The scape-goats now: Africans, Roma, Sinti, or other common people with dark skin. It seemed to be a repetition of the Third Reich, but it was no;: the dreadful activities were opposed by governments, but could not be stopped by them. Through spontaneous actions of violence, the killing continued. The wealthy part of the population carried weapons or hired body-guards; the houses of the rich changed into armed fortresses. Telecommunication became more important than ever. Many people did not dare to attend meetings in the evening, so they organized tele-conferences to communicate without fear. Physical access to the working place became dangerous because mafia-like structures and organized crime spread everywhere, in particular from the poorest countries, the former states of the Soviet Union and Northern Africa. The situation was also aggravated by the state of the environment. The depletion of the ozone layer, the demise of the forests, the high emission rates of toxic substances into the air, polluted rivers and lakes, and oil-covered beaches made it increasingly unpleasant to stay outside. Many flats were supplied with filtering devices which produced clean air inside the rooms.

In our Europe of 2020, the situation has become even worse than in the other two regions of the "Triad", NAFTA and the Far East.

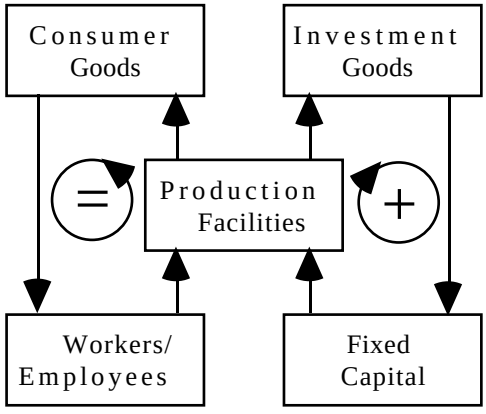
People did not leave their homes unless they had to. Tele-shopping became necessary, tele-work the rule.

It was at this time that intellectuals began to analyze the social and economic situation in Europe. In addition to others, they could go back to scholarly works initiated by Futuroscope, a French futuristic park, located near Poitiers, France, in 1995. They sought a rational explanation of the difficulties. Their controversial result: the origin of the crisis was not located outside, but lay in the intrinsic structure of the economy. While markets can be instruments of democracy and peace under the condition of equal factor endowment, the production system based on private property is not compatible with democratic behavior and equal rights. Firms represent a hierarchical and unequal system, derived from the property rights of the owner. Workers do not offer their services in a voluntary way, but on an obligatory basis. Although the labor market is no longer a system where personal pressure is exerted by its predecessors slavery and feudalism, it still lacks voluntary and participatory elements important for a functioning democracy. While the economic system produces innovations and is able to increase labor productivity and efficiency of production to a breath-taking extent (within the framework of given prices), at the same moment it systematically produces and reproduces inequality by its very structure.

The graph to the right shows two basic loops of value-circulation in capitalistic economies. The left one represents the (re-) production of the workers, offering their services - in exchange for wages - to the enterprises. With their wages they are able to buy their everyday needs. The wage level depends on the general level of technology and the political bargaining process. Of course wages may rise or fall, but the main process is a (re-)productive one and is performed more or less on the same level. The other loop on the right hand side represents the accumulation of capital by private or public firms. Entrepreneurs and their shareholders become more wealthy by a completely different mechanism: they are able to accumulate wealth of a different kind (machinery, buildings, financial assets etc.), which remains their property. Consumption to them is not their essential activity. To put it in mathematical terms: the right loop represents an integral operation, the left just a multiplication by a factor of about 1, depending on the situation of political power, economic growth or decline.

Such being the general situation, what concepts were created by intellectuals in those days? They could see that classical approaches, implemented by the crown, later by political parties and religious bodies, had all failed. As history has shown to most of us, and finally to the intellectuals as well, the traditional slogans which accompanied the revolutions of the 20th century, such as „expropriate the exploiters", were no longer valid. Instead of the antagonistic policy of the socialist revolutionaries of the past, some intellectuals now looked for a different approach. To them it seemed no longer useful to struggle for power for only one social group, and to annihilate opponents, because this could be the reason for self-elimination in this highly interdependent society, and they looked for a cobweb of institutions which would be able to tame the dark features of capitalism in a new way. What could the new subjects be to achieve this goal? How should they be defined? As the classical subject of history in Marxian writings, the working class, had been dismantled by fractionating workers into too many different jobs, qualifications and payment, the new subjects had to be of a smaller size. Smaller groups should replace social classes or other institutions representative of traditional society. They had to be installed on a legal basis, should take care of their members first, but eventually could be linked to other groups or outside persons, encouraged by certain material and psychological incentives. Egotism should be limited, the individuals should work and live in a social arrangement that prevents them from being too selfish on the one hand, and should promote altruism on the other, by offering rewards for cooperative behavior. The increasing coldness of a technologically integrated society should be warmed by bringing people closer. This integration could not be achieved by technology alone, they declared, but through social constructions which could serve as a vehicle to increase collaboration, to strengthen the ability for self-determination, to exert democratic rights on a group level, to be able to control ones own social, economic, qualification and health-status level.

The above goals and results of a changed „gestalt" of society should not remain abstract, but had to be



The two basic loops of value-circulation in a capitalist economy

experienced personally, by each member of society, in an appropriate manner. Thus the size of the groups should not be too large.

The most radical of the intellectuals involved in concepts for a changed social structure demanded the complete transformation of the traditional bodies of parlamentarianism through a different principle of delegation. No longer should political parties fill the Houses of Parliament, but delegates of the new groups. They should be able not only to discuss new laws, but to decide on them as well. Their principle was to increase the direct influence and power of the affected on their social framework and on the overall rules of the social game. The more moderate ones allowed for an interim phase of competition between the new institutions and the traditional ones, but as well they believed in the overwhelming victory of the group-society.

Different kinds of groups with specialized working organizations were focused; partly they could be found in past experience, partly they were invented anew. The groups were to counterbalance the traditional social institutions, and transform them to achieve more favorable effects. To overcome the need for more democratic structures at the workplace, so called Intrapreneurial Groups were created. As a side-effect they could eventually create new jobs, with a wealth of very different profiles, time-structures, and qualifications. To make the bureaucratically ossified system of social security more humane and more flexible, Peer Group Care was invented. Small groups of singles, couples, with or without children, should take care of a few invalid, impaired, unemployed persons. They should be promoted by state empowering institutions, and by some material incentive. Study Circles, deeply rooted in the paradigm of self-organization, should carry out the task of permanent learning. This should be done not by a one-way teaching setup, but by groups with but little hierarchy, and by a continuous shift of the teaching and learning role from one member to the other. The predecessors of study circles go back to the Protestant bible studying circles of Scandinavia in the 19th century, and are redefined now as secularized and democratic learning tools. Workers' Health Assurance Groups should improve the health status on the job by direct evaluation of the factors promoting and hindering good health and adequate social climate. These groups could combine their demands for better health with political action aimed at the provision of equipment more protective for health (as done by Italian trade unions in the last century). The following table summarizes the problems faced and the remedies proposed.
Following the enactment of legislation for new groups, over the last few years we have seen the establishment of such groups throughout the region.

The organizational structure of each group is very similar to the others. Membership in a particular group is voluntary, although sometimes there is a need to be a member in one of the groups (if people wish to earn money they must look for a traditional job or approach one of the Intrapreneurial Groups). The group leaders, called „coaches", are elected for a certain period, usually for several months. In some cases they have money or other material resources at their disposal. The group assembly is empowered to decide upon the use and distribution of these assets in periodic meetings.

Cultural Problem Area	Proposed Remedy
Alienation on the job	Intrapreneurial Group
Social insecurity	Peer Group Care
Information explosion	Study Circle
Occupational hazards	Workers' Health Assurance Group

New Group Scheme as a Remedy for Societal Problems

At the moment, there is public discussion on how to finance the exploding costs of social welfare in all public media, electronic networks, TV channels, the radio network, and the press. There are divergent opinions: the first one states that social security benefits should be reduced to a minimum, because every person who wants to work can do so without difficulty. It is argued that people are lazy by nature, they should try to get a job, and that they are themselves guilty if they cannot find one, thus they should not receive any public money at all. Social insurance, in particular unemployment insurance, should be canceled, and there would not be any need for financing. The somewhat more enlightened opposition has argued in a different way: because the economy does not supply enough jobs for everybody willing to work, the redundant individuals not having found a job should receive benefits from the state since it is the responsibility of the public hand to compensate the population for the malfunction of the economic system.

The opposition prefers to finance the existing social security system by a combination of progressive direct (in particular taxes on wages) and indirect (in particular value-added or turnover) taxes. The difficulty with this system is that tax rates have to be increased because of the rising government spending for social insurance benefits, and tax-evasion could become more common than before. On the other hand, the opposition says this system is more socially just than any other, because it would involve progressive taxation, and take most from the highest incomes. The traditional social security systems were usually based on tax receipts up to a fixed maximum amount, irrespective of the anount of income.

A third position goes beyond the traditional taxation system. It demands a high tax rate on environmental consumption, in particular on energy, special resources and materials (green tax), and the exemption of all direct taxes on wages and income. This would lower gross wages and thus the personnel costs to the firms. The proponents expect an increase in new jobs because material and energy would become comparatively more expensive than to hire a worker. Saving energy and natural resources would be an important side-effect. Capital investments would be driven in a more favorable direction. New, environmentally sound production and services with all their positive effects on the quality of life would outweigh traditional technologies. More jobs would be created, so that the amount required to finance the unemployed could be considerably reduced. If unem-

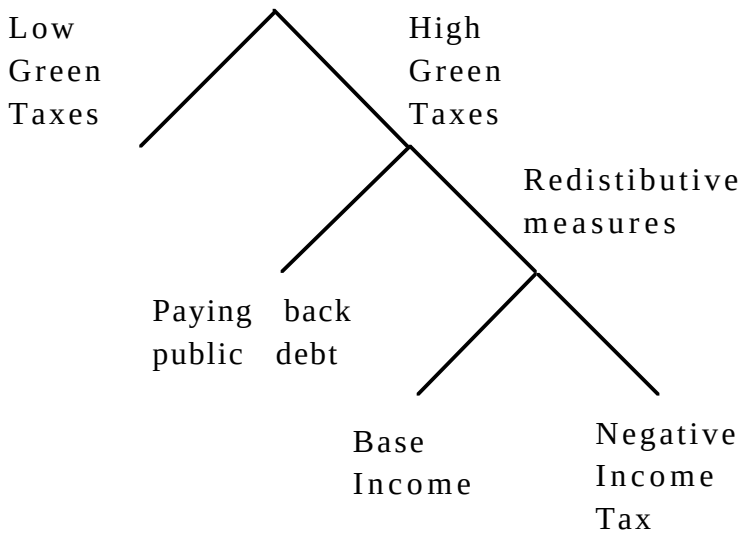
ployment went down, a number of additional favorable consequences would result: criminal rates would be reduced, a higher rate of marriages would occur, the health status would improve, and thus life-expectancy would increase on average, among other effects.

The relative weight of the first position is shrinking. The reason could be that more and more people feel it is not sufficient that the state merely leaves them alone and assumes no responsibility for providing a social infrastructure. This opinion is quite understandable at first glance for the large group of the unemployed. But there is a reason for the employed to adhere to this opinion as well: they increasingly fear violence and social disruption, as consequences of a growing mass of unemployed.

The main discussion goes on between the green tax position and the promoters of a traditional tax and social security system. Scientists and politicians write a lot of controversial articles at the moment, and letters to the editor are booming. But this is not the only frontline. Unfortunately for the green tax voters, they are split into two or more opposing groups: these differ as to the level of the tax rate required, and to what extent green taxes should be redistributed, as well as to whom. One group favors low green tax rates, just enough to compensate for the direct taxes which have just been canceled, and no redistribution; the other votes for high and permanently increasing rates. The funds generated by continuously increasing environmental tax rates could be spent in different ways over time. The initial use would be to finance unemployment insurance, and a next step could be to compensate for health care insurance, later on for contributions to social security, while a fourth use would be to compensate for direct taxes on employees (in the beginning, tax payments by firms for their employees would remain unchanged), and the last stage - a rather utopian proposal - could be its use for income redistribution. The latter could be done in two alternative or combined ways: first, by financing a base income for every citizen in the country; or, second, as an alternative, by combining it with a negative income tax (as proposed by the well known economist Milton Freedman in the middle of the last century, but only in respect of the contribution of the firm) on the poor. One of the main advantages of the base income approach is the increase in social security, and, perhaps, a reduction in the cost of administration. While the income distribution of wage earners would change only slightly, a fixed income would be assured for the lowest income groups. Thus, the overall distribution would become more equal than before. The traditional social security system could become „leaner".

A negative income tax would do somewhat more for redistribution. Higher wages would be more heavily taxed, and the negative tax would be added to smaller incomes. The problem with the negative tax is the higher amount of administrative overhead which must be financed by society as a whole.

In my opinion, the government should be very careful in any case in using the instrument of the tax rate. If green taxes and/or negative income taxes are introduced, the technique should be applied on an experimental basis first. The government should decide on tax rates by taking into account the number of unemployed. The higher the unemployment, the higher the green tax rates that should be set. The rationale behind this is to achieve a susbstantial change in relative prices. The price of labor should be lower, while the price of natural resources and energy should be increased. A reduction of unemployment can thus be expected. But I would remind you: unemployment will not become lower automatically. Institutions are needed to enable the unemployed to take advantage of the new jobs; programs for integration into the world of labor are necessary. I am optimistic that the recently initiated group scheme can have a positive impact in the struggle against unemployment. And, finally, it could be useful to bring into the discussion the traditional parameters again, such as the length of the working week and the length of the working life.



reprint from work *1/1 (1.4.1995)*

On the following pages you will find a reprint of the *expert comment* article from our first issue back in April 1995. While this seems quite a long time ago, this article still fascinates with a stunnigly clear analysis of the late 20th century. The literature may be a little outdated, but follow his thoughts and you will find that things haven't changed that much.

To give you an impression of 1995 when reading this reprint we reproduced the layout of work at that time. Unfortunately, the then used hyphenation rules are no longer availabe in our typesetting system, so we use the modern, more free system that is common today. Enjoy!

Structural Change in Employment

Franz Ofner

1 Statistical trends

In all industrialised countries (OECD countries) the share of the agrarian sector in employment has decreased to a level below ten per cent since the early 70s. The share of the secondary sector has been declining continuously for more than a decade while the tertiary sector has been increasing its employment share. This share accounts meanwhile for between 60 and 70 per cent in the more developed countries.

A similar trend is also true for a number of industrialising countries in South and East Asia (SEAcountries: Hong Kong, Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan, Thailand). Although in these countries the employment share of the agricultural sector is still relatively high (about 50 per cent) the share of the industrial sector, which increased until the early 1980s, has been declining since that time in favour of the service sector. Its share amounts to about 35 per cent.

In addition to the sectoral shifts, a change in employment structure can be observed within the industrial sector as well: there has been a decline in 'manufacturing' employment and an increase in service employment. As a consequence, many of these activities are supplied by independent firms and are therefore classed as belonging to the service sector. Taking the increase of service activities within the industrial sector into consideration, the shifts in employment can be better observed through the change in the occupational structure of employment.

Service activities represent an inhomogeneous field and it is not easy to find a common definition. A common feature is that they do not fit the job profiles in agriculture, extraction, manufacturing and construction. One way would be to use a functional classification, i.e. to relate the activities to the function which they have for their adressees. From this point of view we can distinguish distributive services, producer services, social services and personal services. One can obtain a lot of interesting information fromobserving the development of services in relation to long-term economic development. There has already been a considerable share of certain personal services in pre-industrial (agrarian) societies. Whilst distributive services (e.g. transportation, wholesale and retail trade) and producer services (banking, credit, insurance) already began to develop at an early stage of industrialization, it was not until the end of the Second World War that the growth of the service sector centered on research, information, education, medical and health services.

2 Reasons for structural change

In the following chapter the processes which give rise to changes in work and employment will be described in detail. For this purpose we use approaches developed by Joseph Schumpeter, Jean Fourastié and Daniel Bell. We shall add two important aspects: the internationalization of markets and competitive conditions; and the application of Information and Communication Technology (ICT) in processes related to production.

2.1 Market saturation

Market saturation, technological innovation and the reactions to these phenomena are central themes in the work of Schumpeter. He stresses their significance for the dynamics of the economic system. Fourastié notes the effects on employment caused by continuous productivity growth and market saturation. For Bell, research and science are the centre of economic and social development.

The central idea of the market saturation approach is that there are limits in the demand for consumer goods when a certain level of diffusion has been reached. As a consequence the diffusion process begins to stagnate. Firms can react to this phenomenon in different ways. Schumpeter stresses innovation. The best way to stimulate demand is to find a new key technology, which opens a large number of applications with new functions, satisfying new needs. The diffusion of such innovations is a process with cyclical characteristics. During the introduction phase the diffusion process is oftenslow and hesitant because of problems with investment requirements and risk appraisal. Usually a rapid growth phase follows as more and more firms exploit the new opportunities. They imitate existing products or develop new applications, and investment increases. This phase of rapid growth has a positive effect on employment. At some stage of the growth process, however, the opportunities of the technology are exhausted and market saturation is reached. The intensity of competition increases, profit margins erode, investment decreases, and cost pressure rises. Employment is reduced by rationalisation measures and productivity growth. Search for a new key technology starts again. This is the way Schumpeter interprets the Kondratieff cycles, which have a period of about 50 years. Economic disequilibrium and problems of structural adjustment are regular for two reasons: the innovations are not distributed evenly throughout the economy, and the possibility of their exploitation usually concentrates on several branches; and innovations have a cyclical character.

Following Schumpeter's approach, scientists stressed that the process of innovation is not confined to technology and the related technical components (plant and equipment, raw materials). All basic innovations (railways, electricity, the combustion engine, and the like) were accompanied by farreaching changes in society. Simultaneously with the technological innovations there was a change in organization and management systems, industrial relations, social structure, skill requirements, political systems, and culture in general.

There are also less radical modes to stimulate demand than the systematic search for innovations on the basis of a new technology. These modes relate to strategies that are aimed at improving traditional products or differing from compe-

titors (different models and versions of a product, special design, customer-oriented manufacturing and the like). In this way demand can be stimulated and enterprises can try to secure their market share or to increase it.

It is of great importance for the question of economic development and employment whether key innovations inducing growth effects are frequentlypossible or not. Chris Freeman and Luc Soete give an affirmative answer. At present they see such a technology in computer-aided ICT. They see the reason for the fact that ICT has not stimulated economic growth and employment so far in the lack of social institutions needed for successful development and diffusion of this new technology. To such an institutional framework belong: an education and training system; industrial relations; organization and management structures; combined private and public investments; and labour market policy measures. A 'mismatch' between institutional framework and the requirements for developing the technology and realizing its productivity advantages is a barrier for diffusion and causes stagnation.

One can agree with Freeman and Soete that a good match between technological paradigm and institutional framework is a necessary condition for development, but the authors do not prove on the empirical level that a mismatch exists. One could find other reasons, too. Often electronics either substitute for mechanical components and appliances (e.g. typewriter, calculator, telephone exchange facilities) or are additive components for traditional systems (e.g. machine tools, cars, household appliances, consumer electronics). A lot of new electronic appliances have indeed been developed, but the manufacturing process is both labour saving and capital saving. Additionally, the application of ICT does not need large investment sums for extracting and producing raw material or for developing a new infrastructure, as was the case with the investments required for railways, electricity supply, and vehicular traffic. The infrastructure necessary for ICT does not require a great deal of work because of the high technical level which has been reached at present. Existing infrastructure can often be used (e.g. a telephone network). The positive employment effects caused by ICT belong to the area of research and development. In contrast, ICT as a rationalisation measure results in a relatively large labour saving, not only in the area of manufacturing but also in the planning departments, offices, administration, banking, and insurance companies. Although ICT leads without doubt to structuralchange in employment, it is questionable whether laboursaving effects are compensated by the positive employment effects.

