In this Issue

Ronen and Palley's 'Financial vs. manufacturing MIS'

Why are relatively useless financial MIS systems well developed and broadly implemented while desirable manufacturing MIS are still underdeveloped or failing? What are the key differences between financial and manufacturing MIS systems? Why do we develop financial data reporting at the times when we are failing broadly in the non-financial data area? Why are manufacturing MIS so difficult to evolve and subject to design incompetence while financial MIS are virtually fool-proof and insensitive even to gross errors of judgment? Do we simply develop what is easy and useless rather than what is difficult, challenging and crucial?

These and similar questions are addressed by professors Boaz Ronen and Michael A. Palley from New York City, the very source and hotbed of financial MIS which are so irrelevant to U.S. competitive position.

What are the major differences? Financial MIS provide information about assets, liabilities, income, cash flows and ongoing litigations, NOT on productivity, quality, customers and human performance. Financial MIS are being used by external, or absentee parties, chief executives and financial managers, NOT by internal parties, operations managers, supervisors, and heavens forbid: employees themselves. Financial MIS report monthly, quarterly or yearly (due to bounded rationality), NOT continuously as is needed. Financial MIS are good for accounting policy, NOT for any other policy or strategy important or useful for the enterprise.

The above are crucial and fundamental differences. They spell differences between 'fast buck' and 'sound management'.

There are other differences, equally important. Financial MIS deal with relatively few types of numerical data, NOT with a large variety of data in the quantitative–qualitative spectrum. Financial MIS process large volumes of irrelevant and redundant data, NOT small volumes of high-quality measurements. Financial MIS rely on long-term lifespan of static data, NOT on short-term and continually evolving dynamic types.

Again, even the least complex manufacturing MIS is likely to have more demanding characteristics than the most complex financial MIS. One more good reason for specializing in selling financial MIS systems.

Manufacturing people are informal, creative, flexible, less disciplined and product- not information-oriented. Financial people are formal, rules-oriented, rigid, disciplined and purely information-oriented. One more reason for MIS 'experts' catering for financial people. Format of financial MIS must be relatively rigid, NOT relatively flexible, artificially 'accurate' (decimal places syndrome) and tangible in appearance (although not in substance). All these are essential ingredients of simple-minded computer 'programming'.

The situation is so apalling that even pointing out the issue, as the authors have done, is an act of courage and wisdom, a first step in the pursuits of a new, more even allocation of systems development resources to tap the potential of manufacturing management systems development.

But then again: Who in the U.S. needs to take first steps in anything today? Aren't the last steps equally good and perhaps more profitable?

Trépo's 'French job redesign diagnostics'

French Job diagnostics is presented to non-French people via GRID and ACTIF methodologies. Professor Georges X. Trépo from Jouy-en-Josas has prepared for *HSM* an extensive, comprehensive and useful summary of the diagnostic approaches in France.

Improving the *quality of work life* is the underlying phenomenon, often referred to as '*Arbeit Humanisierung*'. In the U.S., in the Orient and in other countries of Europe the emphasis on the

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quality of *work* life has been long recognized as incomplete and inadequate because the *workers' quality of (whole) life* is the real issue. Separating life into 'work life' and 'non-work life' (or 'work non-life') has never fired real interest outside France, Germany, England, Denmark, Holland and Italy. It is therefore quite exciting to see what job redesign means for improving the 'work life', what are major diagnostic tools and perhaps ask how is the improvement in work life related to improvement in life. This introduction should clarify the difference between our QL (quality of life) and their QWL (quality of work life).

It is necessary to keep in mind that in Europe QWL means simply hours of work, human engineering [sic] and ergonomics, while American QL involves shared ownership, employee services, profit sharing, and related phenomena (kindergartens, lifelong employment, flexible hours, time off, and 'family-like' organization). This distinction dictates the scope, simplicity and character of the intended diagnosis. Instruments dealing with partial phenomena (like QWL) must be partial by definition.

For example, while we worry about ownership, sharing, participation and self-management, French Grid deals with things like temperature, noise, lighting, 'nervous stress' or 'bio-climatic environment'. This very narrow job focus is especially useful for technicians, human 'engineers' and specialized experts. It is less attractive to employees: both managers and workers or even to human designers themselves.

The French have designed another tool (ACTIF) which allows the designers to think in terms of the whole unit rather than in terms of a particular micro-job only. So, GRID and ACTIF do complement one another. The next step would naturally be to start thinking in terms of the whole system or the enterprise and the quality of life of its employees and their family members as well as increasingly integrated 'customers'. Then the shift in emphasis from QWL to QL will become possible even in the above mentioned countries of Europe.

