

In this Issue

Haley's 'Effective business strategy'

Professor Haley translated his experience with the Komatsu Company into valid and useful observations on developing an effective strategy for business, especially if based on employee motivation via quality circles.

It is important to realize that quality circles (QC), like any other 'Japanese' technique, cannot be simply copied. It is not an invention of 'enlightened' management, and must be part of an overall system design, including strategy formulation. Haley understands that. Quality circles are intimately related to total quality control systems and cannot be separated from them. QC emerged spontaneously as a response of workers to certain conditions created by TQC; they were only later 'institutionalized' by more perceptive managers. Only in such a way can a strategy succeed: it must be a natural, almost spontaneous, result of a process involving large numbers of participants. It cannot be simply dictated by top management. QC, as a management tool, must be in harmony with company organization and strategy to be effective: one can never make QC work within an inappropriate, unadjusted, and old-fashioned hierarchical organization. And that goes for the Japanese as well; they too can misapply or blunder QC potential.

The above process of strategy formation leads naturally to self-control and self-management. Systems can be organized either so that workers must be managed from the outside, by armies of 'managers', or so that self-direction, self-control and self-management are encouraged and amplified by the organizational design itself—like total quality control combined with the just-in-time system. So, the question is, How do we wish to organize our system? And not, Should we 'introduce' quality circles?

Haley concentrates on the steps to be taken by management to ensure that the newly emerging QC are viable, effective, self-perpetuating, and in harmony with the company strategy.

It is obvious that one can even organize a system where workers deliberately make mistakes and errors, introduce faults, and induce slow-downs in order to create more work for themselves, secure employment, and become indispensable: also a (mis)quality circle of sorts, emerging on its own, in spite of proclaimed (and therefore useless) company strategy!

Haley also mentions that, of course, there are many Japanese governmentally run companies, with strong, socialistic workers' unions, where quality circles are strongly opposed: QC increase workers' responsibility for earning their pay and not everybody seeks *that*.

Among the conclusions and insights of Haley's paper is the notion of strategy *evolution* through combined top-down and bottom-up processes. Strategies are not set and proclaimed, they must be evolved and naturally embedded in the system itself—if they are to be successful at all. Such strategy allows management to exercise 'legitimate' leadership and individuals do not have to be compelled to act. They act voluntarily not because they have subjugated individual goals to company purpose—not at all—but because the company purpose was creatively derived from individual goals; proper systems organization being the means of achieving such harmony of goals and purpose. The sense of cooperation emerges through individual striving for excellence and achievement.

The point is not to hammer out *the* strategy, but to assure that an innovative process of continuous strategy evolution and readjustment is encouraged and maintained. The problem is not this or that decision and its 'quality', but a mastering of a decision-making process compatible with the human system in question. The problem is not to learn this or that, but learning to learn. Because management should be, more than anything else, management of change, innovation and creativity. The problem of management is not management of people but management of conditions allowing people to manage themselves: human systems management and human management of systems.

Kolodny's 'Work in Sweden'

Japan is not the only country striving actively for small-batch automated production: according to Professor Kolodny's report, Sweden continues to provide leadership in work organization designs on the factory floor.

More than that; in an accompanying comment, Stefan Agurén describes a unique developmental project, the Swedish Programme on New Technology and Human Resources, a five-year experiment to set up normative examples of how high-technology automation and the working environment can be made compatible.

Kolodny calls the happenings in Sweden a gradual revolution. The trend is toward small, hi-tech, self-sufficient, efficient units characterized by impressive flexibility. 'Small is beautiful' is going hi-tech, division of labor out of the window, economies of scale towards economies of scope, etc. – the working place is changing again and it is *not* the legislated workers' participation that is at the forefront. A renewed reluctance to involve workers in high-technology engineered designs represents a long-term switch, the impacts of which still remain to be assessed.

As in Japan, some of the tools are obvious: zero set-up times, just-in-time systems, close-to-zero inventories, with the exception of total flexible manufacturing system. Machine operators are becoming 'area supervisors' and the need for them is decreasing. They reprogram computers, plan work flows, repair and maintain equipment; their job is more demanding, more challenging, more interesting, and more rewarding.

'Flow groups' and 'group technologies' are new organizational units. Old job shops, with all their queuing, waiting times, scheduling, buffers, and other props of mismanagement are being abandoned, now also in Sweden. American theories of inventory control, scheduling, and queuing, also known as operations research, are out of place in a new setting.

Materials handling is becoming increasingly automated. Programmable, self-propelled carriers fetch the parts from high-stacked programmed storage areas.