Jean Fourastié is rather critical of the view that economic growth can be constantly repeated by introducing new technologies. He claims an absolute limit in the demand for physical goods and interprets this limit in a positive sense as an opportunity for social development. Apart from the production of physical goods, a characteristic feature of the secondary sector is the production of technologies serving the purpose of enhancing productivity in both the primary and secondary sectors. Continous productivity growth has two effects: it causes in conjunction with saturation a permanent employment decrease in both sectors; and simultaneously productivity growth reduces the level of prices (or increases the level of real income). It is this second effect which stimulates the demand for personal services. According to Fourastié, the absence of saturation and impossibility of applying technology are characteristic features of services. This is the reason why the tertiary sector absorbs more and more employment and becomes the largest sector in the economy.

As the production of physical goods is limited, producer services and distributive services are limited as well. The real area of growth within the tertiary sector is therefore that of personal and social services (e.g. tourism, education, health, culture). This is the weak point of Fourastié's approach. The last 20 years show that the development of personal and social services has lost its dynamic. There is a major problem in financing the demand for these services. Some of the personal services (e.g. tourism, entertainment) are demanded directly by consumers, whilst for others (education, health) demand is instead stimulated indirectly via tax and contributions and is therefore accompanied by an expansion of welfare state benefits. Perhaps economic development has stabilized at a secondary sector share of 30 to 40 per cent.

This leads to another problem: the question whether technology is applicable to the field of service activities. As we see, ICT has become an important technology within the tertiary sector for processing data and information. This is relevant for all services. Fourastié published his book in1949 and conceded that his theory had to be revised if a new technology appeared which benefited planning activities and processes of thinking and communication.

Unlimited diffusion of activities could be imagined in the area of culture, the arts, and political participation in all areas influencing people's interests. However, the problem in financing these activities is even greater than it is in relation to social and personal services. It is not possible to measure their productivity and they cannot be economically organized. Therefore, an alternative mode for distributing national product and income had to be found to permit such a development.

Daniel Bell also places technological progress at the centre of his analysis, but he differs from Schumpeter in that he does not observe this development only as a cyclical process of inventing and exploiting key technologies. He argues that the innovation process changes its character and influences the social structure, politics and culture. The processes of inventing and innovating have been put on a scientific basis and this change leads to scientific treatment of the production process, technical development and the shaping of social relations. In consequence sciences, research, education and training, health services and government are growing fields of activities and new technologies are used more and more to plan economic and social processes (computer technology and scientifically based methods of analysis, e.g. simulation, system analysis, decision-making theory). The most important problems in this respect are the organisation of the scientific system, financing it and the subordination of science to the relevant political system. Scientists and qualified engineers, being involved in economic and political decision-making, form a new social class as opposed to the class of people excluded from these activities. One can agree with Bell that the sciences as the central element of economic and social development form an important characteristic feature of industrialized societies. However, his approach does not take into consideration that the global information systems and mass media influence political consciousness and thought. Altogether, we have a picture of social development consisting of the following elements: key innovations; market saturation for physical goods and productivity growth in all economic sectors; and the increasing importance of sciences, research, and social planning. However, we should be skeptical of Bell's and Schumpeter's optimistic view that key innovations can regularly be exploitated in such a way that employment is stimulated. We also have good reasons for being skep-

tical of Fourastié's assumption that there are no limits or problems for an increase in social and personal services.

2.2 International trade and employment

A new strategy of competition which could be called 'competition by innovation' pushes traditional strategies into the background, once existing technologies have reached the stage of market saturation. As the limit of saturation depends to a certain degree on the level of real income (price elasticity), cost reduction of production may reduce the level of prices and stimulate demand. Cost reduction can be achieved by rationalisation measures (organisational and technical improvements). These possibilities are, however, exhausted since mass production has been introduced in traditional industries (Fordism).

An option which has become more and more popular in recent years consists of shifting certain areas of production activities to low-wage countries. The possibility of relocation depends on the technical level required for the production process and on the level of skills available in low-wage countries. The areas of the production process requiring a high technical level (research and development, technical planning) and the economic decisionmaking process remain in the highly industrial countries. Since the collapse of the socialist system a number of additional countries in Eastern Europe were added to the list of countries for relocation purposes. These countries, and also many so-called industrialising countries in South and East Asia (Hong-Kong, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, and recently China) have an industrial infrastructure that is more or less well developed, have a relatively high level of human capital andare enhancing their international competitiveness, in particular with regard to medium- and low-wage goods.

Freeman and Soete have shown in detail that these industrialising countries are becoming an autonomous force and do not only serve as a place for relocating by firms of industrialized countries. Competition with these countries has increased continuously over the last years, and their economic development indicators (growth of production, productivity and employment) have significantly exceeded those of all industrialised countries since the middle of the 70s. Exports from this group of countries have risen by 300 per cent in the 80s, productivity levels have come close to those of industrialised countries, whilst wages have stagnated. This is the reason why the pressure on industrialised countries continues to lead to the relocation of areas of industrial production to industrialising countries. Freeman and Soete calculate a so-called delocation pressure index by comparing the ratios of labour costs and labour productivity. The result is that in the period between 1975 and 1990 the pressure to relocate production processes to SEA countries has risen by about 50 per cent for Japan, 100 per cent for the USA, and 200 percent for the EU. The extent of relocation has also increased between the European countries during the last decade - within the European Community from highwage to low-wage countries, and since 1990 to the Eastern European countries as well. This shift has been accompanied by the development of global groups of companies and deregulation of international capital flows.

Freeman and Soete stress that ICT makes certain services tradable. Traditionally, a close connection between producer and consumer is a characteristic feature for many service activities, whilst ICT separates production and consumption. ICT enables the producer to store, gather, process, sort, and distribute very different kinds of data. In addition it cuts down geographical distances and storage permits the use of information in the future as well. These opposing processes (separation of production and consumption, shortening of geographical distances) are the reason for the relatively recent phenomenon that service activities are being relocated to industrialising countries (programming, simple clerical functions, reservation and booking). Market saturation influences many firms to enlarge the markets for their products and to enter into strategic alliances with other companies. This process is promoted by establishing regional trade blocs, accompanied by direct foreign investment in these blocs (EU, Pacific basin area, American trade bloc). Increasing expenditure on research and development as well as on modern plant and equipment creates the necessary conditions for enlarging the markets in order to, at least, maintain the volume of production and sales.

2.3 Application of ICT in the production process

ICT is increasingly being imployed in the production process for different reasons. Administration and office work have been neglected until now as areas for rationalisation measures. Computer-aided ICT changes the situation radically and makes enhancement of productivity possible. An additional field for application of ICT is rationalisation of manufacturing in a traditional sense. Here, however, the possibilities are almost exhausted. Nevertheless, ICT opens new opportunities in the fields of designing and drawing, planning, coordination and organisation. These include planning the process of manufacturing, control of raw material flows, supplying of intermediary products and holding them in store. In this way, the traditional rationalisation process (enhancement of labour productivity and saving of expense) can be continued. In addition, ICT helps to cope with the enormous number of tasks resulting from the growth of international trade and resulting from the process of 'competition by innovation' (developing new products, improving traditional products, manufacturing different models and versions of a particular product, special design, customer-oriented manufacturing).

The possibilities for applying ICT in the large area of services has been mentioned above. This technology is of a reflexive character: there is a trend to automate the processes of encoding and testing software; user-friendly and standardized software packages can be modified by everybody; and objectoriented procedures simplify and speed up programming activities. The implemention of user-oriented networks creates new opportunities for workorganisation, e.g. geographical distances are no longer a barrier to cooperation.

3 Summary account of changes in work activities and employment structure

In the following passage the impact of changes mentioned above on work activities and the demand for skills and qualifications will be briefly described.

Searches for innovations and 'competition by innovation' cause an increase of activities in the area of research and development. The process of introducing new and modified products, manufacturing different models and versions of a particular product and costumer-oriented manufacturing increase the volume of work in the areas of designing, planning of manufacturing process, logistics and coordination of the production process as a whole. Therefore the shift to 'competition by innovation' causes an increase of activities

requiring technicians, engineers and business managers for organisation.

Similar trends are caused by application of computer-aided ICT. It not only gives rise to displacement of labour by machinery, but leads also to a generation of activities of new kinds, so-called automation-specific activities. These activities comprise development of software and programming, maintenance, which is of great importance for the ability to function and, finally, activities which serve to pre-plan the complete production process in detail, technically and with regard to organisation. Simultaneously, the automation process displaces a large number of activities to machinery. This displacement concerns so-called routine activities such as handling and transporting workpieces, assembling as well as typing, sorting, searching, and processing data.

As a consequence of internationalisation of markets, areas of activities are growing that are related to business management (marketing, competition strategies, cooperation, strategic alliances). Increasing pressure on international division of labour, trade with final and intermediate products and relocation of plants causes an increase in activities related to coordinating theproduction process with regard to time, space and technical requirements. Legal matters and problems concerning foreign languages and cultures are added to the list of management tasks. The process of relocation itself particularly affects activities in the areas of manufacturing and assembling of a rather low skill-level as well as, recently, activities in offices and software departments. Many of these activities are relocated to industrialising countries which have a relatively high level of human capital.

The figure below summarises the different effects of economic and technical development on the employment structure. This picture is relevant to highly industrialised countries only. One can see that, altogether, there is a shift away from un- and low-skilled workers and a trend towards an increasing proportion of medium- and highly-skilled employees including “information workers”, technicians, engineers, business managers, and experts on organisation.

This is, however, not the complete result; it is only the outcome of the first run. Further shifts, although only a consequence of this first change in employment itself, are not inconsiderable in respect of quantity. These shifts affect the education and training system. On the one hand occupations requiring higher education and training intensities gain share; on the other the permanent economic, technical and social development creates a high demand for training measures for employees in order to accommodate and specialise their knowledge and skills. Thus, the changes in occupational structure of employment require an increasing volume of education and training activities and this increasing volume contributes its share to the change in the occupational structure. Furthermore, one can conclude that the general higher level of education will stimulate the consumption of cultural and artistic products and that these areas of activities will increase. However, at this stage the influence of socio-economic development ends. Fresh impetus can be given only beyond the economic sphere by a development of the cultural system itself.

Figure: Changes in Employment Structure

reason	**areas of increasing activity**	**areas of decreasing activity**
competition by innovation	research and development designing work planning production planning logistics organisation	
computer-aided production	software development programming production control work planning adjusting of machines maintenance	loading and unloading machines handling work pieces assembling activities handling information
international trade	marketing insurance transportation translation legal regulations	
relocation in low wage countries	organisation and logistics transportation	manufacturing and assembling office activities programming

References

Bell, Daniel: *The Coming of Post-Industrial Society. A Venture in Social Forecasting.* Basic Books Inc., New York 1973.

Fourastié, Jean: *Die große Hoffnung des zwanzigsten Jahrhunderts.* Bund Verlag, Köln 1969.

Freeman, Chris/Soete, Luc: *Work for all or Mass Unemployment? Computerised Technical Change into the Twenty-first Century.* Pinter Publishers, London/New York 1994.

Gershuny, Jonathan I./Miles, Ian D.: *The New Service Economy: The Transformation of Employment in Industrial Societies*. Frances Pinter, London 1983.

Haywood, W.: CIM: *Revolution in Progress.* Proceedings of The Final IIASA Conference on Computer Integrated Manufacturing: “Technology, Organization and People in Transition”. International Institute for Applied Systems Analysis, Laxenburg 1990.

Schumpeter, Joseph: *Business Cycles: A Theoretical, Historical and Statistical Analysis.* Mc Graw Hill, New York 1939.

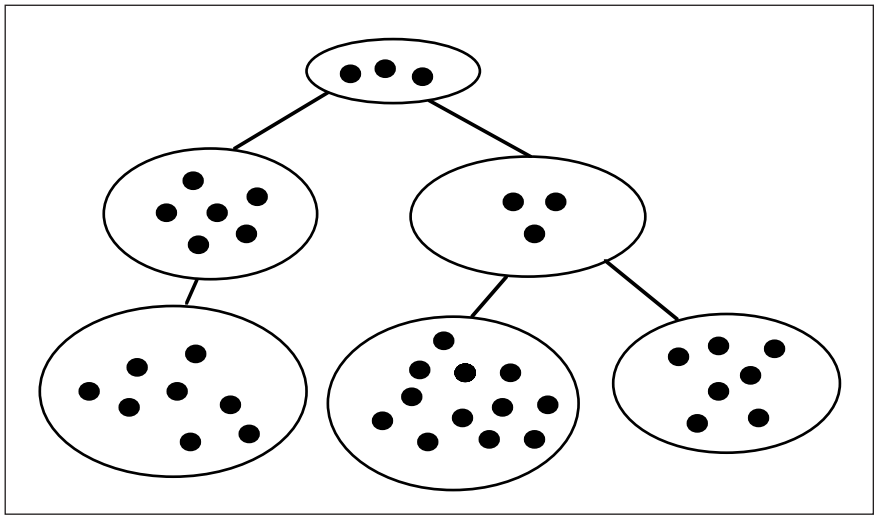
The *CLOSE VIEW*
A visit at Opteam“

On Tuesday morning at 9 o'clock we waited in front of the check-point of a large French car factory near Paris. We looked forward to a date with one of the most successful Intrapreneurial Groups called Opteam™. A very informally dressed young woman approached us, told us her name was Shirley, asked if we were the people from the journal „VirtualGuide”, and confirmed that she could offer any information we would like to have.

We were hungry to get some hands on experience with this new brand of collaborative work which is now imitated all over the country by more and more employees. The term „Intrapreneur” was coined some decades ago by Mr. John Naisbitt, who investigated important trends in the society to come. He expected the single employee to be converted into a self-employed person, a one-person enterprise. Three functions of entrepreneurship should be combined in this social innovation: the complete functional, legal, social, and financial responsibility for his/her economic decisions; the ownership of the tools and means of production; and the engagement in innovative activities for the market. While such intrapreneurial activity actually came into being, it was limited to certain branches only, and was not accepted by the majority of the employees. The exceptions were highly qualified, white-collar employees, like insurance agents, cameramen, or computer programmers. As the main objection against this kind of intrapreneurship, the unsolved problems in case of illness or inability to come to work were seen. Surprisingly enough, it was not the low sick-leave benefits, but the difficulty to continue production or provide services to the mother firm that were paramount. Apart from this, Intrapreneurs felt uneasy when dealing with complex decisions on their own.

The idea of the Intrapreneurial Group emerged in a rather natural way. It is a very simple concept: instead of having all the people working in the firm employed on a wage basis, some of them form groups which function as small-scale enterprises. It depends on the contract they have bargained with the management of the mother firm whether they use their own instruments, tools and machines or they offer their services by working with the machinery as property of the firm. In two respects the concept begins to overcome the traditional social structure of the enterprise: first, the hierarchy inside the firm is challenged; second, the status of employees as wage-earners is transformed.

The above figure shows the traditional structure. Each point in the graph represents a person being on the wage-list of the firm. Each of them belongs to a stratum within an echelon of the hierarchy of the firm. Highest ranks are drawn at the top, lowest at the bottom of the above figure.



The hierarchy of a traditional firm

Definition: Interpreneuring Group
A legally established collaborative group inside an enterprise which sells its services to others.

close view

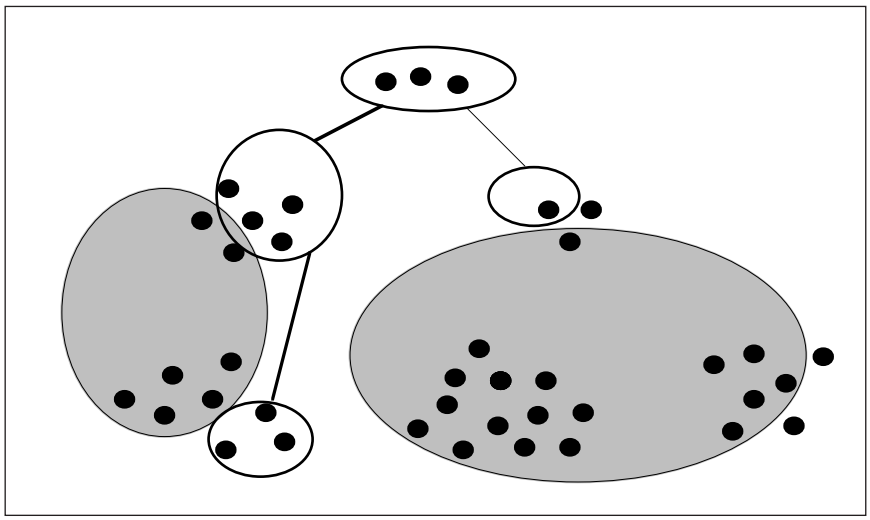
Intrapreneurial Groups

Intrapreneuring regroups the persons. While some of them (a minority in the figure below) still remain employed as before, the majority forms (in the figure below two) Intrapreneurial Groups, enterprises inside the enterprise.

The members of such a group offer certain services to their mother firm on a contractual basis. They form a special institution, an IG (Intrapreneurial Group). This means the group has legal capacity. As an economic subject, the group has the right of disposal of property; it may sell and buy whatever it wants to. The difference to the traditional firm is not only in size: in the founding phase the members share equal rights, although this may be changed later for different reasons on a voluntary basis.

After this introductory information let us come back to Shirley and to Opteam™ again. She said the day was busy, because of their high-quality work a second contract by another firm located in Japan had recently been offered. In their profession - car design - distance makes no real difference, she said. The problem was how and by whom the additional work should be done. They had to add new members to their cooperative, and they must be highly qualified.

We accompanied her to her working room. Cosy armchairs, no evidence of computers, a colorful carpet, and on three walls photos of natural structures under the microscope. The fourth wall was covered by a kind of LCD display, a huge screen. Three controllable TV cameras could look at any corner of the room. The most impressive feature was that the room was not empty. Nearly all the chairs were occupied by persons dressed like hippies. Shirley introduced them as „my team". A strange humming noise was in the air. One could see that each member of the team spoke in a low voice into a microphone he or she held in one hand. With the other hand they operated a keyboard positioned at the right arm of the chair.



A firm with Intrapreneurial Groups (shaded area)

The basic elements of a car - like a skeleton - were visible on the wall screen. Immediately the room became silent when a first version of an experimental design of the bodywork appeared on the wall, overlaying the skeleton of the car. The picture of the car's surface was divided into segments according to the mechanical fabrication of the parts. Several minutes passed without anyone speaking a word. Then - a skinheaded lad broke the silence. He addressed the back of the car by shouting „rear!" The color of the rear became more intensive than the rest of the car. The skinhead manipulated the keyboard and increased the shape of the rear. Flashing numbers on the right side of the screen showed the changed cost of fabrication, and the weight and amount of material needed. Most of the other people had objections to the new form and did not hold back their opinion but commented quite openly. A woman asked if she should try to redesign the prototype. Everybody seemed to agree. For a while we observed the interactive design process up to the moment when we saw a completely different shape came into being on screen. Very elegant, very professional, very speedy looking. The cost fell to a minimum, as well as the expected weight. One man in shirtsleeves said: „It looks fine. Now let's see its performance on the road." Some keystrokes later he produced a simulation of the car apparently going through a hilly landscape.

The members of such a group offer certain services to their mother firm on a contractual basis.

close view

Intrapreneurial Groups

Immediately the car became surrounded by a kind of aura. Shirley explained that now the air pressure near the surface of the car could be seen. „Excellent intuition," the sleevy man shouted in excitement. „We won 10 miles per hour in speed, or in other words, a reduction of fuel intake of about 10 percent. Congratulations! Shouldn't we offer her a bonus for this result? What do you think?" In the upper left corner a colored bar and some figures appeared. Maggie uttered a proud „Thank you, folks! Enough work for today", and left the room, triumphant.

Shirley explained: „This is our voting procedure. You see in this case there is an overwhelming majority of pros for the bonus to Maggie. This is easy and fast stuff. We do not always experience such unanimity. Very often the voting procedure is a starting point for discussions. After some minutes the voting is repeated, and usually we find a qualified majority. If not, our speaker tries to settle the conflict. In case he does not succeed he decides on his own. But you see he has to use this instrument very cautiously. It can easily happen that he will not be elected for the next three month period."