Professor Trépo concludes that GRID designers focus too much on individual work stations and too little on the system they are part of. He points out that ACTIF provides some of the much needed socio-technical methodology which has had some success in France.

Overall, we seem to be getting the right perspective on the relative importance and mutual dependency of things like noise, humidity, muzak and ergonomic stress, and things like co-ownership, co-responsibility, self-management and total quality of employee life (including the working one).

It appears that the American concept of QL is socially, politically and economically more advanced than job design and human engineering microfocus of European QWL. It is through excellent critical papers like these that we learn that crucial difference.

Ahituv, Baroudi and Ronen's 'Microcomputer support personnel'

Personal computers, microcomputers and their networks are reshaping the landscape of corporate computing. Ahituv, Baroudi and Ronen are exploring the desirable personality and technical competency traits of newly emerging microcomputer managers (or 'micro-managers').

Technology support net will obviously differ for centralized mainframes and distributed personal computer networks. Most organizations do not have a formal microcomputer support group. They are much aware of the danger and disadvantages of attempting to run personal networks as mainframes.

Some technologically unsophisticated organizations went the other way and created centralized 'microcomputer labs' (usually under the reign of the previous MS/DP czar), with all the problems of access, scheduling and depersonalization, and thus defeated the advantages of the new technology from its very outset. There is nothing more apalling and backwarded than walking into a room filled with rows of identical 'personal' computers. The question is: how is the support for distributed personal networks to be accomplished?

Ahituv, Baroudi and Ronen concentrate on the personnel questions: selection, training, career paths, personality and competency traits, and so on.

There is the voluntary and informal support of the 'SuperUser' who shares his expertise and experience with the others. This might be the most useful institution precisely because of its spontaneity, flexibility and direct involvement. In

contrast, a formal microcomputer support person works with a multitude of users at many levels and his duties are more precisely delineated and much less spontaneous. Finally, the 'micro-manager' is the person who oversees all microcomputer activities in the organization. It seems that *his* primary role should be to get the micros from 'labs' on users' desks, as soon as possible.

Ahituv, Baroudi and Ronen have explored the roles, potentials and career prospects of all three basic support persons listed above. An abvious conclusion is that mainframe support personnel cannot and should not extend its 'support' to micros. On the other hand, creating a parallel 'non-mainframe' support department or center is likely to defeat the end-user orientation and personal networks advantages. Perhaps the best strategy would be to identify the emerging 'SuperUsers', recognize their role and the types of demands placed on them and encourage and amplify their functions. That way their activities could outgrow into flexible and responsive support of users' needs rather than imposing 'central support' perceptions of what's needed on increasingly 'depersonalized' users.

Ahituv, Baroudi and Ronen have done a fine job in identifying some of the issues involved with technology support net transformation.

Hoebeke's 'Work ethics and esthetics'

Luc Hoebeke of the International Institute for Organizational and Social Development (IOD) has written a paper which comes from experience, observation and extensive reading, not from deterministic linearity of futurists' extrapolations.

Hoebeke's conceptualizations of employment, labor and work as historically emergent forms of social relationships provide a refreshing and useful background for talking about the future. Employment 'problem' emerges as long as income, status and citizenship is directly coupled with the participation in salaried and organized work. As soon as this 'direct coupling' weakens, perception changes and the 'problem' of employment must be restated.

It is being restated quite radically in the U.S.A. today: although the 'unemployment' has been relatively low in 1987 (7.3 million, i.e. 6.0%), there are about 6 million Americans who are not seeking jobs (although they want to work) and 10–20 million who 'float' in and out of jobs through various part-time, work-at-home and self-employment arrangements.

Although most of these are statistically 'invisible' and are not 'unemployed', their classification as 'non-working' is stupid. Most of them work, often very hard, in parallel economies, in barter networks and in do-it-yourself and self-service activities. Many combine part-time with self-employment and their contribution to GNP is often exceeding that of unproductive nine-to-five-plus-two-coffee-breaks bureaucrats of the even less productive service economy.

So the distinction between *labor* and *work* is crucial. Hoebeke makes that distinction. Labor is a time-related concept of economics which is becoming useless in a knowledge-intensive economy. Labor is the time-span from 9 to 5 and it can be 'reduced'. Yet, 100 people each working for one minute is very different from one person working for 100 minutes.

