

In this Issue

Warner's 'Human resources implications'

The nature of the manufacturing process has been irreversibly changed during the past decade. The integrative, multi-purpose and multifunctional technologies reverse, for the first time in history, the ancient process of the division of labor. Not surprisingly, the impact of these integrative technologies on work and working has been correspondingly profound.

Professor Warner explores, with great competence and insight, how work skill-needs are changing and how a new occupational profile emerges in the enterprise. He also discusses the implications for training, selection and recruitment.

The reader should be cautioned about the use of the word 'microelectronics': this should be understood to be as broad a concept as what is commonly referred to as 'high technology'. No narrow and specialized type of hardware is implied by the use of 'microelectronics'; it can be substituted, for all practical purposes, by *high technology*.

It is not only the electronics but also industrial ceramics, optical fibers, satellite communications, biotechnology, etc., which are exhibiting the same or similar impacts and effects as microelectronics.

Adam Smith's 'extent of the market' is still a crucial constraint on the division of labor: except that its continued growth manifests itself not in further division, but in reversed reintegration of labor and knowledge. This is new and exciting. Professor Warner is aware of this 'Great Reversal'. *Flexibility*, again, is the keyword.

Because of the integrative nature of high technology and its rapidly declining costs, companies of smaller size, with small coordinative infrastructure and services, can actually benefit most and most expediently from flexibility. The 'small is beautiful' acquires a new meaning: it is not

'beautiful' in any psychological, ethical or individual sense – it is more beautiful because it is also more flexible, more productive, and more profitable. Popular intuition becomes a hard business fact subject to scientific explanation.

The times of inflexible automation, erosion of worker skills, and increased emphasis on separate planning activities are now past. It is nothing less than pathetic to see some activists suddenly extolling the virtues of factory work, intense specialization, rigid commuting patterns, and the loss of skills: factory is a place for socializing, they insist (meaning that workers can play poker and smoke dope during coffee breaks). The symbol of worker's toil and degradation, the nine-to-five drudgery, is being sold as the greatest invention of man for a place for human relationships and socializing. These social 'thinkers' should simply spend a year on the line to realize how fulfilling the mass-production line is.

At last, small-batch production becomes viable at something nearer to mass production cost-levels: new patterns of skill-utilization are emerging.

Malcom Warner concludes that not only workers but *primarily managers* must be broadly educated and not just narrowly trained. We might add that it is truly the *management and its obsolescence* which represents the biggest threat to the competitive survival of most firms. Specialized worker – so be it; but specialized manager? A person who can only understand balance sheets, NPVs, ROIs and leverage? The modern world of management now shivers at the thought.

Some still worry about the loss of jobs. Yet, the part-time employment, self-employment, homework, telecommuting and do-it-yourself are on the rise. They also solve, quite elegantly, the luddist's argument.

Heller and Rawlins's 'Agriculture systems research'

It is now becoming self-evident that in most of the sciences, in systems research, and most im-

portantly in business and management theory and practice, we are all waiting for the opponents of progress, innovation and organizational change – to die. The enormous wealth of the new philosophies, technologies, practices, insights and systems continues to be aggressively ignored, misinterpreted and misunderstood by the ‘still-in generation’. There is no way of convincing the ‘old guard’ and make them to see the light through a rational reasoning.

That’s how the authors of this paper start: by quoting the famous Law of great Max Planck (which was later so skillfully popularized by Thomas Kuhn) saying that one cannot hope to convince the opponents of new scientific truth; one’s duty is to survive and persist long enough for the opponents of progress to die off.

We are now on the verge of that historical transition.

The opponents of systems approach, holism, high technology, process and human-oriented management, transdisciplinarity, multidimensionality, knowledge integration and striving for continuous change are now close to their point of departure. The new train is being loaded, there are still few seats left, but the whistle has already been blown.

Stephen R. Heller and Stephen L. Rawlins are from the Agricultural Systems Research Institute of USDA and they know, perhaps more acutely than others, about the painful need for interdisciplinarity, broad and integrative education and enhanced flexibility of focus. The ravages and damages of expert super-specialization could lead to unbelievable degradation of human integrative capacities (even a short exploratory paper in experimental high-energy physics can today have more than 100 co-authors).

Only a few realize that *information is not knowledge*, and further, that knowledge is not wisdom. Knowledge requires the existence of a theory which would interrelate separate parts (pieces of information) into a coherent whole. Armies of hardware-driven specialists are generating masses of ‘pieces of information’, nobody sees the whole, knowledge is degraded, wisdom is disappearing. *The only way to manage the whole system is to understand the processes and linkages among its components.* How simple – and yet how remote from the information systems binge which is now holding everybody back and away – from thinking.