You will understand that we looked forward to know how the payment of the members of the group is handled. The answer by Shirley was disarming: „The right of each of us is to earn the average fraction of the net income of our IG. So we start like egalitarian groups during the French Revolution. But we have found that in many cases an equal share is not an optimal distribution of income. Times have changed. In the last century where manual work was the bulk of all the activities, labor time was the basis of the wage. Nowadays, we experience a much higher demand for good ideas, and for creativity, than in the past. Through automation within the last decades routine work was reduced considerably, and the importance of intuition grew. For that reason we tried to replace equal payment by other mechanisms. One possibility is to use evaluation procedures from outside. This method proved to be rather tedious and inefficient: you have to select a board of experts; you have to pay them; you have to evaluate the members of the IG in monthly intervals; and you have to keep the board informed on everything that has happened in the IG. Distorted reporting will come up soon, the members will not agree, and the like. So we started to use our own judgment on the performance of our colleagues. In the beginning, the self-assessment process was experienced as a piece of cruelty to each other, and people felt guilty in evaluating others, but more and more it became a gesture of generosity of the group to increase the income of one or the other of its members. In most of the events of change in income the process is used in an upward direction. People usually tend to reward extraordinary creativity, although at a first glance they reduce their own pay. But, in the long run, they saw their own income growing as well. If the turnover is increased by innovations that are accepted by the market, or production costs are saved, their individual share becomes higher."

"Reducing the payment occurs less frequently, and then in case of emergency only. If some members do not cooperate, if they repeatedly make mistakes, if they are not creative enough and do not even strive for creativity, if they are lazy or drunk, their payment is reduced. To make it difficult to exert power against weak members, a two-thirds majority rule is needed for a reduction in income, if the result will be below the average payment."

"The system of payment is really very flexible. If someone tends to work less hours than the full working week, it is possible, of course, if the majority does not oppose the demand. The payment will be adapted accordingly. The two-thirds majority rule applies for a complete exclusion of a member as well. Any introductory investment by the member will be paid back. Up to now we had only one case like this. One man was expelled because of sexual harassment. He went back to the mother firm, but could not regain his former position in management."

Another woman intervened: „You cannot imagine how relieved the group was after he quit. Now we meet him still at work, when we deliver our final product, but he does not have the power to command us any longer."

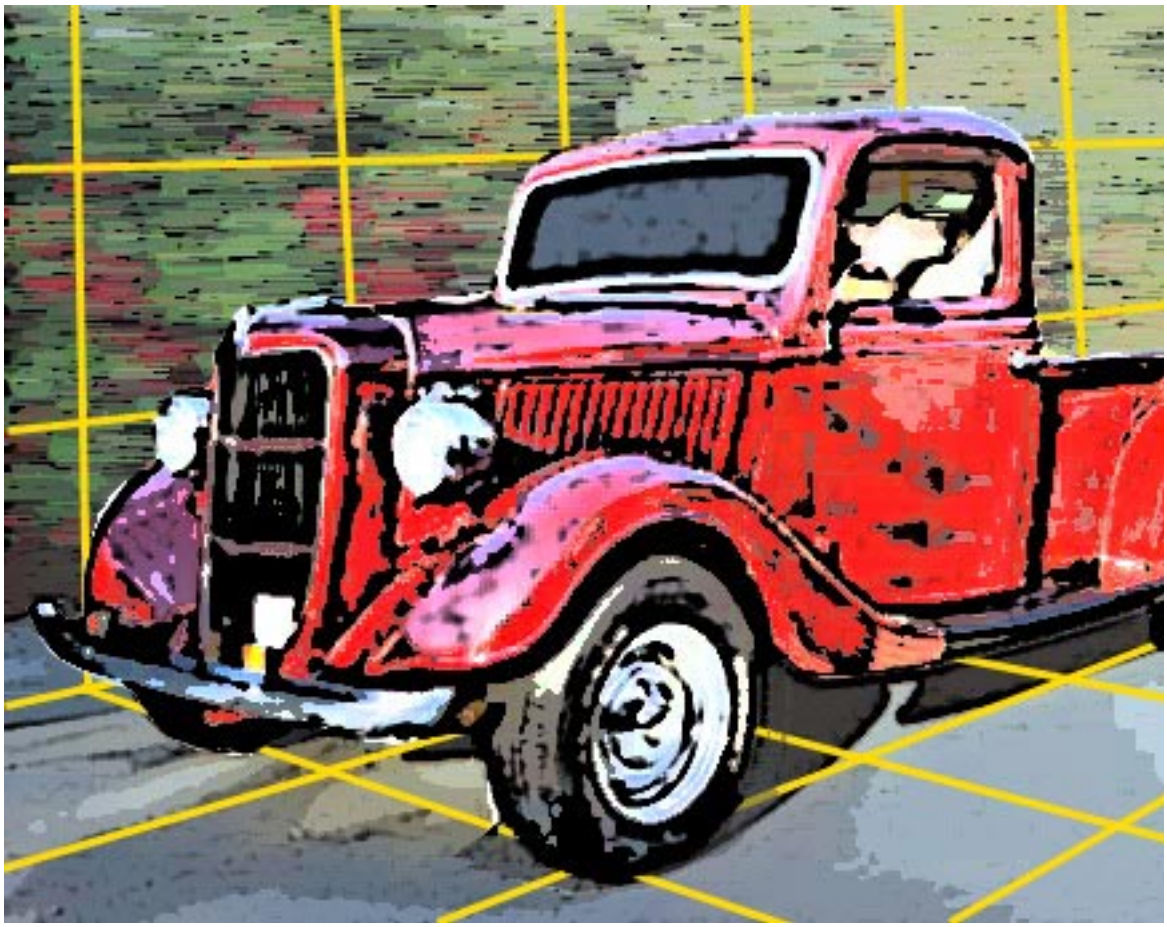
Shirley used her microphone, and in the upper right corner of the screen a window opened, evidently a video transmission. The camera next to Shirley showed a red light. On screen, the face of a bearded man became visible. We could not understand the conversation between Shirley and this man. She used ear-phones. After a short interaction, the man nodded and his picture disappeared.

"Through automation within the last decades routine work was reduced considerably, and the importance of intuition grew."

Shirley explained that she had asked another IG via visiphone to find qualified persons. He will place the ad in the „hiring" column of the World Wide Electronic Link and will test the persons who apply for the job. Not only professional skills are tested, but social competence as well. She said that within the few years of existence of IGs, on average the level of social competence has improved, because people can now interact and decide on their social situation themselves, and there is no authority above them to whom they are responsible other than their own IG.

„Although in the beginning of our IG we had the problem of how to handle individual demands for the number and timing of working hours, this we have gradually resolved. When the members of the group became acquainted with each other, and discovered the strong and weak points of any of the others, they started to reschedule the tasks of the IG in such a way that it became more and more independent of the hours worked individually. Everyone found their place were they could serve the overall goal in the best way. The result was excellent. The service to the mother firm was improved, and tasks were performed in less time than before. The Peer Care System played an important role in this improvement. The clients of some Peer Care Groups could be integrated into our overall activities and increased the efficiency and the working climate in a favorable way."

„Still," Shirley said, „we face the difficulty of the blindness of the market. If an economic depression occurs - and our economic system still is not able to prevent it - the social climate in the IGs comes under heavy stress. When the total income of the IG is shrinking, its members have to reduce their own payment as well."



Screenshot of Opteams Digital Design System. For reasons of copyright we were not allowed to print shots of their real work but only of some old-style truck especially used for such situations. It is shown here travelling at 120km/h, a speed it probably never would have reached.

"Fights between colleagues happen more often, a climate of competition takes place, and things are not always resolved in a desirable manner. I, for my person, think that in the future we should modify the system and reduce the influence of the market as an incentive for technical innovation."

(See our expert report on Intrapreneurial Groups. "A transaction analysis approach", in this volume!)

A corporative system of continuing vocational training

Continuing vocational training has greatly increased in importance over the last years because of permanent technical, organisational and economic changes. All interest groups and institutions stress its importance, and employers in particular complain constantly about a lack of qualified and skilled workers, although a great number of persons attend training courses year after year. Many of the trained persons, however, cannot find jobs that relate to the course they attended. There is a “mismatch” beween skills demanded by employers and qualifications produced in courses. Obviously, the two sides of the labour market cannot find each other.

An analysis of the continuing vocational training system shows that it is strongly segmented. There are three segments and the possibility to enter them depends on certain conditions:

• Intra-company segment: To enter into this segment participants have to be employees of the firm that finances and/or organises the training course. They are embedded in the career scheme of a firm and the training course serves their career advancement.The firm finances the course if there is a high level of certainty that the person concerned will stay in the firm; otherwise it would never realise its investment. Attending courses within this segment has proven very successful, i.e. trained persons can use their skills in appropriate positions.

• Segment of labour market administration: The labour offices organise (re)training courses for unemployed persons in order to enhance their opportunities to find jobs. The courses are financed by the labour offices; access to courses, however, is established by law: unemployment or a high risk of this are conditions for acceptance at such courses. As many studies show, these courses are not successful, and only a small proportion of the persons trained can find jobs.

• Free market: There are no institutional barriers to enter such courses. They are supplied by private agencies and the participants pay for them out oftheir own pocket. Participants are persons who would like to better their job situation for some reason, but are neither embedded in internal labour market structures nor satisfy the conditions of labour offices. These individuals try to find a better job, or to change their occupation, or to find a job after having interrupted their working life for one reason or another (e.g. bringing up children, illness over a prolonged period). Such courses are generally unsuccessful as well.

There are two major reasons why coordination between supply and demand does not work well in the area of further vocational training. Firstly, firms are only willing to invest in human capital of their own employees and rather distrust persons who have been unemployed over a prolonged period, are lowskilled, or who want to change their employer, their job or their field of activity. Secondly, firms tend to think nothing of courses taking place in the segment of labour market administration; they only regard those courses as useful and of good quality that they organise themselves or that have been organised by other firms.

To overcome the existing problems concerning both the needs of persons out of internal labour markets and the demand of firms for qualified and skilled employees, within the European Union a group of social scientists and representatives of employers, labour organisations and labour offices sat together and worked out a proposal for improving the system of continuing vocational training. As continuing vocational training within enterprises works well, the proposal is only related to the other two segments.

The basis of the proposal is a contractual approach. In accordance with this approach, social interactions are regarded as explicit or implicit promises given by individuals to each other to do something. Opportunism and bounded rationality on the one hand, and uncertainty arising from human behavior and changes in the external conditions on the other, hinder the keeping of promises. Therefore different measures have to be found in order to enforce promises and safeguard partners' interests. Institutions and organisations in particular can be regarded as such measures. .Institutions or organisations are of particular importance when one of the partners has to make a specific investment to fulfill the contract and specific information about the partner is necessary. In this case the former becomes dependent on the latter and should be protected from financial losses as well as exploitation. When specific information is required, the market is not a good institution to coordinate activities.

This approach is applicable to the case of continuing vocational training. In the case of training within the intra-company segment, all problems are solved. Normally, the firm organising training courses knows its needs in respect of skills as well as the type of courses required and it will select those employees whose skills and loyalty it has already come to know over a prolonged period (i.e. employees belonging

to the internal labour market). The firm can invest in human capital without risk and the employees trained are sure that their efforts will be compensated by career advancement.

Circumstances are quite different in the other segments. In both the segment of labour market administration and the free market there is a twosided information problem. Neither training agencies nor participants know sufficently well the demand of employers, therefore often training does not meet the needs of firms. The major problem in respect of information, however, is that employers are not familiar with training courses, their content and quality and have no opportunity to get to know participants over a prolonged period. Therefore employers shrink from hiring persons who have attended training courses in these segments. In the case of the segment of labour market administration, participants do not lose money if training courses are not successful, because labour offices bear the costs. Participants, however, become discouraged when their hopes are not fulfilled. In the case of the free market, there is a double disadvantage: participants themselves pay for the training.

The corporative model developed by the group of social scientists and representatives of employers, labour organisations and labour offices aims at reducing these problems. “Corporative” means that representives of all parties involved in continuing vocational training cooperate in order to improveinformation flow between parties and provide

the necessary safeguards. Employers, labour market administrations, labour organisations and training agencies enter into a contract comprising the following items:

- Employers report their demand for qualified workers to the labour offices. Computer-aided information technology enhances such procedures enormously;

- Training experts accepted by firms and training agencies develop courses that meet the needs reported by the employers. Courses can be held by agencies and firms;

- Labour offices pass on information about courses to interested persons.

- Firms and interested persons are given the opportunity to get to know each other and can enter into contract. Training participants work some hours each week in the firm. In the case of expensive training, labour offices provide financial assistance;

- Labour organisations are represented in the board together with the other interest groups and defend the interests of employees and participants; and

- The outcome of the activities is published each year. In this way all parties are encouraged to do their best and keep their promises because of the potential effects on their reputations.

Initial experience has shown that this new system of continuing vocational training worked many times better than the old one. The mismatch between further vocational training and trained employees could be reduced. Many individuals unemployed or unhappy about their jobs receive an opportunity to improve their career chances.

In 1995, we used this picture
to promote our umbrellas.

25 years later, we still use it.

This shows you
how much we value tradition.

Barnington Fine Umbrellas, London/New Delhi

Carol Change

Peer Care
an advantage for society?

work: *Ms. Change, today "Peer Care" celebrates its 3rd anniversary. How do you assess this newly designed constituent of social security?*

I think it is quite promising, although many problems remain unsolved. But I expect improvements over time through the intrinsic structure of Peer Care itself and its capacity for self-correction. You will agree that a period of three years is too short to observe the long-term effects of this innovative institution.

work: *What was the situation like when Peer Care was developed?*

During the late nineties, and at the beginning of the 3rd millennium in the developed world we experienced the erosion of basic human values like love, truthfulness, fairness, freedom, solidarity, tolerance, and responsibility. Although our politicians and the exponents of religious communities used them in each public statement, the gap between theory and everyday practice widened. Re-establishing the above or similar values was thought to be the utmost remedy against all the social illnesses of those days, but the actual situation worsened day by day. While on average the overall wealth on earth increased more or less continuously, access to it became increasingly distorted. This happened not only on a large scale, between the Third World and the rich capitalist centers, but within cities as well. The working week was reduced to 25 hours, but still unemployment increased, while alcohol, drugs, individual aggression and homelessness shaped the image of the cities. More and more people - although well off - showed symptoms of anxiety, and many of them became depressive. They felt increasingly uncertain about their future well-being, and anticipated a deterioration of environmental conditions, a higher risk for survival through the unconstrained growth of technology, and increasing dependency on it. But no-one was able to control the ways of application and the speed of diffusion.

Politicians in power were unable to find a way out of this misery. Their reputation declined steadily. The lack of political control motivated other institutions and groups to gain public influence. This was the hour of Mr. Kirk, the media-mogul. By means of his empire of TVchannels, information and news services, and electronic networks he began a media-war against the traditional political system. And what was the outcome? It was just pure chaos and complete disorganization. The general elections were boycotted. On a poll participation rate of less than 5 percent, no government was able to gain control again. For a while the administration continued to work, but public debt increased and made it impossible to provide public services.

work: *Who were the founders and how did they succeed?*

Against this background a small group of young employees, unemployed and students started an initiative to replace and restructure the social security system by a completely different approach. The members of the group had come to know each other within some "green" framework, and formed a grass-roots community to fight against environmental abuse. Their idea was the following: The social security system has become unable to deal with the growing needs of an increasing number of people. Although some financial means were redistributed to the clients of the system, there was no success in social integration. The elderly stayed lonely, and had a feeling of being redundant, for the unemployed life had lost its positive value. The efficiency of the system went down, and a lot of abuse was evident.

The group considered coherence of modern society to be difficult because of the growing individualism on the one hand, with its centrifugal tendencies, and the bureaucracies, exerting centripetal pressure, on the other. In such an arrangement the humane component must die. "Society has become colder" was a widespread feeling. To act in a successful way, neither the individual can be the starting point nor the state or other bureaucracies. The individual does not have enough power to be an efficient agent of change, and the bureaucracy cannot cope appropriately with the variety of actual problems of the individuals.

While in the past societies were structured in small groups, and the interaction of the members was based on direct communication as well on the physical and emotional closeness and a shared area of living, modern society with its millions of members cannot share their living in the traditional manner. They considered it necessary to create new forms of closeness, of familiarity, of neighborhood. This idea they applied to social security. They invented the "Social Peer Group".

work: *What is the size of a "Social Peer Group"?*

Some tens to fifty persons. Of course the group will

interview
Carol Change

“While in the past societies were structured in small groups, and the interaction of the members was based on direct communication as well on the physical and emotional closeness and a shared area of living, modern society with its millions of members cannot share their living in the traditional manner. They considered it necessary to create new forms of closeness, of familiarity, of neighborhood. This idea they applied to social security. They invented the *Social Peer Group*.”

only work satisfactorily on a volunteer basis. The group is responsible for a number of clients (one to five) needing social care. The number depends on the total number of people receiving (or better: needing) social aid.

work: *How is the Social Peer Group compensated for its work?*

There are two kinds of rewards: the financial and the psychological one. The financial reward is established by an exemption of social insurance contribution. If such a peer group wants to start its work, it has to apply to the still existing Social Security Board for an exemption. The only thing they need is the confirmed subscription of their clients.

The psychological compensation can be seen in the possibly increased contacts and engagement; it is offered by the care activity itself.

work: *Who are the clients?*

The clients are mainly unemployed and homeless, as far as they are able to take care of themselves, and - if the Peer Group can handle it - people who need home care to a certain extent.

work: *What is the advantage compared to the traditional system of social security?*

The advantage compared with the traditional system is the possibility and necessity for personal interaction of the group with the clients, between the clients themselves, and between the members of the peer group. Social skills can be built up. Decision mechanisms can be invented, and, if necessary, flexibly modified. Democracy can be exemplified by acting in a democratic way. The content of the term “democracy” is not always the same, but this can be deepened by practical experience. A social arrangement will not work just by applying certain logical rules. The emotional level must be brought in as well. Even then there is no guarantee of proper functioning.

There is no need for the group to be related by blood like the traditional family. There is room for selecting the group one wants to interact with on the basis of inclination, maybe affection. So the kinship one goes into is based on free choice.

work: *How did Peer Care start?*

The founding group did not believe in establishing social institutions without having first tested them. Therefore it designed an experimental set-up first. By and by, in small-scale social experiments, the Peer Care idea was tested and improved. After some years of experimentation the approach was published via the World Wide Electronic Link (WWEL). All the expectations of the founders were greatly exceeded when more and more people became interested in this method to change the social security system. The difficulties were great. One of the major obstacles which nearly stopped the experiment was the lack of an appropriate legal framework. The national bodies of social security opposed the proposal, and manipulated the media to distribute horror stories about the first experiments. But the cost-explosion worked in the opposite direction. The National Social Security board was finally urged by Parliament to offer participation in the Peer Care system on a voluntary basis.

work: *What was the effect on the traditional system?*

Competition with Peer Care drove the traditional system in a favorable direction, too. The National Social Security System increased its own efficiency and improved the quality of services. The cost of social services dropped for two reasons. First, the system could be reduced in size. Less people than before had to apply for social security benefits. Second, by organizing care within the families, the cost of long-term care could be reduced. The direct and personal interaction with the elderly reduced hospital stays considerably. Hospitalization decreased as well. The mental and physical health of the elderly could be extended to a higher age.

work: *Do you think Peer Care will replace National Social Security Systems completely in the future?*

No. It would not be a move in the right direction. It should not. The continuous existence of two different systems and a kind of

balance between them guarantee a permanent incentive to improve the performance of each. Still, there is a definite need for hospital care which cannot be replaced by care in private homes. The average person can neither function as a nurse nor as a medical doctor. The medical profession and the paraprofessionals will still be needed.

work: *My main objection: Peer Care does not prevent the creation of unemployment. How do you comment on that?*

That's right. Peer Care does work ex-post only. It is not preventive in itself. But by the very system people can become aware of the shameful side effects of the capitalist system. They can learn by their own practical experience that the labor market is blind and has to be tamed by forces other than economic ones. They will understand that society has to control the labor market because in an intimate manner they see the burden the market imposes on them. This personal experience is the precondition for any further political action by citizens.