Work is related to the task and only indirectly to time. Work is not labor and therefore belongs more to culture than to economics. Work is what people do, whether or not they perform labor for the government. Work is a spontaneous and unenforced form of social relationship which often persists (even though in the 'underground' or at homes) in spite of efforts to automize it, specialize it and degrade it into labor by socialist governments. The more specialized little pieces of labor, unrelated to any meaningful task, the more need there is for vast governmental classification and coordination of such crippled and helpless pseudo-workforce.

Hoebeke then talks about 'going back *to work*' and moving from professionalism to modern craftsmanship. By craftsman he does not yet understand the re-integrated knowledge worker, aided by multifunctional user technology, and functioning in a self-managing and self-coordinating environment. He talks about requisite variety and corps of interacting professionals (i.e., multidisciplinary teams). But his notion of *mutual adjustment* as an organizing principle comes directly from the theory of autopoiesis and does surpass traditional coordination mechanism.

Luc Hoebeke has been able to read some very traditional cybernetic-and-feedback literature, often directly oppositional to his mutual adjust-

ment and self-managing ideas, and he overcame it on his own, often without the benefit of modern writings on the topic. That makes his work original, stimulating and interesting to read. *Human Systems Management* is the right medium for evolving and researching such ideas. That's why it might not survive.

Espejo's 'Organisation for regional management'

Ralph Espejo, Senior Lecturer from Aston University, is a disciple of S. Beer and thus views management as an input–output-'electrical circuit' system with plenty of feedback, amplifiers and attenuators, all designed for the purposes of central regulation, control and command. In such management systems, which are now being rapidly abandoned worldwide, even in the USSR, Poland and China, the complexity of the managed must be matched by the complexity of the manager-controller. So called 'law' of requisite variety, i.e. simple property of two-dimensional matrices (see for example 'The law of requisite variety: Is it applicable to human systems?' *Human Systems Management* 6 (1986) 269–271), is obviously applicable to the electrical switching circuits, whether real or imagined.

In dealing with *human* systems, modern and effective management must imply autonomous self-management of mutually adapting and adjusting agents, engaged in self-organizing circle of competitive exchange which connects inputs with outputs via customer, NOT via symbolic feedback loop.

What is important about Espejo's contribution is that his argument here represents a fundamental revision of the law of requisite variety. Espejo states that the complexity that managers have to deal with 'is only that which is left unattended by the system's self-regulating and self-organising processes.' The complexity of the system *does not have to be matched* by the complexity of the regulator. Only that portion which is not subject to self-coordination and self-requlation (which in decentralized and non-socialistic self-managing systems is a very small portion indeed) has to be attended (interfered with) by the manager. The 'law' of requisite variety is finally recognized for what it always was: quite useless artifact. Attending to *residual* complexity is self-evident and quite different from matching system's behavioral complexity (or variety).

We have decided to publish Espejo's paper precisely because this final dismantling of the 'law' of requisite variety comes from the heart of the 'requisite variety' paradigm: from the very proponents and followers of Stafford Beer's idea of control, regulation, feedbacking and cybernating of human beings – the idea that human systems need to be 'engineered'.

Proponents of social engineering and engineers of human souls are being left behind in the ashes of the abysmal performance of their 'designs'.

In the era of knowledge reintegration, human autonomy, self-management and self-coordination the task of human manager is *not* to control or to regulate, but *to create the conditions under which humans can 'control and regulate' themselves* – as independent, dignified and undoubtedly human agents.

The only true appreciation of system complexity comes from recognizing the need for autonomous self-coordination (or mutual adjustment of agents). Misunderstanding and vulgarization of system complexity is reflected in designer's efforts 'to match it'.

If we could implement a fully self-organizing system (not an impossibility) then the 'residual part of complexity' to be attended by the manager-controller would be zero. We would not need the manager. We still would need his leadership, vision, charisma, example and inspiration, we still need his wisdom *not* to interfere with self-managing system, but we do not need his brick and brack of switchers, attenuators, amplifiers, channels and chains of command. In the era of knowledge as a form of capital, the best thing commanders can do is to stop commanding.

Ralph Espejo also deals with some issues of regionality, but he treats the regional system as a 'black box' so that very little is to be learned by definition.

Spiegler and Tsirulnikov's 'System development projects'

Management of complex system development projects is studied in terms of PBUs – *project basic units*. These main building blocks are then further subdivided for the purposes of a priori

measurement of the requisite level of control. This methodology is applicable to information and knowledge systems which have so far been studied in a static and thus inadequate way.