Heller and Rawlins show clearly how in agriculture, using the examples of conservation tillage and range management of both crop and soil systems, the need for interdisciplinarity and integrated knowledge approach cannot be further ignored. ‘Develop the means for integrating scientific knowledge’ is their simple message. We might add: ‘Do not develop the means for further, faster and efficient splintering and atomization of knowledge, please’.

Tomáš Bat’a, the great entrepreneur, compared his management system of business enterprise to that of self-sustaining farming and agriculture: you have to till and you have to plan, you have to rotate and you have to pay attention to the whole – always. And: *there is no short run, ever.*

Interdisciplinary (ultimately transdisciplinary) teams are needed to develop the agricultural management systems that can reduce production costs, maintain or improve quality, reduce losses of products, and conserve soil and water resources. In other words, the same need which applies to sound, long-term oriented (and thus non-existent) business practice of the modern times.

The community of *Human Systems Management* supports the new initiative of the Agricultural Research Service.

Manske and Wobbe’s ‘Computer-aided production’

The use of computers in production control is changing the very nature of production: small-batch production is becoming as efficient as traditional Detroit-type mass production. But that is their smallest and least significant achievement: the nature of management, work organization and planning is changing as well.

The special-purpose machines are on their way out, multi-purpose or general-purpose machinery has entered. They are being combined with *flexible systems* which are increasingly necessary to tackle the explosive *coordination problems* within firms.

Current production and software development practices seem to be still unaware of both ‘flexibility’ and ‘systems’: they tend to exacerbate the tayloristic division (or, better, ‘atomization’) of labor because they aim explicitly at the separation of planning and execution function. *The sep-*

aration of planning and execution into distinct tasks, phases and responsibilities, was and remains the curse of western management.

Modern production systems have to meet economic as well as human objectives and establish an acceptable production culture through small-batch manufacturing. According to Manske and Wobbe, production control cannot be separated from the social relationships within the firm.

The authors discuss two typical responses to the still prevailing separation: (1) *total planning*, centralistic 'foreman organization', and (2) *framework planning*, coupled with decentralized responsibilities.

Advocates of the first approach still see the emerging computing potential as capable of handling small-batch productions as mass production through extreme division of labor, exact scheduling and rigidly specified processing sequence. *This is an inappropriate, self-limiting and un insightful approach.* It must translate into economic loss by definition. Mass production is OUT – not only technologically, but organizationally and managerially as well. The degree of adherence to centralized total planning, and its separation from execution, could be taken as a measure of growing managerial obsolescence and incompetence.

It is necessary, mandatory and unavoidable to shift from total to only framework planning and combine it with decentralized, autonomous and personal execution of plans.

Instead of adapting production, organization and people to planning, the approach must be reversed: design new and further evolve and maintain existing structures so that a wide range of planning alternatives can be dealt with. This sound principle applies not only to production planning, but also, and perhaps even more importantly, to strategic planning as well.

In the traditional approach the worker has no organizing or coordinating function, cooperation cannot exist by definition (there is nothing to co-operate) and the extreme division of labor degrades humans beyond endurance. Re-integrating the labor into larger 'packages' (8–20 'traditional' processes) leads to enhanced flexibility, skills expansion, cooperation and increased communication – a corporation rather than a mere aggregate of men emerges.

Computerized centralization and Computer-aided decentralization: two fundamentally different

paradigms of management, yet both claiming the use of and reliance upon computers.

Although the authors pose the question: 'Total planning or framework planning – which will prevail?', and answer in favor of the latter, it is not very risky to state that such question should not even be asked. Flexibility, worker autonomy, re-integration of labor and knowledge, decentralization and direct personal responsibility will prevail.

Schmid's 'Managing the environment'

Hillel Schmid from the Hebrew University in Jerusalem continues to explore the effective management conditions in human service organizations. In this paper he concentrates on 'the Environment': human service organizations have a rather vague relationship to 'the environment'.

The issues would become clearer if the label 'environment' was replaced by such specific categories as taxpayers, consumers, suppliers, politicians and *human beings*. It is certainly to the lasting discredit of organizational 'sciences' that they even venture to speak about 'environment' in both social and human context. 'Managing the environment' is then a concept one step beyond...

Many *private* human service organizations are proving to be extremely successful *because* they have dropped 'environment' and replaced it with 'human beings': this is not just moral or ethical, it is a *better way of doing business*.

Hillel Schmid from Jerusalem has reviewed most of the 'environments' which have appeared in the business management literature. The conclusions are: environments should be matched, scanned, reduced and managed. Environments are complex, turbulent, unstable, dynamic and even 'rich'.

But how does one deliver a *human* service to *human* beings while realizing profits and not wasting their tax money? Professor Schmid offers his answer: 'The greater the ability of the human service organization's director to predict the modus operandi of competitive organizations already in existence and those which may appear in the environment the organization is active in, the easier it will be for him to gear himself accordingly and to ensure a flow of resources to the organization he administers'.