This idea deserves some generalization and makes clear what the founders of Peer Care had in mind: in the 19th century the individual experience of the social was given by social class and by social stratum. Everybody learned during his/her life what it meant to be a blue-collar worker or a farmer, a medical doctor, a nurse or a teacher. The workers experienced a rather homogeneous environment. Essential features of it were intersubjectively shared. So the individuals consciousness of individuals became more similar. The political party, trade union or church offered perspectives which were the shared belief of many members of the same stratum or class. During the second half of the 20th century one could see that society no longer offered a life-long niche to a person. The rapid technological and organizational change caused individuals to move to other jobs, at other locations, into other professions as well as into unemployment. Permanent learning became necessary. Individuals had to be much more flexible than before, and had do decide on their own how, and in what direction, to continue their careers. Nevertheless, political decisions on the side-conditions and the establishment of overall rules for society have to be produced. The problem was that political institutions were not prepared for this new situation, and had great difficulties in adapting to it. The Peer System should be one flexible answer to the changed situation. The underlying idea was to create new politically enabling institutions which not only allow for personal and direct experience (which had vanished through division of labor, to the extent that children thought money was just the output of a bank-teller machine), but at the same time to make action possible (invite an unemployed person to cooperate with you on your job) on a small scale. The system of Peer Care co-evolved with the coming up of the Intrapreneurial Group (IG) Movement. IGs were very efficient in integrating people who were linked to them by the Peer System. They were aware of a number of activities at their jobs which were not carried out simply because of lack of time, or lack of interest, in a particular task. Such work was the basis for reintegration of unemployed, retired, or impaired persons in a way which offered advantages to both sides: to the Intrapreneurial Group; and to the clients of Peer Care.

To comment on the basic problem of unemployment which still remains unsolved, I refer to the actual discussion on the introduction of green taxes. If energy consumption and natural resources are liable to tax in combination with a tax-exemption for wage-income and social security contributions, I think here is some potential for a greater number of jobs. The wage sum to be spent by firms will be reduced because of the canceling of the firms' contributions to social insurance, and the net wage for the employee will be equal to the gross wage-income, thus increasing the wage-earners real income. Through the increase of relative prices for energy and natural resources it can be hoped that in the short run consumers will move toward environmentally sound behavior, and enterprises will invest in more jobs and in energy- and resource-efficient technologies.

Still, a great difficulty remains unsolved: if the stress on the environment is already reduced by green taxes, and the economy becomes more sustainably oriented, the incentive for reducing not only the rate of growth, but the level of economic activity, could vanish. In the past we have experienced a similar example in the paper production industry. While during the late eighties and the early nineties of the 20th century the pollution per ton of paper could be reduced considerably, the fast expansion of the industry within a few years overcompensated the beneficial effects to the environment. By the end of the last century, pollution reached the same level again as at the beginning of the eighties. In the long run, a shift in consumer behavior toward less material consumption has to be intended.

work: Thank you very much!

“Peer Care does work ex-post only. It is not preventive in itself. But by the very system people can become aware of the shameful side effects of the capitalist system.”

announcement

Mike Cooley Awards for human centeredness 2020

Ideas are sought for innovative, creative and economic solutions to the application of technology in social, political and artistic life as well as in areas of production in order to enrich the human experience and simplify work activities, i.e. those concepts that will

- foster the development of personality
- enhance the conditions for self-realization
- aid in the establishment of cooperative relationships
- contribute to the development of countries not making use of information technology; and
- stimulate the restoration of the natural environment.

The concept of "human-centeredness" was originally developed in the 1980s, when certain shortcomings of traditional computer systems became apparent. There were several reasons for such problems. An increasing number of unsophisticated users became involved with computer technology who were more interested in their own applications than in using highly developed software systems. The requirements for the interfaces of these software systems were fundamentally different from the interface requirements until then, and were supposed to disappear - to a large extent at least - to enable users to concentrate on their task.

In addition, the introduction of computer technology, especially that which was referred to as CIM, led to difficulties when organization as an important factor in the man-machine system was not taken into account. Technology-centered systems implied that the organization of a company had to adapt to the computer system. This, however, was not always the most efficient solution owing to the fact that social and psychological side-effects were not considered. In order to obtain a comprehensive picture of the changes brought about by information and communication technologies it was necessary to adopt an integral view.

Mike Cooley was one of the pioneers who developed the concept of a more human-centered technology, which initially came to naught because of the political power relationships of the time. Cooley was a shop steward in the British armaments corporation Lucas Aerospace in the 1970's, where he organized an employees movement from below that had as its goal a changeover to the production of civilian goods. At the beginning of the 80s he served as scientific director for the Greater London Enterprise Board until its dissolution under the Thatcher regime, during which time he promoted projects for the production of socially useful goods by concerns in which the employees and unions were included in all relevant decisions taken.

Thirty years later the Mike Cooley Foundation was created. It is a part of the conviviality network of the Ivan Illich Society. Its major concern is the sponsorship of the increased application of technologies that: 1)further the creation of human-centered workplaces; 2) are based on the commitment of those concerned; 3) serve for the production of socially useful products for civilian purposes only; and 4) are relevant to the restoration of the natural environment.

It is for these reasons that the Mike Cooley Foundation announces its annual awards for human-centeredness.

All free-lancers, Intrapreneurial Groups and other teams from every country in the world are entitled to enter this competition by sending their project proposals via iNet by 1 July 2020 to the following address:

mcaward@cooley.fnet.

All proposals will be evaluated by an international jury which will be chaired by Peter Brödner as senior member. The prize will consist of recognition in the form of a non-repayable loan in the amount of new ECUs 10.000,-, granted as starting capital for implementation of the concept deemed most desirable at a ceremony to be held on September 1st.

parallel worlds

The introduction of computer technology and telecommunication not only changed working conditions but our culture. A new way of percieving reality has evolved. Reality is no longer seen as a hierarchical, tree-like structure but as a web of information with many different paths to traverse it. The metaphor for knowledge is the computer network where information is stored in a distributed form. The distinction between past, present, and future becomes unimportant, and the linear structure of time is lost. When we look into the future we always look back at the same time. In addition, there is no unique line of development but several different ones. Scientific research tries to capture this development by describing and interpreting many aspects of a given topic simultaneously. This method helps to represent history in a more comprehensive manner because it includes more than what actually happened. It includes as well what might have happened. Thus, several different "worlds" have to be considered for a thorough analysis of historical development. The following stories about parallel worlds represent an attempt to realise this approach in a tentative manner.

Incredible stories about work organisation, feminisation of work, and culture

World #1
Feminisation of work

In world 1 more than fifty percent of the workforce in industrialized countries was female. As a result, the division of labour has changed considerably over the past 25 years. In known history there had always been gender differences between what was considered a “female” activity as opposed to what was considered a “male” activity. These differences tended to change over the centuries, and there was a certain national and cultural variability. In the 20th century, female work in industrialised western countries was supposed to be clean and easy. Women could usually be found in fields of occupation with a strong social orientation. Male work, on the other hand, was heavy and dirty. Men tended to choose technical occupations. Generally, they earned more than women and held the vast majority of the managerial posts in private enterprises and in public administration. This division of labour was supposed to be quite natural. In that sense, the exclusion of women from certain kinds of occupations was quite rigid.

On the other hand, the division of labour was sometimes fairly flexible. In some cases, women did use advanced technology if the work involved was low-status and repetitive. The classical example for this phenomenon was the introduction of the typewriter in clerical work.

Traditionally, clerical work was done by men who became qualified through training on the job. In principle, every clerical worker had a clear career path. With the introduction of the typewriter, a division of labour in clerical work came into being. Managerial activities became professionalised. The condition for a managerial career was a degree from a business school. In contrast, the monotonous work of secretaries and typists did not offer any career opportunities. Nevertheless, typists and secretaries were the ones who worked with the most advanced technologies available for administrative activities while managers only used traditional tools.

This example shows two things. First, there was no fundamental obstacle to women using modern technology. Division of labour, as far as technical instruments were concerned, was not natural and given. As long as the technology implied low status and repetitive work, women were allowed to use this technology even if the feminine/masculine dichotomy suggested something else. It must be noted however, that the relationship between female and low status work was not as simple as that. Female work was not automatically combined with a low skill level and a monotonous character. Female skills, as for example their communicative competence, were not considered as skills at all, and therefore occupations related to those skills were defined as low status. On the other hand, not every kind of monotonous and repetitive work was done by women but as long as it was done by men it was seen (at least to some extent) as being more skilled and prestigious. In this sense, division of labour was always very flexible and open for definition processes by the society. Women were never completely excluded from the use of technical instruments even if the stereotypical attitudes prevailing in society ignored such facts.

Second, there were several reasons why a specific activity was defined as typically female. These reasons were seldom evident and clear cut. As we have seen, the technical character of an occupation (and, looking back, we realise that using a typewriter was a kind of technical occupation comparable to working in manufacturing) did not imply that this work was necessarily done by men. A second important variable was power and influence. Managerial or political careers were usually open only to men; but not all men, or even the majority of men, had good career opportunities. In addition, the relationship between technology and power was fairly complex. When women started to enter universities in larger numbers in the middle of the 20th century, a certain number chose subjects, e.g. law, which offered fairly good opportunities for influential positions in administration and management. At first, only a very small number of women were able to reach these positions. In contrast, the career opportunities offered by many technical studies were not so obvious. Nevertheless, the vast majority of technicians and engineers were men. The definition of the gender characteristic of a given activity could therefore be a very complex process. Societal norms which influenced this definition process changed very rapidly at the end of the 20th century.

In the course of the 20th century, more and more women entered the labour market. They also chose professions deviating from their traditional role model. The percentage of female students in universities in general, and even in technical universities, rose. The reason for women's emancipation is still under discussion but there are a few developments which probably had a certain influence (smaller number of children per family, rationalisation of housework, public care for children). Firms apparently had a certain interest in employing women. Especially in the second part of the 20th century, the fast technological change resulted in a lack of qualified employees. In this situation, gender stereotypes lost their influence in personnel management, and many women entered positions which were previously not available to them.

Women were traditionally employed in the tertiary sector. During the 20th century, this sector grew rapidly. The service sector as such made up for a growing proportion of the Gross National Product. In addition, clerical work in manufacturing became more and more important because of a growing need for planning and administration in a complex and globalised economy.

This development led to intensive discussion of the feminine/masculine dichotomy which had governed the role behaviour of the sexes for ages.

On the other hand, traditional male jobs in manufacturing and mining tended to disappear. Traditional masculine skills, especially the ability to do hard manual labour, no longer offered the opportunity for safe and well-paid jobs.

This development led to intensive discussion of the feminine/masculine dichotomy which had governed the role behaviour of the sexes for ages. Roughly, one could distinguish between four ideological positions among women in relation to the emancipation of their sex. The more traditional group accepted their gender role and found emancipation more or less unnatural. Another group consisted of the first women who had entered the male labor market and tried to adapt to masculine standards. They wanted to overcome the traditional submissive female personality and to become equal to men, not only in their career opportunities but also in their behaviour. As a consequence, they suffered from a fundamental role conflict because their own subconscious expectations and the expectations of

parallel worlds #1

The only way to overcome this role conflict was through a permanent process of critical reflection on traditional ways of interaction.

their environment contradicted their goal. Women felt inferior and were treated as inferiors even if they were highly qualified and tried to be dominant.

This strategy was criticized heavily by another group of women who insisted that gender differences between women and men existed and should be accepted as such. The difference from the traditional point of view was that this group stated that the typical female properties were not inferior but superior to male properties. They accepted the feminine/masculine dichotomy as such, but they redefined the value of the two sexes. Rational behaviour had been preferred to emotional behavior before, now it was vice versa. This point of view was usually accompanied by a critique of modern technology and of industrial organisation. Women were not only supposed to be more emotional and socially oriented than men but also nearer to nature and ecology. Modern technology was by definition male and hostile to all living creatures.

This position had a certain influence on female professionals insofar as these women started to reflect on working conditions and modes of cooperation between employees. Previously, women who wanted a career took it for granted that they would not have enough time to raise children because the time schedule of highly qualified professionals did not allow for any such distraction. They accepted the highly competitive and sometimes rude tone of interaction customary between male employees. Now, their aim was not only to obtain equal opportunities but also to change working conditions in qualified jobs. One important argument was that not only women, but also men, would profit from such a change in working conditions. In this respect, women's claims could be seen as part of a general human centered point of view. Therefore, this rather fundamentalist approach had a certain influence on qualified women. On the other hand, women who worked with modern technology, e.g. computer technology, rejected the restrictive ideas pertaining to this theory because rejection of modern technology would mean that women would be completely excluded from the process of design and development of this technology. Therefore, the influence of this theory in its extreme form was restricted to certain academic circles.

It became obvious that the process of female emancipation was contradictory. On the one hand, women could not take over masculine forms of behaviour because of divergent expectations. On the other, allegedly female forms of behaviour were obsolete in demanding occupations because submissive and cautious strategies would not enable women to assert themselves. The only way to overcome this role conflict was through a permanent process of critical reflection on traditional ways of interaction. This was the basis for the fourth ideological position towards emancipation of women.

In this process, women were helped by the fact that modern technolgy had properties which supported traditional female attitudes more than male attitudes. In addition, in many areas of clerical work where computers were used as a tool for coping with large amounts of information, women worked more with computers than their male superiors. The technology as such had certain inhe-

rent “feminine” properties. Computerised activities were clean and demanded great attention and accuracy - usually requirements for typical feminine work. Computers resemble typewriters to a large extent. The argument against the computer being a “feminine” technology was that computers necessitate rational thinking and mathematical abilities, especially when it comes to programming. Apparently, the computer is somehow an ambiguous technology. Again, it is open to definition how the character of a technology is devised. There was a difference between using the computer and programming it. The average user was very often a women. These women acquired some competence in computer usage and therefore demanded the opportunity to participate in the design and modalities of implementation of computer systems.

The effects of modern technology, especially that of computer technology on working conditions for women, are not easy to describe because they vary as the result of different types of qualification, of companies and personal variables. Highly motivated young women without children had certain career opportunities. The number of female computer professionals rose. The work of secretaries very often became more interesting since with the help of a computer a secretary could perform tasks she could not have performed with a typewriter. For many secretaries, computer technology meant job enrichment and job enlargement. They were usually more skilled than before, but generally did not receive higher wages because of that. Computers took over many routine jobs. The spectrum of clerical workers' tasks became broader. This was both an advantage and a disadvantage. Jobs became more interesting but more strenuous as well. Some typically female professions disappeared completely, e.g. key entry typists. For some women, especially those with a low level of skill, introduction of the computer meant more work pressure, inadequate working conditions and low pay.

One of the reasons for the demand for female labor was that (stereotypical) feminine properties became more important for the economy in the late 20th century. An aspect of this development was that the service sector, which was traditionally a sector which employed many women, grew whereas manufacturing became smaller, at least as far as number of employees was concerned. Therefore, individuals with high social competence, who were friendly and had the ability to organise were needed rather than those with technical skills. As a consequence women, who were supposed to possess more social competence than men, were preferred. With the introduction of computer networks this development became even more pronounced.

First, through computer networks cooperation could be intensified which was the basis for potential productivity gains in certain areas. Cooperation understood as the common effort of several people who can be seen (more or less) as peers requires that the cooperators have the ability to understand each other's needs and to negotiate in cases of dissension. Again, abilities involved in such strategies were usually seen as feminine. Therefore, more women were employed in such areas.

Second, firms which relied heavily on computer networks required employees with a high intrinsic motivation and a positive morale. This kind of technology is as vulnerable as it is expensive. Cost effectiveness can only be achieved when atmosphere and working conditions in a firm are acceptable because the consequences of sabotage and sloppiness are much more dramatic than with traditional technology. If the workflow stops at one point in a networked organization the whole activity of the firm is affected. Just-in-time production was an extreme example of this kind of problem because it depended on raw material and intermediate products being in the right place at the right time. Computer networks may be flexible as long as they work. As soon as they break down the organisation reacts rather inflexibly. The social conditions in a firm which can ensure that such breakdowns do not occur required new ways of interaction. New forms of group work were installed by management to make production more cost effective (lean production). In some areas women were supposed to ensure the cohesiveness of such workgroups. This was yet another reason for employing women who, because of their specific

parallel worlds #1

socialisation, were more likely to possess the necessary properties than men.

Despite the technological and organisational need for women to be employed in areas from which they were traditionally excluded, the process of emancipation of women was a long and tedious one. Women started to work in “fringe” areas of modern technology, e.g. counselling, training or in health care occupations with a high usage of modern technology. At first, they were not able to obtain jobs in purely technical areas for several reasons. They were usually not accepted as equals by their male colleagues. They could not adapt to working conditions characterised by masculine styles of interaction. They did not have the support of a housewife, which was a precondition for many responsible positions. Their aim in life encompassed more than making a career. It included cultural interests and social needs which many professionals thought dispensable. Women therefore chose occupations with a combination of social and technological interests to satisfy their various needs. In addition, they tended to look for jobs with a flexible form of work organisation to be able to reconcile the demands of their occupation and their family (part-time work). This decision was socially acceptable because the average male technician preferred purely technical activities with no demand for social interaction and high working pressure. As far as status was concerned, this was preferable because jobs with a strong social component were usually seen as inferior to purely technical jobs.

The growth of the tertiary sector and the demands of new technology led to the disappearance of such purely technical jobs. Male employees had to accept that jobs matching their traditional role stereotype no longer existed. They entered areas of occupation which were previously (more or less) entirely female, e.g. retail trade. As a consequence, they had to adapt to working conditions in these environments and to acquire social competence and sensitivity to the needs of others, properties which are, for example, necessary for a sales career. The necessity to develop human-centered, safe and ecologically acceptable systems (from nuclear power plants to stand-alone PCs) implied that it was no longer possible to look at technology solely from the technical point of view. Interaction via global computer networks made gender differences obsolete because there are no cues for the participants of this kind of communication as to whether their interaction partner is female or male. This made gender at first artificial or virtual, and then the importance of gender roles gradually disappeared.

This process was accompanied by a critical discussion of the feminine/masculine dichotomy. Gender stereotypes were increasingly seen as a consequence of certain historical and social settings. The question was not whether women should adapt to male standards or men to female ones. It rather was how to transcend the feminine/masculine dichotomy in accordance with the demands of the modern world. The redefinition of gender roles was seen in accordance with the development of a human-centered approach to systems design. A human-centered approach not only considers the health and well-being of employees, but also takes into account their social and cooperative needs. This approach demands people who can see beyond a narrow technological point of view in two areas - as developers and as users because human-centeredness is not just a new form of technology design but a way to organise firms and bureaucracies around the people involved. Developers have to be aware of the fact that (large) technical systems always require fundamental organisational and social change (systemic rationalisation). Users must be able to work in a changed environment in such a way as to combine the development of their own skills and interests with the increase of productivity.

In some sense the process of transcending gender roles was part of a human-centered approach because men could profit to some degree from actions to further equalise the rights of women. Humanisation of working conditions or the organisation of working conditions to allow professionals to follow cultural and social interests not

Despite the technological and organisational needs for women to be employed in areas from which they were traditionally excluded, the process of emancipation of women was a long and tedious one.

only had positive effects for women but also for men. The concept of hierarchical relationships in organisations lost its importance. Project groups consisting of peers became a more adequate form of organisation for advanced firms. As a consequence women, who were usually situated at the bottom of the pyramid, gained, and men lost influence. In a long-term view, even this loss of influence was turned to advantage because decisions were reached in a more democratic manner. Control and pressure from superiors lost their importance. This made working life more agreeable and relaxing. The number of purely technical jobs decreased, while work with a strong social component increased. The character of occupations with a social orientation was redefined. They were not seen as inferior any more and they lost their proximity to the feminine stereotype. This made them more acceptable for men. On the other hand, women entered typically male professions and acquired more and more competence in technical matters.