The very concept of PBU is recursive and dynamic. PBUs are subject to *phasing*, i.e., the subdivision of higher PBUs into lower level ones. They are also subject to *coresidence*, i.e., project roles assigned to one person are taken over by another person.

The authors still distinguish between clients, decision makers and designers according to older notions of information systems. The fact is that these three persons (and their roles) are being increasingly integrated and the purpose of advanced knowledge systems and management support systems is to bring this information about. The paleo–churchmanian distinctions are apparently going to haunt systems theories for some time to come. Then we end up with something like PBU = ⟨C, D, O⟩, i.e., a triple of 'client', 'designer' and 'objectives' (of client *and* designer). Even further, O = ⟨S, R⟩, where S is a target system and R is the resources and means.

The authors are forced to revise the churchmanian thinking later with their idea of coresidence.

Somewhat more interesting are some of the propositions:

- It is always possible to insert an additional stage of commitment phasing level when other phasing criteria have been applied.
- The higher the PBU appears in the project hierarchy, the more likely is the use of the stage of commitment criterion for its phasing.
- The lower a PBU is in project hierarchy, the more likely the use of trial and error or functional criteria for its phasing.
- Trial and error phasing of PBUs that stand high in project hierarchy is more likely when the system is intended to support a managerial rather than an operational level decision making.

The number of tasks in a hierarchical project grows exponentially with structure complexity. Reaching the limit of control due to coresidence (one person performs both client and designer roles) is inevitable.

Spiegler and Tsirulnikov actually calculate the limit of control due to Client–Designer correspondence at approximately 3.3 levels of hierarchy. Practical recommendation: *reduce as much as possible the number of hierarchical levels in the project structure.*

This conclusion is self-evident and therefore not followed in practice. NASA Challenger Disaster has been traced precisely to too many hierarchical levels of decision making so that utlimately no relevant decisions are possible. Large American companies do operate at 8–12 levels of hierarchy of command (like the Soviet military) while Japanese operate at 3–4 levels and Lincoln Electric in Cleveland at 2–3 levels of hierarchy – far from the Soviet model.

Hierarchical models based on full blown division of task, labor and knowledge are obvioulsy failing on a global scale. Multifunctional workers, job rotation, multifunctional managers, task and knowledge integratetion, 'flat' hierarchies, if any, self-coordination and self-management, and whole host of similar interrelated phenomena are making their emergence just in time.

Spiegler and Tsirulnikov write in 1987 that 'separation of functions is a fundamental requirement for the control of any systems.' Separation of functions implies: (1) 'this ain't my job' attitude; (2) knowing everything about nothing; (3) 'turfing', 'little empires' and politicking; (4) virtually no communication; (5) costly and wasteful military 'model'; and (6) Challenger-disaster syndrome.

Functional separation and more of it is quite desirable for governmental bureaucracies of, say, India. *Human Systems Management* will continue to devote its pages to studying these issues from the viewpoint of self-managing systems.

Gardner, Ruth and Render's 'Job stress'

Three professors from George Mason University conducted a study on VDT, which stands for 'video display terminal' rather than anything more serious, and confirmed that frequent users of VDTs experience more stress than non-users of VDTs.

A sample of 140 U.S. Navy civilian employees in the Washington, D.C. area was used. These clerical and administrative workers in the governmental bureaucracy are now under stress. Before the use of computer equipped with VDT there was

very little, if any, need for any stress in any governmental bureaucracy. These are not the for-profit production companies which have to compete with the Japanese day in and day out. Such for-profit institutions, exposed to the most ruthless global competition are relying heavily on the VDTs and they report lower levels of stress than before.

By the year 2000 the VDTs will be as common as telephones and equally stressful. In Japan VDTs already are as common as telephones, as they are in Hong Kong and Singapore.

VDTs promote efficiency and they allow accounting, monitoring and reward for a good day's work. We can expect this to be extremely stressful among the U.S. Government unionized employees. Especially if we use *questionnaires*, asking the employees how stressful the new technology is. We do not need information on what people say is stressful but what actually is stressful. Instead of developing employee questionnaires and thus relieving ourselves of any research challenge, how do we develop objective *behavioral* measures of stress? Is there an *actual* health risk associated with working in the coal mine, on fishing boat, on mass-production line? Is teaching at the business school stressful to professors? Is there even more risk associated with working in front of a VDT?