Thus the Director becomes the focus: he can compete, bargain, coopt, form coalitions, di-

verify, find a niche, grow, sign contracts, apply pressures, and disrupt strategies – but can he deliver *human* service to *human* beings? Can the Director do that?

Of course: he can convince key elements, achieve legitimation, negotiate and establish exchange agreements, ensure support, and study and anticipate; he can also scan and gather information on the task environment.

Tax money are becoming scarce; human services are increasingly privatized and finally run as businesses should; directors, vice-directors and their advisors are being cut back; computerization is freeing workers to concentrate more on humans and less on paper; taxpayers demand quality and dignity; people prefer to be directly involved through self-help, self-service and self-diagnosis. All these and countless other changes represent a fundamental shakeup in the delivery of human services.

Can 'Directors' survive all that change by simply equipping themselves with 'an array of strategies'? That remains to be seen.

Medland and Inglis's 'CAD'

CAD (Computer-aided design) is very much part of high-technology revolution. High technologies are the technologies which allow us to do things differently and to do different things, not just to do the same thing more efficiently. CAD certainly qualifies as high technology, especially as an integral part of a computer-integrated system.

Dr. Medland holds a Chair in Computer Base Design at Brunel University; Stephanie Inglis completed comparative analysis of CAD techniques in 1984. Their work is welcome in *Human Systems Management*.

The readers with their own work stations are quite aware that the integration of CAD into manufacturing, service, office and home practices is proceeding at a furious pace. CAD today ranges from simple automated draughting to complex simulation of design models.

CAD supports the creation of new products or new service systems. Designing of systems is becoming a major productive activity in which the consumers themselves will take part – becoming 'prosumers' in the process. It is only a matter of time when the 'great software designers' realize

that CAD *must* be married to expert systems, decision support systems and artificial intelligence: all at the same time.

'...and now back to the drawing board', a metaphor of our management fathers, is on its way back to CAD. Modern executives and managers are now *fluent* in computers, including CAD. Computer 'literacy' is certainly inadequate, even for the illiterate. Except that CAD itself is still rather an unorganized patchwork of disconnected techniques. That's how we used to go about developing technology: piecemeal. Only now we are catching the first glimpses of *integrated systems*.

Both Medland and Inglis would probably agree with this view. They themselves call for richer interlinks of CAD with CAM (Computer-aided manufacturing). Many CAD 'implementers' still concentrate on the improvement of individual elements rather than on their integration. They still try to substantiate the CAD investment via payback period, or something. Few realize that CAD is a *different* way of doing things and should not be measured by criteria applied to the old ways.

The authors again affirm how important is top management's full backing of the high technologies. But mostly they are reluctant: fluent use of high technology undermines the authority of those who are in charge (i.e., only computer-literate), thus risking creating of resistance to the use of a system they do not understand.

The challenge to Human Systems Management is obvious: *how to make low-tech top management functional in the high-tech environment?* It is becoming not only tiresome, but outright unacceptable, to take seriously all those talks and even 'scientific' studies about 'fear of technology', 'resistance to change', or 'executive stress'. Are professional managers asserting their professionalism through fear, resistance and stress? Of course not. Professionalism still does involve more than just 'being paid for it'.

Operators similarly complain of backaches, eyestrain and headaches. Some of it is of course due to inadequate ergonomics, but some of it is, and permanently so, due to increased demands on the usage of head rather than muscle.

The authors conclude that CAD systems are not and should not be simply computerized versions of manual techniques: CAD *is* a different

approach, different technique, different technology. CAD is high technology.

Mitroff's 'Bigger is not better'

Professor Mitroff from the University of Southern California prepared a paper on the emerging logic of the Second Industrial Revolution. His message is similar to the increasing number of private and governmental reports: 'Our systems – most of them – do not need repairing; they have to be rebuilt. Our thinking does not need improving; it has to be changed.'

Systems of education, health care, management, national defense and most governmental projects – all have to be changed, fundamentally. This requisite (and mostly spontaneous) change is being slowed down and interfered with by our outmoded ways of thinking.

The need addressed by Professor Mitroff has been amplified quite recently by the nuclear disaster at Chernobyl, the failures of NASA, the epidemics of international terrorism and the continued inability to streamline the nuclear strategies of the two superpowers.

Professor Mitroff expresses his profound skepticism about human ability to write computer programs for the Strategic Defense Initiative project. The complexity of a full defense system is staggering – obviously much higher than the traditional offensive weaponry. Humankind has a long history of replacing older and simpler systems by newer but more complex systems. In order to manage systems of today's complexity we have to change our ways of thinking, our ways of management and our ways of systems design. Also, as W. Edwards Deming teaches 'It is no longer possible or affordable to trust – we have to *know!*'

Professor Mitroff argues that the age-old 'more is more' and 'less is less' ways of thinking are not effective any longer. Examples from nuclear weaponry are highly illustrative: building more and more offensive weapons does not solve anything; the same for building bigger offensive weapons. Building less and less (or smaller) offensive weapons leads to enhanced insecurity, mistrust and instability.