Equal rights for women have still not been achieved completely. But the situation of women has improved considerably in the last fifty years. This is partly due to social changes as, for example, the change in family structures. It is also partly due to the organisation of the modern economy. And partly, it is due to the introduction of modern technology, especially computer technology and telecommunication with its potential to transcend traditional gender roles. Computer technology played an especially important role in women's emancipation because of its pervasive nature. Previous technological innovations like the steam machine helped to change social relationships considerably, but they were not as omnipresent as computer technology. The introduction of computer technology affected women to a larger extent than previous technological innovations.

The process of female emancipation is not automatic. There is still a certain amount of resistance to it. Special measures have to be taken by private firms and by government. Though these measures are sometimes controversial, they have beneficial effects not only on the situation of women but also help to improve the working conditions of men in certain areas. In addition, they increase the effectiveness of modern technology. The experience of the past 25 years shows that there are several effective strategies for reaching this goal. Quotas for women in leading positions did prove to be an efficient principle even if there were and still are many arguments against such strategies. The amount of housework for women was reduced through a new organisation of this work (equal sharing of household work between women and men, provision of certain services by the government or other social institutions, new forms of living together). Working conditions were changed to enable women (and of course men!) with children to have career opportunities. The terms of part-time work were adjusted to those of full-time work to a considerable extent. Part-time work no longer implies exclusion from career opportunities and high income. And women were offered more opportunities for training and qualification.

The process of female emancipation is not automatic.

Incredible stories about work organisation, feminisation of work, and culture

World #2

Masculine (re)definition of work

World 2 is characterised by a decrease in the percentage of women employed after a maximum in the late 20th century. Since the beginning of the 20th century, women began to enter the labour market and to obtain higher levels of qualification. This tendency is long-term, and to a certain extent it is not reversible. But it is susceptible to short-term fluctuations. The development of female employment in the last two or three decades of the 20th century can be partly explained by the radical change from the Fordist to the Post-Fordist paradigm. This change consisted of a fundamental restructuring of the economy as a whole, and, accompanying the restructuring process, the introduction of new technologies, notably information technology and telecommunication. At the beginning of this process, employers needed a large number of qualified and motivated employees, but the pool of potential male employees able and willing to work in unstructured and demanding situations was not sufficient. Opportunities for qualified women arose. At the turn of the century, this development came to a standstill.

There were two service industries which were to a large extent responsible for the growth in jobs over the last two decades of the 20th century: the public sector; and business and financial services.

Those countries with the fastest growth in women's employment had a large public sector combined with a strong increase in the growth of financial services. The economic problems arising in those two industries led to a notable decrease in women's employment. Employment in business and financial services started to contract as banks, building societies and insurance companies reacted to intense competition by introducing new technology and shedding labor. In the public sector a similar trend was visible. This was especially apparent in the health sector, which traditionally employed a large number of women. Cutbacks, privatisation and rationalisation meant that there were far fewer opportunities for women in clerical and nursing jobs. Generally, the new jobs created for women in the service sector during the last decades of the 20th century were low-paid and precarious. Most of the jobs created in countries like Belgium, the Netherlands, France, Germany, and the UK were part-time. Thus, the only increase in women's work over these decades was apparently through part-time work.

In contrast, however, there was a rise in opportunities for well qualified female professionals in the two sectors mentioned, e.g. advertising, law, accountancy, in busi-

ness and finance or as doctors in the public sector. Apparently, the introduction of information technology in these two sectors led to disadvantages for women with a low skill level and to advantages for women with a high skill level. To some extent, women were able to seize these opportunities. There were other, more positive, tendencies on the labour market. The demand for services related to the manufacture of high-tech products, such as customisation and design, increased. There was also a greater demand for personal and social services.

This contradictory situation had very diverse effects on different groups of women. The opportunities for highly skilled women were still quite good whereas part-time workers with a low level of qualification suffered. This was all the more serious as the majority of people working part-time (about 90 %) were female. Part-time work offerd few opportunities for advancement. That meant that women had to find other routes out of these low-paid service sector industries, such as by training. Only a minority of women managed to take such routes. There were at least two obstacles confronting them. In companies training tended to be based on seniority and existing qualifications, and the government imposed budgetary constraints, which meant that the state had to concentrate on acute short-term needs - typically the unemployed - where women were underrepresented on unemployment registers. Another form of discrimination against women by companies was the false perception that they were less likely to stay within the firm. Despite women's increasing labour force attachment, the expected returns on investment in training female workers were still perceived to be lower than the returns on training male workers.

Many women lost their jobs in the service sector because of the rationalisation of clerical work. Another tendency was that male employees who did not find any jobs in manufacturing applied for jobs in the tertiary sector. At first, this resulted in a role conflict with the men involved. Only the most adaptive ones were able to do work which was previously supposed to be feminine, e.g. as salespersons. This meant that the feminine/masculine dichotomy which was the ideological basis for the traditional division of labour was redefined. Men's work, which had previously been described as being heavy, dirty, and technology-oriented was now supposed to be flexible, innovative, versatile, efficient, and assertive. Men were supposed to have good qualities as organizers and a certain amount of social competence. Women were supposed to be inflexible, submissive, and inefficient. Through this redefinition, men could take on (more or less) attractive jobs even if they would previously have rejected them. Women were excluded to a certain extent from jobs which were previously supposed to be typically feminine. Clerical work and retail trade became more “masculine” as a consequence of that.

Even if women were employed for their social competence they were not always in a position to use this ability extensivly for their work. In banking and insurance women were often prefered because of their friendly manner towards the customers. Friendliness and social orientation led these women to find solutions for their customers' problems, which was advantageous for the customers but not for the woman's company. In a highly competitive environment such behaviour was not in accordance with the company's goals. In this sense, the typically feminine properties did not promote women's opportunities on the labour market even if some of these properties were acceptable to companies. Again, men who could adapt to the new situation by treating customers in an agreeable manner were prefered because of their adherence to the companies' goals.

Companies sometimes argued that in certain areas they prefered women as managers because of their ability to supervise their subordinates in a less dominant manner than men. This was supposed to be more efficient in a competitive and innovative environment. The idea was that female empathy and acceptance of the needs of others was more motivating than authoritarian control. In reality, many women had to adapt to male standards of management style. The character of their environment did not allow them to retain their traditional role model. To some extent this can be seen as a positive development because women learned to become assertive and self-confident but in many cases the role conflict resulting from this situation impeded them in their career. The efficiency of female managerial behaviour depends very much on the extent to which women succeed in modifiying the structure of traditional business enterprises and in making it more “feminine”.

Generally, jobs with normal working conditions (full-time, including social security) were mostly taken by white male, employees. The chances for women to get well-paid jobs with career opportunities became smaller and smaller. Society in western industrialised countries

had a high rate of unemployment with a large number of jobs with precarious working conditions (no social security, flexible working hours, part-time - often less than 20 hours per week). Only a minority of employees had traditional full-time jobs. The border between employment and unemployment became blurred because of the many precarious jobs. Women tended to be restricted to this area, often being unemployed or working for a small income below the poverty level.

With the introduction of modern information and communication technology groupwork became more and more important. After the first comprehensive computer networks were installed companies realised that technology as such does not lead to productivity gains without accompanying organisational restructuring (systemic rationalisation). In the paradigm of lean production work groups consisting of peers with a wide range of responsibilities were seen as an appropriate form of organisation for networked companies with a complex structure of operations and a continuous flow of raw material and intermediate products. Division of labour, which was rather pronounced before the introduction of computer systems, was abolished to a certain extent. Computerised information systems made it possible to reintegrate functions which had been separated previously. Despite the fact that the feminine/masculine dichotomy implies that women possess more social competence, workgroups consisted predominantly of men. Women only acted as assistants to the peers in the groups doing low-skilled work which could not be computerised, whereas previously, in a hierarchical organisation with a large degree of division of labour, they had the opportunity to do skilled work at an intermediate level. In this sense, women did not profit from the introduction of groupwork even if the concept implies a more human-centered approach.

Female employment dropped considerably when the process of fundamental restructuring of the technological basis and of organisational relations was finished. An outstanding example of this process is the fate of women in computing. In the seventh decade of the 20th century the percentage of women studying computer science and working with computers was very low. This situation changed during the late seventies and early eighties. Because of the large-scale introduction of computer systems in manufacturing and service industries and in public administration, skilled computer scientists and programmers were extremely scarce. Owing to this situation companies also hired female computer scientists to a large degree. There was a steep increase in the percentage of female students choosing computer science. In the early nineties, computer science became professionalised which meant that education and training became institutionalised and the profession was defined by a stable set of requirements. Female computer scientists who had previously profited from the flexible and unstructured nature of computer science as long as this young discipline was forced to define its own subject were excluded again from a profitable and prestigious area. Computer science was taught in secondary schools where boys (sometimes inadvertently) were supported to a greater extent than girls. In addition, the demand for computer scientists decreased. The consequence was that women refrained from going into computing. The number of female students dropped again. A similar development could be observed in many other typically masculine areas of work even if it was not as striking as in computer science.

At the same time as women were again excluded to a certain extent from the market for “normal” full-time, well-paid labor, theories about the genetic determination of gender differences became popular again. Women tended to withdraw into the family. This development was further motivated by the reduction of social services and health care by the government. Women were again forced to care for their children and for elderly relatives. In addition, women's needs were not considered in the process of design, development and implementation of modern technology because these technologies were developed and used predominantly by men. This phenomenon can be described as a vicious circle. Women did not work in positions which would give them the opportunity to influence the structure of modern technology. Therefore their wishes were not considered. As a consequence, women became extremely sceptical about the use of modern technology. Measures to avoid this vicious circle were not taken. Women were also excluded from training programs in modern technology. Special training programs for women to acquaint them with modern technology are problematic to a certain extent because highly skilled women often reject work in male dominated environments even if there are special training programs for them. On the other hand, such an environment can only be changed when women enter such occupations in large numbers. Because of the inherent contradictory nature of this situation women preferred to stay at home and withdrew from a conflict with a very uncertain outcome.

Incredible stories about work organisation, feminisation of work, and culture

World #3
Adapted technology

World 3 is on a planet in a very distant solar system. The inhabitants of World 3 have little traffic and only traditional means of communication like mail and telephone so as to avoid pollution, and informal ways of communication are maintained. Economic organisations are small and predominantly orientated towards the local market. Local resources are exploited in a very creative and innovative manner. Technology development depends on strict societal norms. Technology must not interfere with traditional ways of living. Ecology plays an important role. Some forms of technology which inhabitants of the earth might call advanced do exist, e.g. stand-alone computer systems.

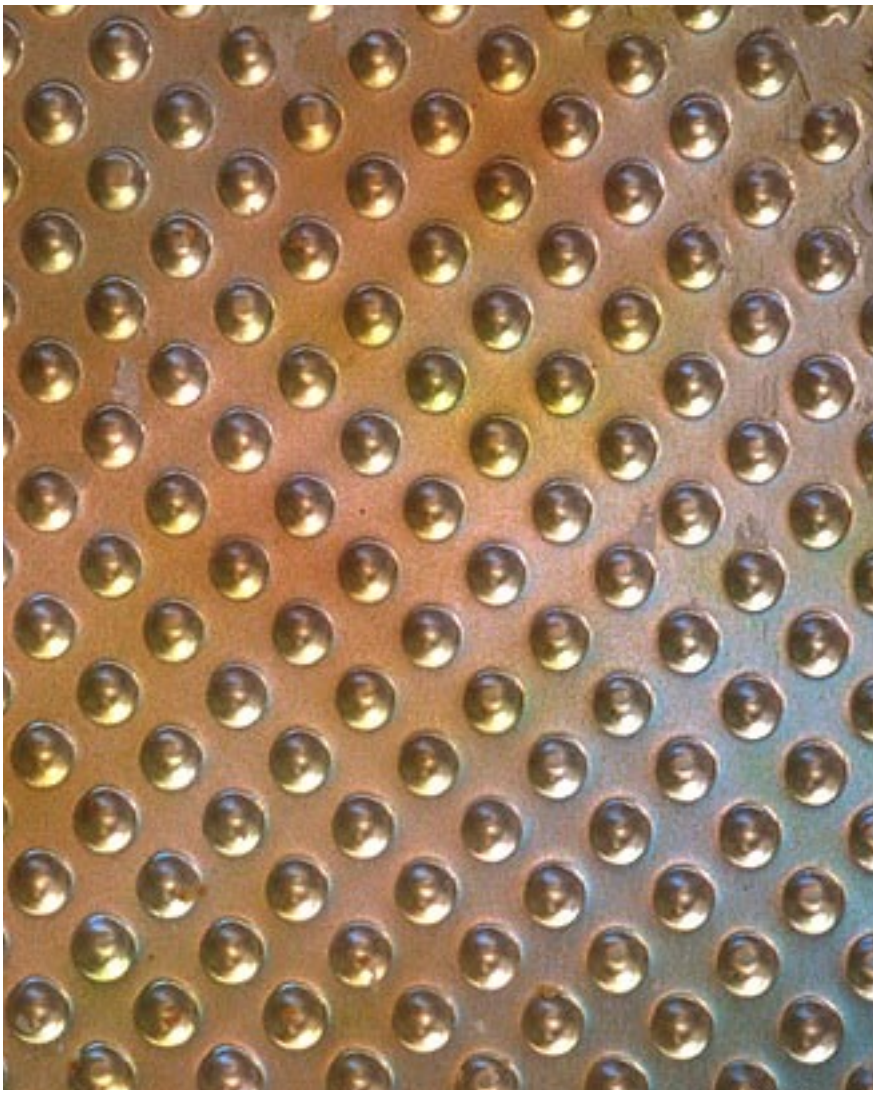
Local cultures are very rich and diverse. The standard of living from a perspective of available products is lower than on the earth. Cultural activities and the pursuit of spiritual goals make up for the lack of physical goods. Technology is organised like a craft, and skills are distributed evenly among the population. The optimal allocation of resources is a constant problem. World 3 is perpetually threatened by foreign intruders.

Incredible stories about work organisation, feminisation of work, and culture

World #4

Complexity and flexibility of space and time

World 4 is a world where computer networks help overcome the limitations of space and time. People are able to communicate via e-mail, visiphone or video-conferencing across large distances. As a consequence, the concept of space changes fundamentally. Places which can easily be accessed by computer networks seem near, while other places seem farther away than before. Telework is widespread and very common. As a consequence, people are more flexible in organising their schedules. Computer networks are the technological basis for a wide variety of work contracts because people can work effectively anywhere and anytime they like. Traditional labour contracts obtained by trade unions in the previous century are only relevant for a minority of employees. The number of hours employees with a non-traditional labour contract work per week depends on the actual demand for their service and not on a contract bargained for by trade unions. Workers therefore have more flexibility in organising their work autonomously. On the other hand, they also have to be available during their leisure time, which means that they lose autonomy as well.



There is no sharp distinction between work, training and leisure time. The complexity of modern technology necessitates

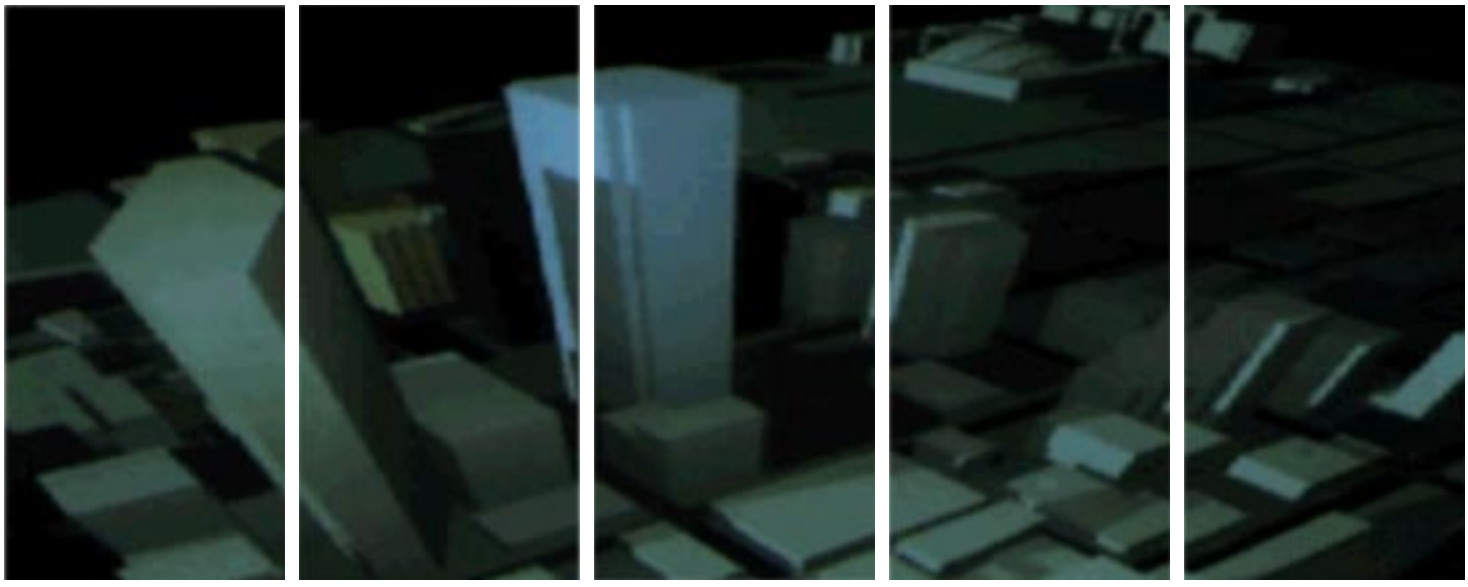
parallel worlds #4

an active and self-organised process. It includes the ability to communicate, to discuss, and to decide via electronic networks. Because of the complexity of business processes (e.g. large investment projects) and the indefinite character of information in ill-defined situations which prevail in modern life discussion and democratic decisions become more important. Risky and fundamental decisions about the fate of a large company acting in a highly innovative market must be supported by the majority of employees.

Tools offered by the computer networks like e-mail play an important role in this development. E-mail is the oldest and most traditional of these tools. It combines the advantages of letter and telephone. Still, there are certain differences to these methods of communication. It is more informal and easy to use than mail. And it does not interrupt the workflow as the telephone does. It is asynchronous, therefore it does not require the attention of both communication partners at the same time. Communication is not restricted to contacting only one person. It is possible to send a message to several, even many, persons at the same time. Therefore, it is possible to exchange ideas with many more people than before. The style of writing changes and becomes more informal.

In other systems supporting communication and cooperation there is an attempt to structure processes more. Coordinated electronic calendars depend on all participants entering their appointments into this calendar reliably. In this sense, they are less flexible. On the other hand, they increase flexibility by making more efficient dates for meetings possible. This can only be achieved if all participants have their electronic calendar with them continually. Most people carry small information and communication systems in their briefcases around with them. They can be reached anywhere and everywhere electronically. This has a fundamental influence on the concept of privacy. Because of the importance of electronic communication it is necessary to be in constant contact with electronic communication systems. In this world there is no protection from electronic intruders. The mixture of work and leisure time is not only a consequence of new and flexible work contracts and the increase in self-employment but also of the current technology. If people are available 24 hours a day their continued presence at their offices during a fixed period of time becomes less important. The introduction of new information technology results in an increased rigidity of structure but at the same time in increased flexibility.

Electronic forms of interaction affect different kinds of occupations in different ways. Highly qualified workers are able to work at home, either to avoid the loss of time on the way to work or to be able to focus on one project without being disturbed by everyday organisational problems. Electronic communication enables them to stay in contact with their office in case anything important arises. Self-employed workers who specialise in counselling or similar jobs related to finding and structuring information are able to communicate with several different customers at different locations more easily. Many routine jobs like accounting are done in Third World or Eastern European countries to reduce costs. In this area, many female jobs will be lost.