The problems of 'workers participation' and 'co-determination' are becoming increasingly difficult to manage. Union stewards are not interested in participating in decision-making planning,

design and quality management; they are interested in job guarantees, pay levels maintenance and contracts. There is no one interested in talking about the redesign of a particular work area or about ways to introduce a new technology. The implementation of quality circles in Sweden is still in its talking stage. This is similar to the American misunderstanding of quality circles: they cannot be implemented, they are not tools of management. Rather, they are a spontaneous workers' response to a particular type of work system organization, which can be 'institutionalized' by management later.

After 'high' technology, there is a 'high' commitment work system. High commitment is a new philosophy about people at work, including participation in the design of their workplace. This does not exist anywhere yet. Management seems to be often willing; are workers interested or even able? Absenteeism in Swedish 'enlightened' society is often as high as 30%. This is much higher than in the Soviet Union and East European economies where there are strong economic reasons for high absenteeism. This is blue-collar absenteeism; white-collar absenteeism is virtually non-existent. Why not, then, think harder and better, about such concepts as high commitment and workers' participation? So far, high-tech means more high-detach than high-touch. People, unless forced and coerced, will not exhibit a tendency to socialize at the place of their work – the worst place for socialization ever designed by man. They will have a tendency to stay away, as much as they legally (and illegally) can, in order to establish an alternative pattern of self-supporting and self-service activities at home. White-collar workers are soon to follow.

Thompson and Scalpone's 'Factory of the future'

Harry Thompson and Russ Scalpone are both practicing consultants with considerable experience in the field of high technology management. They do not only identify problems but come up with meaningful recommendations for managers.

It is being increasingly recognized, especially within *HSM*'s new focus, that it is the *management* (rather than hardware or software) of technology which represents the most important chal-

lenge for the future. Not management in the engineering sense, but management of people in their new association and interface with high technology: management of human systems. Thompson and Scalpone recognize this and go well beyond the usual hardware/software considerations.

Highly (or fully) automated manufacturing technology (CIM and FMS) is now available. In this sense this is not the factory of the future but the factory already existing today. It represents such a revolutionary departure from all our previous manufacturing efforts that no management theories of the past apply. In the future we shall have to learn to manage humans in such factories and to evolve entirely new sets of management experiences, theories and principles.

News media and news media-influenced 'management' have concentrated on the issue of labor displacement, labor retraining and union demands. Yet, the key issue all the time has been: organization. One cannot introduce high technology without profoundly changing organization of work. Organization and use of the human resource is a critical factor in the successful implementation of high technology. High technology does *not* mean doing the same things as before but faster and more efficiently. It requires doing things differently and doing different things. Managers who fail to understand this are already out of step and 'defined away'. Managers who cannot manage fundamental organizational change will become a burden and problem for technological companies.

There are even today some business schools which do not train our future managers vigorously in FMS, CIM, CAD/CAM, Robotics, and all the human, organizational and management issues associated with them. They still teach 'economies of scale' when it is the 'economies of scope' that are becoming the main concern of practice. High technology is *not* 'just another capital investment' and it should not even be thought of as such.

Traditional specialization and 'division of labor' are among the first to go: rigid hierarchies with highly specialized job responsibilities are ineffective in running an FMS; a flexible, integrated team-style job structure with few job status differences are best suited to the FMS. Multidisciplinary of knowledge, broadness of skills, integration of tasks, problem-solving ability, and intellectual curiosity characterize a new worker. Far cry from the traditional economists' 'divided

labor' or 'labor divisioned'. Agonizing simplicity and degrading boredom of traditional jobs and tasks (outcomes of zealously pursued division of labor) are finally on their way out.

Thompson and Scalpone recommend:

- (1) Concentrate on preparing rather than just eliminating people.
- (2) Workforce knowledge and skill levels are more important in the FMS than in a traditional manufacturing environment.
- (3) Labor practices based upon 'scientific management' don't fit the Factory of the Future.
- (4) The integration of functional disciplines is required to operate an FMS.
- (5) Automation does not assure quality.

Schultz-Wild and Köhler's 'New manufacturing technologies'

Computer Integrated Manufacturing (CIM) has a long time ago passed from the 'experimental' stage into the category of important practical tools for improving manufacturing productivity. As we often stress in *HSM*, it is therefore high time that the attention be shifted from hardware/software issues towards the management (i.e., human systems) problems.

Schultz-Wild and Köhler selected the issue of 'manpower': surprising as it may be to technophobes, manpower still has the *key* role in complex technological systems. What is needed is a *homogeneous* job structure and higher than traditional level of skills. The authors use a case of introducing FMS in a large West-German metal manufacturing company.