Professor Mitroff states: 'At a certain point, "more" or greater numbers of weapons does not lead to "more" felt security but just the reverse or

"less".' The new break, new reframing of the situation is needed: the continued emphasis on mutually assured destruction of the offensive weaponry is impossible.

As Mitroff correctly identified: most of our problems are *systemic*, therefore our solutions must be systemic. The problem is not with repairing the systems which actually brought about our difficulties, but with changing them.

Mitroff also mentions that *single* number or measures – no matter how desirable they are on the surface – will *not* benefit the system as a whole. Operations research and management sciences have devoted *all* of their history to the elaboration of such inadequate single-criterion methodology. In 1972 Multiple Criteria Decision Making (MCDM) emerged as an independent area of inquiry. Yet, there are even today some students who receive less than thorough education in MCDM – this in itself is an inexplicable phenomenon.

Along single dimensions men cannot travel anymore. Only along single dimensions more leads to more and less leads to less, or more leads to less and less leads to more. In the world of complexity and multiple dimensions 'more' or 'less' become dated single-dimensional categories. Emerging multidimensional categories involve labels like better, different, effective and desirable – i.e., *human* categories. So, it boils down to humans and their thinking: technology does not fail, technology does not kill – *humans* (and their patterns of thinking) *do*.

We are entering an era when doing more (or less) of the same thing is no longer desirable. Now we have to do things differently and – most importantly – *do the different things*.

'We are the prisoners of our old machine age view as to what constituted knowledge,' concludes Professor Mitroff. 'The systems age has changed all of this. Uncertainty and imperfection are *inherent* features of a complex system, and hence, of knowledge about the system itself.'

Until now we have tried to conquer complexity by learning more and more about less and less. It ain't working.

Morgan's 'The Challenger decision'

The Challenger disaster serves as a prime example of organizational, decisional and judgmental

failure of American management. Yet the requisite and potentially rich lessons are drawn only reluctantly, if at all.

Margaret Morgan focuses on the role of a metaphor: its aggregate and sweeping effect on the minds of men, and their inability to 'snap out' of its domineering and often subconsciously felt influences.

The metaphor is the 'gung-ho', war-like sloganeering of the 'can-doism' of the frontier long past.

This is only one of many plagues of today's American management: doing before thinking, thinking before preparing, training before education. The 'we can do it' attitude of lesser minds, although admirable and seductive in its resolve, fails repeatedly in its long-term outcome.

Such approach is *unprofessional* and the 'gung-ho' style of management is a symptom of the rapid decline of professionalism in management and business. Professionalism does not mean that somebody is being paid for something: many ditch-diggers are. Professionalism is characterized by assuming (and being qualified to assume) long-term responsibility, employing experienced and considered judgment and not succumbing to the misplaced endeavor of 'image building'.

Morgan argues that metaphorical thought patterns can be dangerously limiting if the metaphor model becomes confused with reality or if the analogy's points of interface with reality are too few or too unimportant. It can lead to a simple-minded conviction that anything we seek to accomplish follows automatically from decision assuming enough will. The 'When there is a will, there is a way' is a tragic misplacement of values, leading more often to the 'ways' of frustration or

crime than to reliable ways of solid professional achievement.

As we are all 'boldly surging ahead', we are being soundly and resolutely 'beaten' by the quiet and slow Japanese and Korean businessmen and managers, beaten at our own game.

We still remember the Challenger ('the flying brickyard'), and its human ants running around and pasting the loose bricks back on, trying to pry the doors open (no keys or screwdrivers in sight), or shouting that all school kids of the nation are watching the 'crazy quilt crew'. After the pains of needless human sacrifice subside, a lasting impression remains: unprofessionalism and incompetence.

We have all become hostages to the *extreme division of labor, division of knowledge and division of responsibility* – a nation divided. We have become a nation of narrow specialists, dependent on others and therefore blaming others for our own failures. We seem to know more and more about less and less. Approaching the extreme end, 'light at the end of the tunnel', we are assured of our destination: knowing everything about nothing.

'If it's not your job, then whose job is it?' must be the most often asked question of our 'divisionalized' era. It is being asked in response to the most frequently uttered statement on the facts of our life and the state of our union.

Margaret Morgan, after immersing herself to study the role of dominant metaphors, remains extremely skeptical at the end. Her concluding statement is really a sentence, of sorts:

'So, NASA is getting going again but with no plans to understand decision making in general and no assurances that "can-doism" will not be replaced by a new but equivalent "ism" to base their decisions upon'.