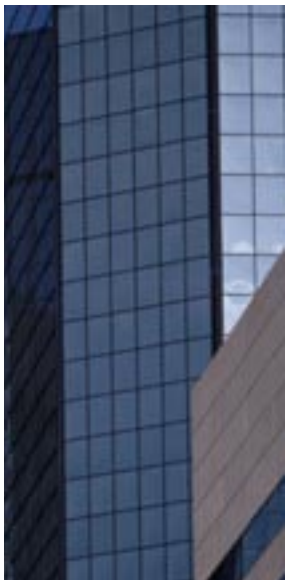
parallel worlds #4

Other kinds of low-skilled work are done in remote offices in suburban areas to reduce expenses for rents in fashionable offices in city centres. Several models of these offices are used. Some are used by only one company regularly. Others are shared by several companies, and employees alternate between working in the central and the remote office. Telework centres help to solve the problem of control and of the definition of work output. Employees are controlled as to whether they put in a fair day's work, and elaborate contracts which define the work to be done in a certain period of time, as would be necessary with work at home, are avoided.

In some rural areas, there are remote offices organised by self-employed workers as a cooperative to alleviate the problem of unemployment in these areas. The amount of traffic is to some extent reduced through the introduction of telework. Especially work at home of low-skilled workers leads to a certain amount of isolation. The development of urban centres in remote areas of large cities seems to be a solution to this problem but which is often declared too expensive by community authorities. In suburbs, there are initiatives to combine remote offices with other communal facilities like libraries, child care centres or medical centres. The cost of the development of these communal centres is a constant source of conflict between the occupants of these areas and local authority.

The victims of this development are those regions and people who have no access to new information technology or who lost their jobs because of its introduction. The cultural gap between rural areas with no connection to computer networks and urban areas becomes larger as does the gap between computer literates and illiterates. Many jobs in western industrial countries are lost because of the introduction of computer networks, not only because cheap work can be obtained in Third World countries but also because many activities are transferred to the machine. Telebanking and teleshopping make clerks in banks and shop assistants redundant. Many activities which previously had been included in the price of a service can be done by the customers themselves because of computer networks. In teleshopping customers no longer get any assistance in selecting a certain product but have to find this information themselves; in telebanking they themselves organise the administration of their bank accounts.

Most of the workers are repeatedly unemployed. During this time they occupy themselves with activities which had previously been offered by private companies or by the state previously. Child care is predominantly organised privately by parents' cooperatives. Parents have to spend a certain amount of time for such cooperatives because many activities require the parents' cooperation. Decisions are made democratically after long discussion to reach a consensus of all participants. Care for the elderly is privately organised again, and not by governmental institutions. On the other hand, people have more time for democratic participation in the decisions of their local government. This is all the more important because supranational organisations have an increasing influence on national affairs. These organisations are very remote from citizens and sometimes lack transparency. Increased activity by citizens brings political discussion back to a local level. Computer networks can be used to support local initiatives because they contain the necessary information about local and international affairs. Such information can only be used if the access to networks is free or very cheap. This is not always the case. Some governments try to bar access to the net because they want to reduce the amount of democratic discussion and citizens' participation.



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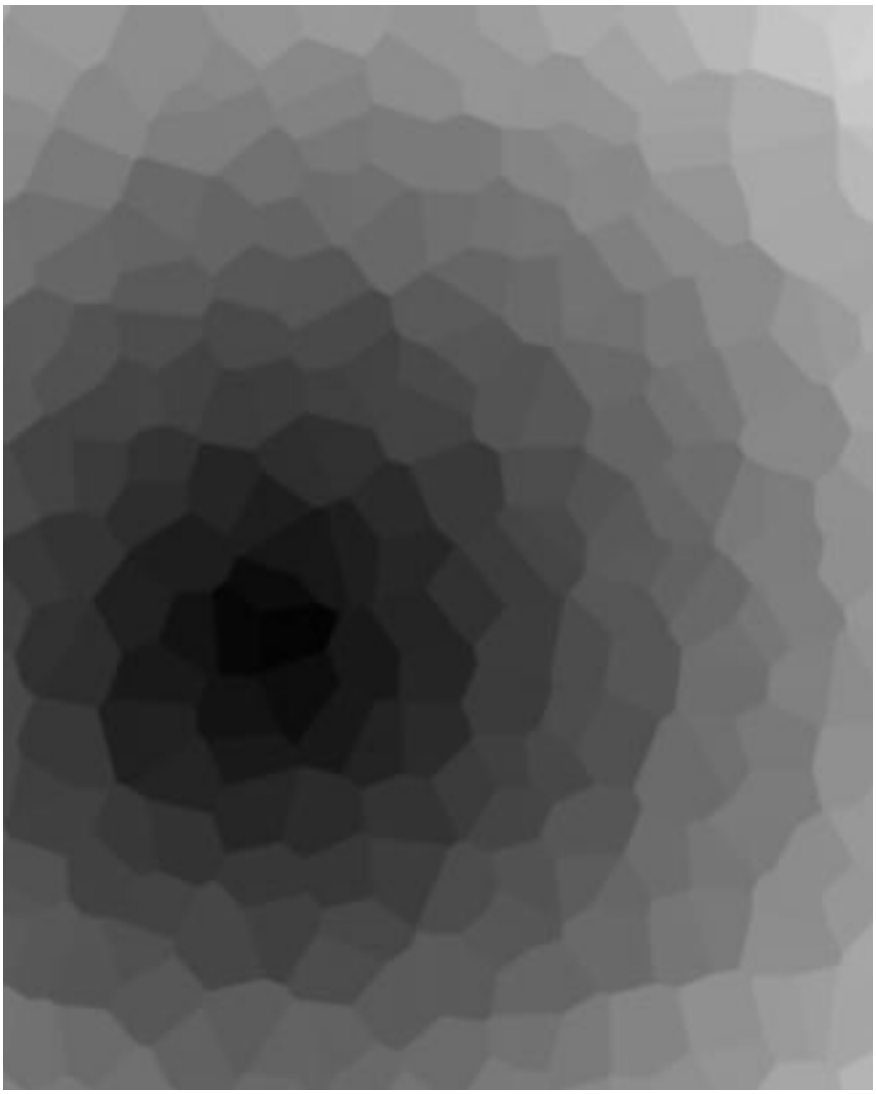
World #5 Control

World 5 is characterised by rigid measures of control. These measures are not always obvious and can assume diverse forms. Measures of control are supported by computer technology and electronic networks. These technologies help refine traditional instruments of control like keystroke counters for mechanical typewriters. Control is automated by the use of electronic technology, “intelligent agents” indicate to higher managers which employees do not meet the goals of the company and why. Some of the intelligent agents suggest disciplinary measurements.



There are at least two major mechanisms of control - external and intrinsic control (or intrinsic motivation). The consequences of both mechanisms are to some extent similar (speed-up of work and reduction of democratic participation of workers) but the methods they employ are different.

External measures of control tend to strengthen hierarchical forms of organisation. Higher managers have a large amount of influence. There is little communication between their subordinates even if the technology (by the use of e-mail or other forms of electronic communication) would provide easy and efficient means for vertical communication. Such principles still play an impor-

tant role in world 5 even if it seems otherwise. They are combined with intrinsic control. To some extent, external control is necessary for almost every situation during working hours even if the intrinsic motivation of employees is very high.

Many companies try to solve social conflicts, which arise because of precarious work contracts or franchising systems, with such strategies. These measures are successful because there is a high proportion of skilled unemployed workers owing to the introduction of information technology which has led to the automation of a large amount of routine activity. There is no problem for companies to find an adequate substitute for a dismissed employee. This increases the pressure on employees to work more efficiently in terms of speed and/or accuracy.

There is a large range of possibilities to control employees by electronic means which are used by many firms. The efficiency of an employee can be assessed by measuring the frequency of his/her activities on the computer or his/her (electronic) output. Access to data and software is restricted according the level of authority an employee has. E-mail or other forms of electronic communication are especially restricted. If it is allowed it is carefully supervised. Discussion groups or the organisation of projects are only allowed if they serve the interests of the company. Employees have only limited possibilities to control what management does with their data. Laws to ensure data protection are very liberal and seldom regarded by companies.

Workers often work isolated because of the introduction of new technology. Either they work at home or in remote offices. Very often, they are not integrated in stable workgroups. This reduces their opportunities to discuss common interests with their colleagues.

Trade unions lost their influence because they concentrated on blue collar workers. This group of workers became smaller by automation and the introduction of information technology, and trade unions could not adapt to the new situation. In addition, the high level of unemployment restricted trade unions' bargaining position. White collar workers refused trade unions as an appropriate organisation to represent their interests. On the other hand, their own traditional professional organisations are not able to succeed in establishing better conditions of work for them. This is partly due to the fact that the situation of white collar workers is not homogeneous. There are large differences in payment, status, type of work contract or content of work. These differences reduce the potential of white collar workers to act collectively.

Intrinsic control is a strategy of control that operates by means of incitement rather than coercion. Discipline is not imposed externally but is a consequence of the motivation of the individual (self-discipline). The necessity of self-discipline is not restricted to the context of work. The formation of the individual starts at school. The organisation of work, education, the public health system, and prisons is very similar. Its basis is the constant observation and control of individuals and the production of uniformity and consent with existing forms of social relationships. Empirical observation shows that self-discipline is never absolute and has to be combined with measures of external control.

Intrinsic control was always important to some extent (human relations philosophy) but with the introduction of modern technology its importance increased considerably. There are several reasons for this development. The character of work as such is changing because of the growing number of white collar workers. Traditionally, white collar workers were not monitored as strictly as blue collar workers because of their higher status in companies and because of the fact that they handled confidential information. With white collar workers making up the majority of the work force, this culture of work also influenced other areas of the economy. Another reason is that sloppiness and sabotage of individuals have more serious consequences in modern companies than previously.

The interactions of modern technology and organisation are more complex than ever before. Organisation plays a major role in productivity gains reached by the introduction of technology based on electronic networks producing a broad range of customised products or services. Such systems require a comprehensive use of human abilities, decentralised production units, reduction of the division of labour, and collaborative forms of organisation. The emphasis is on commitment, high quality of the orkforce, and full utilisation of human resources. Subjectivity is imposed on the modern individual to enable her/him to meet the demands and expectations of management.

The development of semi-autonomous groups is encouraged. Again, these groups are supposed to support intrinsic motivation. The responsive character of the computer which is constantly waiting for the users to enter data, commands or text, together with the group pressure of semi-autonomous groups, increase the pressure on workers. This is combined with external control, e.g. the development of stricter targets and the integration of tasks into centrally controlled business processes. In semi-autonomous groups, workers are forced to deal with problems in order to meet the targets.

In a world like world 5, autonomy like this gained by the workers means more and less control at the same time. Workers are allowed to decide about matters immediately concerning themselves, but only insofar as this serves the company's goals, which are cost-reduction, improved quality, etc. In this sense, intrinsic motivation is still a form of control.

In a world like world 5, autonomy like this gained
by the workers means more and less control at the same time.

Incredible stories about work organisation, feminisation of work, and culture

World #6 Democracy

In World 6, computer networks are used to enhance democracy and the participation of citizens or workers in matters of relevance to them. Computer networks support discussions between equals. A network culture of mutual assistance develops. The activity and self-organisation of individuals is supported by the interactive and self-organised character of modern computer programs. Study circles are formed to discuss problems related to organisation of work processes. Autonomous thinking and the art of democratic discussion are already taught at school. Because of the complexity of business processes (e.g. large investment projects) and the indefinite character of information in the ill-defined situations which prevail in modern life, discussion and democratic decisions become more important. Risky and fundamental decisions about the fate of a large company acting in a highly innovative market must be supported by a majority of the employees.

Democratic behaviour is intensified by the use of cooperative electronic systems. Traditional mechanisms of discourse in face-to-face communication are partly obsolete in electronic discussions. In many forms of electronic interaction, it is not possi-

ble to see the other participants of the communicative process. Therefore, non-verbal forms of dominating a discussion, e.g. talking in a loud voice or interrupting people frequently, are of no consequence in computer networks. The turn-taking mechanism (the mechanism which normally guarantees that only one person talks at a given time) functions completely differently from face-to-face communication. In electronic communication, people who are usually silent start to participate. Dominating behaviour is usually punished. Because of the impersonal situation people are more open than in normal conversation. Because of the higher rate of participation in electronic discussions, decision-making is often a difficult process and takes longer than in traditional forms. On the other hand, many different opinions are heard which sometimes improves the quality of decisions.

The increased influence of democratic structures and the decreasing importance of status results in the gradual disappearance of hierarchical control. In a constantly changing world, stable control structures become obsolete. Project groups are installed for specific purposes and are dissolved when they have achieved their goal. The introduction of project groups strengthens the network character of modern organisations. Distributed computer systems are the technological basis for this flexible form of structure. Through the introduction of information technology the members of a project group do not have to be in the same place to communicate efficiently. All the members of such a group have free access to all the information relevant for their tasks. Access control is reduced to a minimum.

Another advantage of this form of structure is the fact that decisions are made where the knowledge about a given matter is concentrated. These decisions are made democratically. A high degree of organised discussion is necessary for this process. Again, this necessitates the use of electronic communication. This phenomenon can be described as decentralisation. In such systems, information is stored in a distributed form and can be called for from anywhere in the company. All the employees of a company are much more informed about what is going on around them. This fact increases their motivation and the efficiency of their activities considerably. On the other hand, through decentralisation a new form of centralisation is achieved. More information which is better structured and therefore more usable is available for higher management. Information is entered decentrally, which means that it is more or less up-to-date. Higher management can refer to the most recent available data and is informed about all current operations in the company. The quality of top-level decisions is thus also improved by this combined process of centralisation and decentralisation.

Participation of workers is improved. Cost-effectiveness is not the only reason why management agrees to this development. White collar workers institutionalised their own professional organisations. Traditional trade unions either disappeared or changed radically. White collar workers developed new forms of argumentation and conflict with management representatives. Because

of the vulnerability of the new technology and the importance of morale and a productive atmosphere for clerical work, professionals are in an advantageous bargaining position. The new professional organisations do not concentrate solely on wage conflicts but introduce societal issues like democracy or ecology as well. Unemployment is lower than in other worlds, legal measurements for social security are discussed, and wages are relatively high.

A human-centered approach is the basis for social and technological innovation. There are many opportunities for end-user collaboration and democratic participation. Technological and social systems are seen as a whole. The enhancement of human skills in the production and service sectors constitutes the paradigm for technological development. Societal norms ensure to a certain degree that human attributes and knowledge which are unique and irreproducible are not excluded from learning and organisational innovation, even if they are not supposed to be cost-effective in an economic sense. The development of multiple skills, learning organisations, and life-long learning emphasise the development of adaptable working cultures and practices.

expert report
Intrapreneurial Groups

A transaction cost analysis approach

To be able to assess new kinds of corporate organization, like Intrapreneurial Groups, in a more theoretical context, the framework of the widespread method of Transaction Cost Analysis, combined with a comparative institutional analysis, will be presented.

We refer to the classical book by Oliver E. Williamson, who, at the end of the last century, has applied the transaction analysis approach to all types of enterprises engaged in material production. He not only investigated contemporary firms, but enterprises of the 18th and 19th centuries as well. Pinmaking was used as a case study, as other famous scholars have done before. Adam Smith and Charles Babbage were only two of them. Different from the approach adopted by the group of Radical Economists which had a somewhat distorted view by looking at the production process in terms of power between capitalists and the workers only, and different from the mainstream economists tied to Neoclassical Theory who neglected power completely, Williamson gave evidence that power is not only a category which is responsible for changes in organization of work but of efficiency as well. He virtuously developed criteria for the analysis and evaluation of efficiency in a manner rather loosely connected with the traditional categories of class struggle and property relations preferred by Marxian economists. These criteria are listed and explained below. The objects of his analysis, six alternative work modes, represent an analytical framework of six "Idealtypen" (Max Weber's "ideal types"), where any newly created and invented one can be placed, located, and evaluated. The six types are grouped into pairs by different types of station ownership relations, called entrepreneurial, collective ownership, and capitalist.

1. Entrepreneurial Modes: Each station is owned and operated by a specialist.

1.a Putting-Out system: A merchant-coordinator supplies raw materials, and makes contracts with the individual entrepreneurs. They, separated by location, use their own equipment at their homes, and perform specialized operations. They are not independent entrepreneurs, but hirelings, tied to a particular employer, for whom they work at a price fixed in advance.
Example: Spinning and weaving in Silesia, cutlery manufacture of Solingen and Thiers in 18th century, performed by dispersed cottage labor.

1.b Federated: The stations are closely located in a common building or area. Material flow between the stations is set by contract. If buffer inventories fall below prescribed levels, penalties are due.
Example: Leasing space and power in a mill to individual artisans, common in 19th century England.

2. Collective Ownership: Work stations or land are owned by the entire group of workers.

2.a Communal Mode - every person for him/herself: Every person has a claim to the output associated with his/her own labor. Workers move from station to station at prescribed intervals, each bringing his/her own work-in-process inventory with him and selling his/her final product on the market. Resources are pooled. There is no specialization among workers.
Example: "Artels" in Russia, 19th century.

2.b Peer Groups: Workers are not compensated on the basis of their own product but are paid in accordance with the average turnover realized by the group. Workers may or may not rotate between stations. They may elect temporary leaders (in rotation) to improve logistics and administration. Strategic decisions remain with the Peer Group.
Example: Co-operatives, "socialist firms" (Ernest Mandel).

3. Capitalist Modes: Plant, equipment, and inventories are owned by a single party.

3.a Inside Contracting: The management of a firm provides floor space and machinery, raw material and working capital, and arranges for the sale of the final product. The production job is delegated to inside contractors, who hire their own employees and receive a negotiated piece rate from the company.
Example: Construction industry, 20th century.

3.b Authority Relation: Capitalist ownership of equipment and inventories, employment relationship between capitalist and worker.
Example: Average capitalist firm, 20th century.

The above six modes may be rearranged by analyzing them from a different point of view. Williamson looked at them as well by using the concepts of contracting and hierarchy. The following figure shows his result for a refined view of contracting. While I have filled the matrix by the modes of organization in the way Williamson has linked them to rows and columns, one can see that even more refinement in principle is possible by separately showing the degree of reliance on contractual detail (column) from the time structure of the bargaining (row). A closer look will show that one off-diagonal element will nevertheless remain empty, however. The reasons for that are the inertia of organizations and the limited capacity to process information. The framing contract between the members of an organization cannot be changed in a continuous manner, because the necessary psychological adaptations to a changed consensus would stretch them too far (lower left corner of the matrix). In a similar manner, the periodic and fundamental change of contracts for all the details of the production and remuneration process would burden the members by an information overflow to which they cannot react appropriately (upper right corner of the matrix).

	time-structure of bargaining contracts	
degree of contractual detail	continuous contracting	periodic contracting
comprehensive contracting	Putting-Out (1.a), Federated (1.b) Inside Contracting (3.a)	
contracts as a framework		Communal Mode (2.a) Peer Group (2.b) Authority Relation (3.b)

For hierarchy Williamson found it useful to distinguish between a hierarchy of contracts and a hierarchy of decision-making. Contractual hierarchy is strong if only one or a few agents are responsible for negotiating all contracts; it is weak if each agent negotiates each interface separately. The decision-making hierarchy is great where the responsibility for effecting adaptations is concentrated by one or a few agents; it is slight where agents are themselves responsible for adaptations, or they are subject to collective approval. The table following shows the rank ordering of modes from least to most hierarchical in contractual and decision-making terms.

One can see that the contractual order is not completely the same as the decision-making order. Peer Group makes the main difference.

Williamson developed eleven simple criteria on the efficiency of an institutional arrangement within an enterprise. They refer to three types: product flow; assignment attributes; and incentive attributes. Following is the listing and a short explanation of each.

Rank	Contractual	Rank	Decision-making
(1)	Federated (1.b) Communal Mode (2.a) Peer Group (2.b)	(1)	Federated (1.b) Communal Mode (2.a)
(2)	Putting-Out (1.a)	(2)	Putting-Out (1.a) Inside Contracting (3.a)
(3)	Inside Contracting (3.a) Authority Relation (3.b)	(3)	Peer Group (2.b)
		(4)	Authority Relation (3.b)

Product Flow

1 Transportation expense: The cost of the physical transport of the raw, intermediate, and final product. Modes that save on these costs are favored. The rule is true only under the condition of ceteris paribus.

2 Buffer inventories: To separate activities at stations distant from each other, buffer inventories are installed. The lower the buffer minimum level, the better.