We, of course, cannot yet assess all and full impacts of CIM on workers, organization and nature of work. One thing is clear however: our management principles and practices will have to change, most likely in a radical way. Our economics will have to change as well. It is never too early to start thinking along these lines as they are *the* crucial aspects of technological revolution, not the hardware and not even the software. Yet, it is the managerial/organizational understanding where we are most (and often hopelessly) behind the reality of this age. Wait-and-see attitude, although wise and prudent for individuals, is entirely inde-

fensible for companies, states and nations. To be left behind in understanding the managerial impacts of high technology implies only one thing: to be left behind.

What are the major manpower issues? There is labor displacement and resulting social conflicts. The work *must be* restructured and redefined, working conditions redesigned. CIM cannot function without people as a key factor.

Ignoring these problems, especially in the U.S. companies, leads to 'economic disasters' based on ignorance and incompetence as well as on excessive 'hardware blinders'.

The authors argue and demonstrate that no significant job loss due to CIM introduction is possible in the short run. Outdated skills will have time to phase out in an orderly fashion. Requisite skills will have a chance to be evolved over a period of time. In practice, when high technology is *actually* introduced, there is little worker resistance – that appears more a priori, as a response to expectations.

The shift in union policy, calling for reduction of working hours, has now been complemented by concerns about work structure and work organization. The older short-term wage bargaining is now an ineffective and outdated issue.

The most fundamental and most exciting concept put forward by Schultz-Wild and Köhler is the notion of 'homogeneous' skill or expertise. This is one of the recognitions that the age-weathered and often revered (by orthodox economists) notion of ever-increasing division of labor is finally being overcome. The automatization of economy and society is showing signs of reversal towards synthesis and re-homogenization of skills – thanks to computer-based high technology. The reversal of division of labor trends will reverse the trends toward more and more hierarchy (in itself a result of excessive division of labor).

The problem arises when new systems with a homogeneous job structure are to be integrated into traditional departments characterized by strict division of labor and specialization. This is a serious transitional problem which is crucial in the short run (thus especially in the U.S. managerial framework). In the long run, the advantages of CIM-combined homogeneous skills are undisputable and certainly represent the wave of the future. Through articles like this, *HSM* attempts to bring you there.

Enk and Hart's 'Strategic problem solving'

Professors Enk and Hart note that the decision tools and techniques of the past 30 years (especially those associated with the OR/MS/DS operational 'sciences') are not useful for strategic problem solving and decision making. They suggest 'eight steps' as an initial approach toward developing more useful literature and a methodology concerned with the strategic issues.

Enk and Hart mention that 'strategic' decision situations are shrouded with uncertainty (yet they omit modern risk-analysis techniques), characterized by multiple interests and perspectives (yet they do not bring Multiple Criteria Decision Making to the task), and inherently ill-defined (yet they do not mention models of fuzziness and approximate reasoning); they recognize these problems as 'conflict-ridden' but do not deal with or even define what conflict is. The reader will ask: What then is this eight-step approach? What does it have to offer if it can afford to be so disassociated from the decision sciences?

The authors say: The approach attempts to move interactively toward a response that all participants and the client can both understand and endorse. Is this philosophy reminiscent of interactive programming within MCDM and Decision Support Systems (DSS) in general?

The eight-step approach, in essence, is a process for facilitating interaction among individuals associated with a decision process who hold multiple perspectives and offer different kinds of knowledge and information about an issue. In short, ESA relates to *all* decision situations of importance and organizational significance.

The authors differentiate themselves sharply from the so-called Keeney–Raiffa kind of analysis which assumes all information to be known from the outset. Similarly they put a distance between themselves and the so-called 'voting procedures' associated with the name of Arrow. Less clear is why they separate themselves from Decision Support Systems (Keen, Scott Morton), Decision Dynamics (Yu), Interactive Programming, Multiple Criteria Decision Making, Approximate Reasoning and Fuzzy Sets, etc.; all these approaches are explicitly related to technology, networks of personal computers, and decision support.

The following are the *eight steps* recommended by Enk and Hart:

- (1) scoping,
- (2) identifying people,
- (3) information search,
- (4) discovery of emerging knowledge and concerns,
- (5) surveying potential participants,
- (6) profiling survey results,
- (7) interactive workshop(s),
- (8) reporting and follow-up.

They describe an application of the above sequence to power plant siting in New York State. This is an extremely important example as power

plant siting is a rich and well-covered field of Multiple Criteria Decision Making (MCDM). Thus a useful comparative analysis can be performed (perhaps in the follow-up article).

The authors conclude that the ESA could be especially useful in resolving conflict situations arising around vexing public/political issues. Multiple interest groups are brought together and consensus is actively searched for in a structured, organized fashion. Issues of economic revitalization, industrial and technological innovation, and hazardous waste treatment, are specifically mentioned.