The authors find that the stress reported by VDT users is higher than that reported by VDT non-users. This seems to match the earlier results which confirmed that working can be actually more stressful than non-working, under certain conditions.

The dwindling group who still does their Navy work in a non-computerized way finds itself under very little stress. They do not report too much of 'fever, chills and aching all over' which some people working with VDTs seem to report. Work also seems to cause depression, pounding heart and tension among the U.S. Navy employees.

The U.S. Navy employees (whose educational and social profile we do not know) are subject to stress and conflict and they complain that they are expected to 'think faster' than occasional users. They also perceived that they were expected to work at a specific rate(!). How can anybody in the U.S. Navy be expected to work at any rate?

Some *HSM* editors spend 10–12 hours a day in front of VDT, doing stressful, unpaid and boring work of reviewing papers on stress. In contrast to U.S. Navy employees (or to any for-profit employees anywhere) they do not report 'itching of eyes, periods of depression, difficulty sleeping, ringing or buzzing in ears, neck pain that radiates into shoulder, arm or hand, periods of extreme anxiety, cramps in hands and fingers, and alarming pain in chest.' Why they don't report such obvious tell signs of hard work is a topic of our next research project.

We agree with the authors: 'With this important issue of clerical and white-collar productivity facing the U.S. and other nations, it appears that a continuation of research in this discipline is called for. 'Why do U.S. Navy employees find work stressful and Japanese employees don't? Why are employees of Lincoln Electric in Cleveland proud of their hard work and the U.S. Navy employees report 'periods of depression'? Why can't we increase U.S. global competitiveness this way?

Torres's 'Impact of technological change'

Roberto E. Torres, Ph.D. candidate from Michigan, has explored the impacts of technological change in clinical laboratories and radiology in the U.S.

Any high technology is composed of its core (hardware, software and brainware) which is embedded in the support network of requisite flows and relationships. Introduction of high technology then leads to a qualitative restructuring of the support net, redefinition of tasks and skills, and reorganization of requisite structures. Torres does not employ any of these concepts viewing high technology as a form of social relationship. Instead, he concentrates on manpower effects only.

Most new medical technology, being high technology in the above sense, must lead to redefinition of skills/educational requirements, redefinition of occupations and job categories, change in tasks contents and requirements, and so on. Less obvious would be changes leading to reintegration of knowledge and labor (also less specialized, more multifunctional technologies and workers), more automated and self-managing systems and more self-service and do-it-yourself technologies. These changes would be predicted from the high-technology paradigm developed in *HSM*.

Torres provides classification of medical technology by function (preventive, diagnostic, cure, etc.) and then limits himself to diagnostic technologies. He reports that while productivity increases, the demand for services grows as well, leading to increased need for technical staff and higher health care expenditures. In predicting the future, he simply projects higher demand of trained laboratory workers. He disregards the growing costs of service which leads, especially in diagnostic technology, to the boom in self-service, do-it-yourself appropriate diagnostic products which the customers use directly by themselves in the privacy of their homes and thus bypass the entire army of expensive 'laboratory specialists'.

With radiology the error is not so crucial because most technologies are heavily regulated and not so easily transferable into self-service domain. Torres predicts higher demand for radiologic specialists.

The paper concludes with a number of recommendations and implications for the health manpower planning and policy-making process. Because Torres does not distinguish between public, private and privatized health care institutions, it is difficult to judge whether 'planning and policy making' refers to U.S. governmental bureaucracy or to individual health institutions on a regional basis. For example, 'The organizational aspects of the educational institutions are impacted significantly by technological changes. This affects the allocation of resources in the societal context, which is an essential phase of the planning and policy making process.'

This would imply that U.S. government is expected to deal with the suitability of adopting and introducing new medical technology in terms of economic impact, substitution of manpower, demand for health manpower, capacity to produce manpower within a timeframe, training costs, etc.

Most likely, private and privatized health care institutions will listen to their customers (i.e., patients) and integrate their wishes into competitive, affordable and medically effective products, combining health service with self-care and self-help under a variety of human arrangements. Centrally planned medical care seems to be a bit obsolete for a country like U.S.A.

Torres is aware of this in his conclusion: 'The private manufacturing companies are increasingly sharing their participation in the provision of continuing education when new products are introduced into the market.' We should add that the very nature of the products they are introducing is rapidly changing: from specialist/operator driven, to user-friendly customer driven *integrated health product*.