3 Interface leakage: The amount of actual or effective losses of product during manufacturing. The lower the leakage (e.g. by embezzlement, by hiding true quality attributes), the better.

Assignment Attributes

4 Station assignments: When workers are not equally skilled at every task, modes are favored that make discriminating job assignments on the basis of comparative advantage.

5 Leadership: Modes that economize on coordination needs and make discriminating leadership assignments are favored.

6 Contracting: The capacity to aggregate demands and contract experts to serve the needs of many stations (e.g. maintenance workers) is the focus of this point. The more easily contracting is accomplished, the better.

Incentive Attributes

7 Work intensity: Modes that encourage workers to give their best are favored.

8 Equipment utilization: Modes that disfavor equipment abuse and neglect are favored.

9 Local shock responsiveness: Modes that facilitate quick recovery from machine breakdown or workers illness are favored.

10 Local innovation: The more process improvements that can be carried out at low cost, the better.

11 System responsiveness: Modes that adapt easily to changing market conditions and permit cheap improvements are favored
One can see that Williamson's criteria refer to a technology which is focused on material production. As modern multimedia computer technologies and electronic networks have become of paramount importance and ubiquity, his criteria have to be modified to take into account the tremendous progress which was made in the exchange of information of all kinds. The new technologies

influence not only management methods, but logistics and cooperation between workers as well. Let us discuss Williamson's eleven criteria on efficiency under the influence of new electronic technologies, when the production process has mainly changed from physical production to processes of information generation, retrieval, consumption, transport and exchange. Today such processes account for the majority of work activities performed in the modern offices of the developed world. In essence, the above "station" can be a work station in the office, a personal computer at the telecenter, or a personal digital assistant at home, as telework has started to boom after some initial reluctance.

Thus one has to adopt the content of Williamson's key terms to the electronic age. In contemporary information society the raw, intermediate, and final products consist of packages of bits and bytes coded into electric potentials, currents, electromagnetic waves or modulated light beams. The former term "station" now refers to a computer screen and keyboard, an intelligent TV set, AI-assisted tele- or visiphones and virtual-reality booths. In the same way as Williamson, and before him, Adam Smith, has used a characteristic example to illustrate his analysis, pinmaking, we have in mind the immaterial phases of hypertext production as the prime example. The assumed steps necessary are: reading of other related texts, papers and books on screen; data acquisition; creative writing; translation; correction; and layout.

By the transformation from material production to an electronically mediated service economy, some of the above criteria become redundant, and one can skip them; some of them experience a change in importance and weight, and some of them have to be modified in content. The adapted list of criteria and their content is shown below.

Information Flow

1 Transportation expense: The cost of information exchange between distant stations becomes a neglectable item in total cost. The modes do not differ with respect to information exchange costs. Thus this criterion becomes irrelevant if the appropriate communication infrastructure is provided.

2 Buffer inventories: Buffer inventories now become electronically stored information (text, data, visual or acoustic information), residing on electronicly readable data carriers. To separate and at the same time to couple activities at distant stations, central or local servers are installed. Although the cost of transport of information is negligible, it still remains an important task to provide adequate and sufficient information as an input for the next station. The modes differ in their ability to give incentives to the person at a single station to finish a task in a coordinated manner, taking into account the time structure of the next station. That mode will be favored which can perform the task efficiently, as well as eliminate standstill. The advantage of the electronic system is that it can be used for the transport and storage of intermediary information at the same time as for data related to coordination of the different stations.

3 Interface leakage: As output and intermediary product now consist of information, a completely different picture has to be drawn related to fraud and embezzlement. It becomes a question of survival as to whether confidential data can be kept under cover and personal data are not available for abuse (which does not necessarily mean data must stay inside a small geographical area, but must be kept inside the network of stations of the enterprise used by the workers or by an authorized subset of them). In the information age keeping personal data and research results secret is one major goal of the firm. If only one single case of violation of privacy is reported to the public the prestige of an enterprise fades immediately - as does the price of its stock. The lower the leakage (e.g. by embezzlement, by hiding true quality attributes), the better. While much can be done by cryptographic means (a standard of public key systems is now established world-wide), there is still the risk of information abuse by employees of the firm who have official access privileges to qualified data. Thus it is of vital importance to establish high standards of trust in the enterprise, as well as satisfying working conditions and a high degree of co-determination to bring up a convergence of individual goals of the workers and those of the enterprise. An example of the importance of security and safety is that many firms still do not transport their data by electronic networks but use human couriers for this purpose.

Assignment Attributes

4 Station assignments: When workers are not equally skilled at every task, modes are favored that make discriminating job assignments on the basis of comparative advantage. This criterion remains valid, although the means to perform the task have changed considerably, by the high degree of electronic connectivity reached all over Europe for the private and public enterprise sector, private households and public institutions. Services for personal evaluation and staff recruitment are provided by a flourishing industry founded around the year 2000. It is still of great importance to create qualifications which exactly fit the tasks to be performed. The more the mode can succeed on this level, the better.

5 Leadership: While electronic networking assists management in its coordinative functions, the problem of leadership assignment is only dealt with by a better database on available staff. The final decision still remains a highly volatile art.

6 Contracting: The European Electronic Network allows for teleconsulting and tele-repair, in particular for software and hardware problems. The more easily contracting is accomplished, the better.

Incentive Attributes

7 Work intensity: Modes that encourage workers to give their best are favored.

8 Equipment utilization: A particular threat has developed as the result of the new information technology: computer viruses and hacking. Modes that disfavor equipment abuse and neglect are favored.

9 Local shock responsiveness: Modes that facilitate quick recovery from machine breakdown or workers' illness are favored.

10 Local innovation: The greater the ability to use the potential of information technologies for process improvement at low cost, the better.

11 System responsiveness: Modes that adapt easily to changing market conditions and permit cheap improvements are favored.

Because of the need to perform the overall task in a continuous manner, without interrupts and breaks (the latter refers to the overall process of production only, not to the single individual), a 12th criterion must be stated.

12 Susceptibility to inference: As electronic technology is not determined entirely by its technical parameters, there is a high degree of freedom for the organizatorial mode to set the degree of reliability of the production system. The flexibility of the mode to handle the likelihood of standstill time is of crucial importance, not for one single operation, but on a statistical basis, in the average period of, say, one year.

It has to be mentioned that the modified eleven criteria should help to determine optimal or at least appropriate organizational arrangements. There are two procedures possible. First, they could be selected from the list of the six modes at the beginning of the report, or second, a new organizational mode could be invented which is designed and appropriately tailored according to the highest scores in fulfilling the criteria.

Let us look now at the first method. We shall evaluate the six modes of organization under the condition of contemporary electronic technologies and apply the modified criteria to them.

As the result of the advent of communication and network technologies, we can observe a basic difference to the former material production technologies. The potential is now evolving for a less hierarchical interaction between the members of a production unit, in particular on the operational level. Networking technologies will not be favored by management if they have to defend some monopoly on information. Strongly hierarchical organizations will thus experience great difficulties in appropriating the potential fruits of networking in view of the higher speed of formal and informal information flows, the shrinking "distance" between the members of the firm ("Japan is just a mouse-click away"), the existence of a unique network within which all tasks of employees can be performed, the creative power of self-organization, and the possibility for synchronous as well as asynchronous modes of collaboration.

Now let us apply the method of elimination to find the optimal solution. If we look at the echelon of hierarchy, the topmost (Authority Relation - 3.b) will assume a lower ranking. It cannot offer the degree of flexibility information oriented enterprises need with respect to fast adaptation to the changing markets. It shows a major disadvantage: Authority Relation is not a voluntary relation for the worker, it is an incomplete form of contracting. The employee is subject to detailed supervision. He/she has to accept orders and instructions as premises of his/her behavior. Authority rule is less and less accepted by the majority of people. The degree of education, training and qualification, both formally gained, or by training on the job, has increased to such an extent that people do not like to be in a completely subordinated position any longer.

The bottom of the echelon is formed by Federated (1.b) and Communal Mode (2.a) on both sides of the hierarchy, the contractual and the decision-making one. These two fall short as appropriate organization modes for a different reason than Authority Relation. Because markets are more volatile than in the 19th century, the product of the enterprise has to be redefined at irregular intervals. While agricultural or milling activities remained constant for generations, information as a product or service is changing its content fairly rapidly. As there is no way to redesign the tasks of the enterprise in an organized manner, the two modes will have difficulties to survive in this environment of fast changing demands.

The concept of the Peer Group (2.b) does not encourage work intensity enough through compensating workers by the average product. The problem of free riding comes up sooner or later. As Peer Groups are weak in assignment to stations and in leadership, the ability for flexible and fast adjustment is missing (similar to the case of the two other modes mentioned above).

Only two more candidates remain, remnants of completely different historical periods: Putting-Out (1.a), a mode rooted at the outset of early capitalism, and Inside Contracting (3.a), a type of organization used by large capitalist firms during the late era of Fordism to overcome the problems of rigidity and petrifaction. Both seem to be interesting candidates to become the winner of our competition of modes. Let us look closer and use the method of analogy. Putting-Out forms a rather centralized, but only slightly hierarchical system. Networking technology can be shaped in a very similar structure. The "star" (in addition to the "ring") is one of the frequently used types of electronic networks as well as the structure of the widely used electronic client-server architecture. The analogy may be continued with respect to material flow, now called data. Data may be owned by a merchant-coordinator (located at the center of the star) who submits them to the workers' stations on a contractual basis, and, after the workers have finished working on them, they are sent back to the center. The weakness of this mode is the isolation of the workers. If they are not integrated in additional social relationships they become more and more dependent on the center. They have no other choice and alternative than to sell their work - although formally independent - to the merchant-coordinator. They can thus easily become subject to exploitation, face low wages, weak social benefits, experience feelings of loneliness, etc. The last mode remaining to be characterized is Inside Contracting (3.a). As is the case with Putting-Out, a high degree of centralization may be combined with a slight degree of hierarchy, but in decision-making terms only, not in contracting terms. In Williamson's definition, Inside Contracting does not control material assets of any kind, but it depends vitally on workers hired. Through electronic networking technologies, an Inside Contracting firm faces a greater range of alternative possibilities. The "Inside" is no longer limited to geographic space. Information workers may be tied up at locations everywhere in the world. At the same time, there is no need to be related to only one "parent" firm. It is possible to build up a portfolio of parent firms. The monopoly power of a single firm can be mitigated. The spreading of risks could be helpful in economic depression.

The discussion of attributes different from the original definition of ideal types shows that there could be viable alternatives, more appropriate to modern technology than

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Intrapreneurial Groups

The discussion of attributes different from the original definition of ideal types shows that there could be viable alternatives, more appropriate to modern technology than the six versions discussed by Williamson. Let us recapitulate which mode we are looking for:

the six versions discussed by Williamson. Let us recapitulate which mode we are looking for:

A Because of the low price of computers and the abundant network links all over the country the means of production could be owned by the workers on an individual basis;

B The cultural tendency toward a high rated value of the individual restricts us to vote for any authoritarian organization with a leadership which is not legitimized by the workers;

C Negative effects can result through the isolation of the workers. Group approaches may satisfy the need for collective action, assistance, guidance, resistance, etc. better than a model based on single individuals. This is not only a vote in favor of the workers. It is rational for the parent firm or the entrepreneur as well. In case of illness, the tasks can be more easily shifted by the members of the group to one or more other members. There is no need for the management of the parent firm to deal with such contingencies;

D Group organizations create possibilities for self-organized collective action. They may educate people in rational decision-making, in learning to assume responsibility for their actions, in enabling them to become socially competent, etc. In case of stress, occupational risks or illness, the group can become a center of preventive activities far more easily than a single individual; and

E A group of workers organized as a legally competent institution has the right and the abilities to hire additional people. This could not only serve to increase the firms capacity but it could be used as well for social integration of invalids, the impaired, the hitherto unemployed, displaced persons, etc. Of course one can not expect this will happen by itself. Incentives have to be offered by legislation to encourage the group to show this socially oriented behavior.

If we take into account the above mentioned five demands, it should be possible to construct a new mode of organization which fits into the contemporary needs much better than any other mode previously discussed. Let us call this new creation an “Intrapreneurial Group”. It is a small-group-based, legally empowered institution. It is allowed by law to own assets, to sell and buy commodities and services, to hire workers, and, of course, it is subject to taxation. Usually it enjoys elected leadership, with rather short election periods. The remuneration is based on average earnings, but wages are bargained for individually inside the group. Intrapreneurial Groups form only one element of a new scheme (the others are Peer Group Care, Green Taxes, Negative Income Tax, and Workers’ Health Assurance Group). Their balanced interplay is vital for a more sustainable society.

(See our report on the visit to Opteam, a very successful Intrapreneurial Group in car design, in this volume!)

Working towards the noosphere

Quietly, almost imperceptibly, practicism slips away; the time of piecemeal engineering, muddling through, lack of theory, all pass away. In the two decades since the turn of the millennium we have had to learn, and have learned, that it is possible to drag ourselves out of the mire by the scruff of the neck. We are still procrastinating over solutions to the great problems of humanity, and the things which the optimists of the previous generation had dared to hope for are still only dreams; yet the gloomy prophecies of the twentieth-century pessimists have not been realised either. We have been successful in numerous tiny things, even if only in a modest sense, and from this we can draw the strength, courage and self-confidence we need to tackle the difficult problems of human development. This we can do not with the delusion of feasibility found in previous years, but rather with the realistic acceptance of the boundaries of possibility. We are still aware of the shock of the twentieth century, the discovery that there is no Mother Nature to look after us, that we have no godfather to protect us, that we have to stand on our own two feet, and that what we make out of human society depends largely on ourselves. But the story has gone on, and we are slowly learning to cope with what initially seemed to be an impossible burden, conveying a belief in utopia on the one hand and nihilism on the other. With every new experience, be it painful or joyful, we know more today about global interrelationships than we did, say, 25 years ago, and with this knowledge we can achieve more than we could then, even if we cannot yet appreciate the full scope of things. The loss of the old world-view has had a lasting effect, but this demise has made room for a new, clearer picture of the world and ourselves, growing out of the rubble of traditional concepts.

As the great majority of philosophical debate in the last century was taken up by the dispute between the capitalist model of economic society and the socialist communist alternative, the eventual collapse of the alternative discredited those grand concepts which had been nurtured (especially in Germany) in intellectual history. French philosophers made their own contributions to this deconstructivism, and by the end of the millennium it had become fashionable in intellectual circles to cast doubt upon their own academic and technical activities. The door was thus opened to a whimsical philosophy, and criticism of rationalism provided encouragement for irrationalism; this expressed itself in many forms, as fundamentalism, as withdrawal into the private sphere, as inwardness, as esoteric. This could be summarised as the ideology of the fin de millénaire. The more this philosophy bloomed, and the more abstract, abstruse and absurd its theories became, the more it degenerated into social and political insignificance; for in technical, social and economic practice, people continued to work as before, and concentrated on the here and now.

However, the phase in which philosophy was tied up with itself also had its positive side. It worked cathartically. It cleared away traditional ideological ballast, enabled us to face obsolete values without inhibitions, and it was creative, because it produced new ideas. It laid the foundations on which today's new values can be built, and showed us the point where theory and practice can join together. This is important today.

In this phase, which was like a breathing space, all possible directions were considered, because there was no orientation. This apparently undirected, unordered search has now become obsolete. Philosophy is usable once again, and is needed to determine our orientation today.

We have to appreciate those processes which enable steps already taken to be transformed into the anticipation of further steps; and we have to appreciate the processes which allow the construction of ideal models

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and the retention of progress already made. They make possible the accumulation of small steps to form greater overall progress. In the way that the coherence of its components allows any developing system to advance, philosophy has also reached a stage where the countless experiences of its practical activities can be brought together to give an overview of the problems and attempted solutions involved in the relationships between humans, technology and nature.

The work and activities we undertake every day can once again be justified, not only for their individual value, but also because together they have a much wider philosophical purpose over and above their everyday worth.

This is the real social background to the renewed debate about the terms *work* and *activity.*

There are two possible questions to be answered. The first, which is probably the more important, asks which goals and causes are involved in seizing, penetrating and changing the daily actions of the living process. The second is how to differentiate between work and activity, and how to define the relationship between them, when real developments and changes in society are taken into consideration. Of the two questions, the latter is currently seen by many people as far more of a problem than the former.

The dispute is ignited by a controversial philosophy. This states that the concept which is normally known as *work* is gradually disappearing from our society; that this disappearance justifies the claim that the term *work* is antiquated, i.e. no longer suited to describing a characteristic of human existence; and that it would be better to speak merely of *activity* when expressing what people principally do.

The argument over terms is not merely a dispute about words, definitions and conventions. It started back in the last century, when Hannah Arendt was the first to formulate the theory that working society was running out of work. She thus introduced the terms *manufacture* and *action* to accompany the existing concept of *work.* Today this discussion is no longer hypothetical. The changes predicted in Arendt's time have become social reality. The discussion concerns the following three empirical facts in particular.

Firstly, modern telecommunications have altered the everyday activity structure of individual members of society. The availability of computers and terminals connecting them to a network (now of statistical importance, in the way that the number of cars, washing machines or televisions per household used to be) has become so widespread that many activities for which one earlier had to leave the house can now be done at home. The phrase *go to work* has now somewhat lost its original meaning. Work is increasingly less bound to a particular place or time, with the result that work and leisure time become much more difficult to separate. Secondly, the number of people employed in the secondary sector in developed countries has fallen dramati-

cally in the last quarter century, and now accounts for less than 5 % of those active in the economy. Even if the percentage of those employed in the primary sector is included (between 0.8% and 3.1% in the G7 countries in the year 2019), the fact remains that an ever-decreasing number of people is involved in material production. Some important points must be considered here. This development results from the use of flexible automated technology; those people still employed are required only to oversee the manufacturing process and intervene in an emergency; such work requires high levels of education and motivation. When one bears these facts in mind, it becomes obvious that unqualified manual work has more or less disappeared.

Thirdly, there is already a group of nations with highly developed information technology, the so-called info-tech countries, in which the basic living requirements of many of the population are paid for by the state, without the recipients having to do any kind of work in return. Some countries are considering extending this basic income to all citizens or residents, with a standard rate of payment for each individual. The degree of industrial productivity must of course be ascertained, so that (regardless of the productivity of any individual) a proportion of the wealth created can be distributed to all members of society. Each individual is to be given enough for a standard of living which is determined historically and is continually rising. At the same time, the percentage of the potential national work force which has no work to do in the formal sector of the economy, or has a precarious work situation, or is employed part time or makes a loss working freelance, is higher than ever before in history. The "Two-thirds society" predicted at the end of the last millennium has become reality. Work in the formal sector has become less and less important in earning a living.

The facts cannot be doubted. The objection may of course be raised that the survey and its results focus only on the info-tech societies, and ignore the mass of industrial and agricultural countries which account for over nine tenths of the world's population. But assuming that today's info-tech societies grew out of yesterday's industrial societies, and today's industrial nations aspire to be tomorrow's info-tech nations, there appears to be a trend in the direction of information development. Even the least developed countries are being connected to the information highways. Without considering the question of whether information technology development in some societies might be blocked, it is obvious why the survey is limited to countries and economic areas which are already highly developed.

The really controversial point, on the other hand, is the question of estimating the trend and its theoretical connections.

What of the disappearance of the typical factory workers and secretaries who left home in the morning to join their bosses at a particular place and time to do their work, only returning home to their leisure time in the evening after doing their shopping?
Does this mean that work no longer exists? The typical freelancers of our time, with iNet connections at home, who plan their own time, using the computer to build products in cyberspace and earn money, or to shop, make bank transactions, deal with authorities, become active politically, educate themselves or just relax and have fun: do they have no work, simply because it is no longer stricly regulated, but rather flexible? Why were the first tasks to be farmed out to freelancers working on the computernet designated as "part-time" work? Could it not be that associating work with a particular place and time is not valid for every place and every time, but is rather a passing phase in the development of work?

The next question we have to ask ourselves is whether work disappears when material production and its associated manual activities are marginalised. The answer can only be in the affirmative if work is understood to mean manual labour. But would this not mean an inadmissible restriction of the term *work*?

What about the terms *mind work* and *intellectual work*? How does one classify work done in the information sector?

It has to be admitted that etymology supports the narrow interpretation of the word *work*. It is a word which originally had negative connotations in many languages, and these can still be found today. The English *labour* also means birth pains; the French *travail* comes from the name of an instrument of torture, and even today provides the root word for forced labour, effort and imprisonment; the Old High German *arabeit* belon-

gs to an old verb (which has since died out in the Germanic languages) which meant to be orphaned or forced into arduous service as a child. It continued to be used until the development of New High German to express great physical exertion, misery or hardship. The polish term *robota* and its related Slavic word group have a similar unpleasant flavour, and the Greek δουλια (doulia) was used in the antique period to mean work performed by slaves.

Two different semantic variations now become apparent. On the one hand we have the hard nature of the

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activity itself, the high levels of drudgery and physical exhaustion involved. On the other hand we have the uncomfortable circumstances under which the activity takes place, namely heteronomy and virtual slave driving. In as much as strenuous physical effort is deemed to be an integral part of work, it must be conceded that a change has taken place. And yet history has shown that technological transformation of work does not necessarily lead to its humanisation. Technology has indeed reduced the physical work burden, but this potential for making more human is not always put into practice. The dominant, commanding role of the superiors and the suppression and misuse of their underlings may not be swept away, and the expectations and promises which accompany the new technology may not be fulfilled.

Let us be honest: even in our information technology society, with its high proportion of intellectual work, heteronomy has not by any means been eradicated. Work stress, and pressure from one's superiors and from competitors, lead in our high-tech society to social inhumanity, which even manifests itself as physical illnesses and deformities, and general hindrance of personal development. If heteronomy is taken to be a significant feature of work, we must insist that work has most definitely not disappeared from our society yet.

Let us be honest: even in our information technology society, with its high proportion of intellectual work, heteronomy has not by any means been eradicated.

The question remains nonetheless: are physical slog and subordination required to be present in a human activity if this is to be described as work? Is it not possible that we have here two attributes which may or may not apply, i.e. are coincidental, and do not form an essential part of the work process? Is no work imaginable which is pleasant to do and determined by oneself?

Similarly we can ask whether the decoupling of work from financial income means that work has disappeared. What in reality disappears is working in order to earn a living, i.e. work which one does for remuneration in the form of money to live on, food, daily requirements, lasting consumer goods or specific services. And even the disappearance of such work applies only in the official sector of the economy, not to moonlighting, to the shadow economy, which is making on ever-increasing (albeit officially unrecognised) contribution to society's wealth. Isn't working to earn a living, like handicrafts or forced labour, merely one type of work, rather than the be all and end all of work? What about the forced labour in the concentration camps of the twentieth century, peasants working for their masters under the feudal system, or work done by slaves, which stand in stark contrast to earning money for one's work?

They all represent something which, in its time, was widespread and represented the principal activity of many people, but which has now largely lost its importance, in the same way that working for a living was the principal activity in the heyday of capitalism, but has now become much less significant.

Can this really mean that work has come to an end simply because working for a living has been marginalised? In spite of all our modern technology, nobody would dare to say that housework has ceased to exist, or that political or other types of work have either. Is such work not really work, just because it does not belong to the official sector of the economy?

Are they not all simply special forms of one and the same activity, and is this activity not work?

Should we wish to contemplate this possibility further, we must ask ourselves the following question: What is the nature of the activity we call work?

In the age of agricultural development, the term was used class-specifically to describe those who, in the established social order of the time, were considered to be lowly. Later, at the time of the industrial revolution, theorists widened both the scope of the word, to include all members of society, and the meaning, to describe the principal activity of each person. It happened this way because the towering bourgeoisie had confronted the sickly nobility with the argument that it (the nobility) was unproductive. As the bourgeoisie seized economic and political power, it devoted its interest to productive, i.e. profit-making, work and deemed this to be the interest of society as a whole. Work for remuneration thus became a conspicuous mass phenomenon of industrialised society.

Only then did work receive full recognition as an essential condition for the maintenance of the human lifestyle, and only then were the various forms of work activity seen as histo-

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ric manifestations of conformity to laws of sociology.

Work came to be seen as the epitome of human activity, the deciding factor which had enabled humans to rise above the level of animals, the very thing responsible for the progress made by humanity, the meeting point of humans and nature, which is determined by both technical and cultural factors.

Now, in the transition phase to the post-industrial information age, in which the paradigm of the information network has become the paradigm of world cohesion, we should by no means assume that the term "work" is incompatible with present reality; we would do better to take the viewpoint that it is being redefined. It has already been redefined once, namely at the start of the industrial revolution, when specific elements of the concept expanded and eventually took over the entire meaning of the word. This process is now being repeated, and was actually brilliantly anticipated by Marx when he spoke of the eventual demise of the labor theory of value.

A hundred years ago it became clear to some people (notably Teilhard de Chardin and Vernadsky) that humanity, despite its relatively low biomass, has an influence on the biosphere which exceeds that of all other living things put together, and causes changes which otherwise only take place over the massive time scale of geological alterations. The demonstrations of political power made by the dropping of atom bombs on Hiroshima and Nagasaki at the end of the Second World War were for many an unmistakable sign that an entire epoch of civilisation was coming to an end.

It was the epoch in which social development had been able to occur spontaneously, because technical and scientific progress had not become so advanced as to control the very conditions of existence of humanity.

Further indications of the end of this era were provided by nuclear accidents such as the one in Chernobyl, and the climatic and atmospheric changes occurring at the end of the second millennium. The social tensions, unrest and conflicts both in and between rich and poor nations in the last decade will not be the last of these signs, either. Humanity has fallen into a crisis of existence. It can only escape when its individual members accept responsibility for the maintenance of the global conditions required to support the entire ecosystem, and recognise their own abilities and limitations. They must also participate with awareness in the development of society, rather than simply allowing it to take place behind their backs. A higher level of organisation is required in the system of humanity. The control and regulation of complex systems, using appropriate information/communication technology to delve into the mechanism of information processing, are required. That is the hidden meaning of the information revolution.

Work today must mean contributing to this higher organisation of humanity. Work today must mean the advancement of coherent activities of the individual elements of human society in order to create a structure, a state and a functioning of the system which ensures the maintenance of the internal and external conditions of its existence. The following essential conditions must apply: each individual must have sufficient freedom of movement that he or she is able to organise himself or herself within the system; he or she must participate voluntarily in these coherent activities; and his or her contribution must be essential, i.e. without it the collapse of the system (the destruction of the human race) would be inevitable.

The term *work* has thus been given a new lease of life. As the new specific meaning is subordinate to the general meaning, the latter must also be redefined. This must be done in such a way that the justifiable historic meaning is retained, but without reducing the general meaning to an abstract notion which scorns the historic uses of the word. This generalisation transforms work from a characteristic of social systems to a general quality of a system that organises itself. All evolutionary systems do work, in order to maintain themselves, in order to prevent their own collapse, in order to protect themselves against mishaps.

The roots of this philosophy go back further than just the sixties, seventies and eighties of the last century. It was in these years that research in the fields of physics, chemistry, molecular biology, neurology and sociology led to the first steps towards the theory of self-organisation being taken; these united evolution theory and system theory to produce emergence theory. According to this resultant philosophy, the development of the cosmos is a single and unique process of new generation.

The source goes back as far as the Ionian natural philosopher Anaxagoras. He saw a conflict between the principle of $\chi\alpha\sigma$ (chaos) meaning decline and disorder, and the prin-

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ciple of $\nu o \upsilon \sigma$ (nous) meaning advancement and order. *Nous* is the force that creates order and defies the general tendency to chaos. *Nous* can thus be seen as simply the basic ability of matter to organise itself, to keep creating new, ordered structures despite the general process of decay which shows itself as increased entropy. *Nous* is the ability of systems to evolve and develop new qualities. This contradiction also played a part in French existentialism, and this is now being seen in a new light. Being contradicts and resists nothingness, which only exists in as much as it is included in the process of becoming; thus "no longer" becomes "not yet". The permanent ordering, the continual struggle against degeneration into nothing: that is work.

On the level of inorganic systems, this conformity of self-organisation manifests itself in the ability of simple dissipative systems, far from thermodynamic and chemical equilibrium, to form new structures, thus making use of energy and exporting entropy.

The elements do work, in that they co-operate to produce a particular structure, state or type of behaviour of the system, which itself then influences the elements in return - "enslavement" as the German physicist Haken said almost 50 years ago in his synergetics teaching.

Biotic systems show themselves to be rather more complicated and complex. By adjusting to the external conditions of existence, they are in a position to create their internal conditions. The Chilean neurophysiologists Maturana and Varela thus invented the term *autopoietic*, (i.e. self-producing) to describe them. The elements work by contributing to each other's reproduction, in order to reproduce the whole system, and the whole system reproduces itself in order to reproduce the elements. Such a connection is described by the figure of the hypercycle.

Social systems have greater abilities than simple autopoietic systems. They can in addition regulate the external conditions of their existence, and thus transform them into internal conditions. An Austrian, Jantsch, thus described them in the 1970's as *re-creative*, i.e. making their environment afresh. In this sense they are thus "alloplastic", in accordance with the psychological term. The next question is, how is work performed within them?

The basic elements of social systems are the labour forces, i.e. the personified abilities and skills, the human capability to work. This potential is realised by using specific tools, machines and installations. These are artificially created instruments, representing transformations of nature, which enable the conversion of ever-increasing areas of the natural world into elements of human culture, and the development of ever-increasing uses for existing objects. The products of this work, the results of the work process, serve to satisfy the needs of the elements of the social system. That is to say, the human biotic systems join together to form a social super system, which enables the maintenance of a better existence than would otherwise be possible. The metabolic cycle which provides for the needs of the individual is thus enlarged, to become a cycle of collective provision in which communal requirements are made ready in case of later need. People thus maintain this system from which they receive all their needs, and so are simultaneously maintained by it; hence they make themselves into elements of the social system and become social themselves. Once again, work is the process by which individuals contribute to the reproduction of society. For this is what they do when they manufacture products for the use of others, when they make or remake technical production instruments, when they create or re-create the necessary conditions of production, or when they create or re-create the social relationships on which the production process depends.

> The permanent ordering, the continual struggle against degeneration into nothing: that is work.

Only when their help in reproducing society is indirect, i.e. when they are restoring their own creative energies when they have been exhausted by the production process, can one say that they are not working. This activity does indeed benefit the individuals themselves, by increasing their knowledge or allowing them to recover their strength for use in later production work; but they are not producing anything which can be used independently of themselves for the benefit of others. We are talking here about the unfolding of the individual, the development of his or her personality, and the completion of his or her human faculties. This is the self-organisation of an individual element of the system, which does indeed have a purpose in itself, but whose life process is dependent on other elements of society, and upon which other elements of society are dependent.

For this reason, work is the basic activity of all self-organisation processes in society, regardless of the form it takes, in which individual activities can be integrated into the whole process.

Whether the work is done at a fixed place and time, whether it is physically strenuous, overseen by a superior, or done in return for income, are all factors which distinguish one type of work from another, but not work from non-work!

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The ways and means of co-ordinating part-time work to guarantee sustainable development of the sociosphere on a planetary scale represent not only a quantitative change to certain aspects of work, but also a qualitative change which may be used to punctuate the history of our civilisation. The principle which society has so far used to guide its development is in need of updating. It is a principle of developing some sub-systems at the expense of others; it can function only as long as the whole system is not endangered, a state which cannot continue for much longer.

It is a principle of following sub-goals without considering an ultimate goal, a principle which puts competition before co-operation. The degrading circumstances of work, such as restrictions of time and place, great physical exertion, and work only for pay, all arose because of this principle.

The development of state intervention and the social state after the First World War, and even more so after the Second, heralded the end of Adam Smith's invisible hand; moves away from capital accumulation regulations in the 1970's and 1980's were initially misunderstood as rejection of state intervention in the economy. In reality it was the start of the replacement of a mechanistic, centrally-controlled system for steering society by one which can better cope with the non-linear, complex and dynamic relations of the present.

In human society there are elements (i.e. individuals) with the gift of awareness, who, unlike the elements of pre-cultural systems, are able to perceive the system as a whole and act accordingly. They are capable of understanding the necessary conditions for the stabilisation of the whole system, when it is in a phase of fluctuation; they are also capable of acting against sense and wisdom.

Self-organisation based on the principle of co-operation is now appearing in many forms, e.g. Intrapreneurial Groups, Workers' Health Assurance Groups, Peer Group Care, Study Circles etc. Let us make this new form of co-operative life the core of a new development phase in the sociosphere in which the conditions for maintaining the whole system are duly taken into account; let us work together to bring about the transition to the noosphere!

If we do this, the word *work* will have acquired a new meaning.

That‘s work too, isn‘t it!

Following the article in our last issue by peace researcher K. Fuchser we are now continuing this hotly disputed debate with a contribution from a member of the armed forces. Like always, the opinions expressed in this column do not necessarily reflect those of the editors.

As long as there is the possibility of a conflict or emergency arising at an unknown time and in an unknown place, we will need forces which are able to counteract such threats. They may have to defend a government against rebels, support rebels who are fighting a corrupt regime, undertake rescue operations, punishment actions, measures against terrorism or drug dealing, psychological operations, or merely provide a show of force. As long as there is conflict, an army in some form or other will be required. This is a basic prnciple which today‘s society, accustomed as it is to a comfortable life, tends to forget. We work to secure everybody‘s welfare, using the means which society feels able to give us. If, due to a lack of consensus, society is not prepared to give us what we need to defend its interests, we have to make do with what we have. It is the a cynical reversal of the truth if we, the armed forces, are blamed for any mishaps which occur in our deployment in low intensity conflicts, cyberwars and netwars; we work hard, and do the best we can with the limited means at our disposal.

We are no longer the dulled characters who made up the army of the last century. The First Persian Gulf War against Iraq‘s insane dictator brought about the change. Today‘s soldier is highly educated, a technical expert and a social engineer. In the same way that the economy challenges a person and makes him or her use all available talents, education and experience to survive against the competition, so the soldier of today uses social competence to deal with the changed face of modern warfare. War today includes operations which once fell outside of the traditional definition of military action; the modern soldier exploits the social weaknesses and blocks the social strengths of the enemy. The soldier of today is the „Knowledge Warrior“, who wages war by employing (and keeping secret) better techniques and information than the opponent can. This development has led to ever-falling male domination of the sphere of war; today we can be proud that women stand shoulder to shoulder with the men, and have identical entitlements and rewards to those of their male colleagues. The development of initiative from below is also important; orders have long since stated merely what must be done, not how it must be done. The work organisation is a network, which allows the nodes (the individual soldiers) the greatest possible freedom to use their own knowledge and conscience to make decisions. As regards democracy and the removal of hierarchy, we have long been able to compare ourselves with civilian organisations.

We are not only highly qualified, we also work with the most sophisticated technology available on the market, to which we make our own additions. It has thus become possible for a well-equipped brigade of no more than 4,000 soldiers to tackle operations which would previously have required the full strength of a division. This needs to be recognised.

We do everything we can to shape technology, especially information technology, so that it supports people in the fulfilment of their tasks, rather than becoming an appendage of the war machine. That is to say, we do everything we can within the bounds of possibility. Where there are financial constraints, and the use of autonomous smart weapons is cheaper, then these weapons will become more widespread. We know that such technology touches upon a philosophy which totally contradicts our original intention of improving human abilities. Such technology leads to loss of jobs in the armed forces and the removal of people from decision loops. This may have fatal consequences which we too are unhappy about. We know that there is no guarantee that software will work perfectly; we know that the potential input (information to process) on the battlefield is unlimited, and cannot be fully anticipated even by intelligent machines. This means, of course, that errors can occur at any level of information processing, which can have undesirable consequences if people are unable to intervene. The use of precisely aimed weapons does indeed reduce bloodshed drastically, but unintended casualties from „friendly fire“ etc. remain nonetheless inevitable.

All we ask is for society to accept these consequencies rather than making us solely responsible. The malfunctions which inevitably occur in all automated weapon systems must be accepted if too many budgetary constraints are made on the military. The only way of minimising such accidents is to recognise the threat to our security from less-developed countries by making appropriate funds available to the armed forces. The U.S. system, in which independent troop-units are privately sponsored, should at last be introduced in the European Union!

Leut.Com. Mettmann,
European Academy for Strategic Studies.

News from science and technology

Moscow, Russia: Chief researcher Fred Kaporow definitely left a deep impression when he introduced "MoodMaker" technology to the fascinated press last month. According to the press release, MoodMaker can change one's mood within less than 5 minutes to whatever you like. Want to be cheerful? depressed? happy? excited? calm? Just take a shot of the appropriate substance and you will be on your way. kaporow states that his company "KapoChem" will make it into a product, probably pills, within 3 month. "Excessive testing has shown that MoodMakers have no side effects whatsoever. This straightens the path to a commercial product". However, the story goes that some of MoodMakers' tester suffer from an unidetifyable syndrome that includes a temporal breakdown of the immune system. See "imtp://kapo.chind.co.su" for information on MoodMaker and "mmp://critchem.fnord.edu " for other sources on the matter.

London, England: In the Republic of England, a family of four today spends about $40.000 each year at the food department of the supermarket, according to the Food Marketing Institute. That money trickles through an industry that is undergoing another radical change. After the extensive spreding of aquaculture in the early century we now face the advent of the food tablet. Frederic Meyer of FastQuality demonstrated a first prototype of a Food Pill that can give you all the nutrition value and vitamins of a balanced meal. According to Meyer, the food pill "won't substitute our eating culture, but it will be found in hospitals and all other places, where emergencies occur. People will have it in their first-aid package. You will find it in every life boat and it will be packed with every lifejacket". Meyer stressed that it is not their intention to compete with the current trend for extensive, pleasurable meals. See "imtp://fastqual.co.us" for more information.

Sao Paolo, Brazil: A family's Hospital visits were never something to look forward. Now NeoSpot, the R&D partner of IBM, introuced a medical tool that probably will change that. Named after the tool that was introduced by Lenard "Bones" McCoy in the classic TV serial "Star Trek", NeoSpot's "Tricorder" is said to be the first usable biosignal monitor available for sale. "Until now, we had to at least touch the patient with our monitors" Freda Satava explains in her unrepeatable way, "or even stick sensors into them. Now this is not necessary any more". With the Tricorder, most common blood tests, bodyfluid analyses and the detection of major injuries can be accomplished without even touching the patient. Check out "ibeam://neospot.ibm.bra" for details.

Massachusetts, United States: Tim Bearing, enfant terrible of modern science, tees off another hot debate: after his controversal work on possible connections between cellular communication devices and facial cancer two years ago, he has now published the findings of his latest project. In his latest report he states that he has found a "reproducable setup in which an electron can be controlled by the will of a trained person". Bearing states that "once this technology is developed, we will be able to transport matter be means of our thought, and probable even levitation is on our doorstep". His paper is being heavily discussed within the physics community, while the most prominent scientists refuse any comment. "Bearing once again proves his qualities as a phantastic story writer, but as a scientist he is not even worth noticing!" says Prof. J. D. Manhearth of Stanford University. However, Bearing's study will be tested by a number of labs all around the world. For the latest information, check "imtp://bt.crowley.priv.us"

Peking, China: After the death of the CD within the first decade of the 21st century it looks like the days of it's successor, the FlashCard, are numbered too. Fto Neng Technology last week showed off it's first prototype of a new holographic storage device. Since with holography, the whole picture is encoded in every single fragment of a broken hologram (with of course varying quality), storing data with a holographic technology could at last bring us the quasi-indestructable data carrier. According to voices from Fto Neng, holographic storage offers "nearly infinite capacity. We could store data with high redundancy and still have, for today's standards, ultra high storage density, combined with maximum security. And, if you want to share your data with a friend, just break off a piece of your holographic data carrier and hand it to her. She won't have maximum quality, but she can see everything." However, asked for a introduction date nobody was willing to answer. The technology is, so they said, still in it's very initial state of development. See "mmp://holo.fton.chnet" for details.