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Understanding a Knowledge Organization as a Viable System

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Understanding the Viable Systen Model (VSM)

The Viable System Model (VSM) is not the easiest way to approach a societal institution; to apply it to knowledge organisations raises additional questions and problems.

The model is in fact quite hard to understand. Although its creator, Stafford Beer, has _ from the VSM's beginnings in 'Towards the Cybernetic Factory' (Beer, 1962) through the intermediate but very important steps represented by „Decision and Control" (Beer 1966) and „Brain of the Firm" (Ist and 2nd editions, 1972 and 1981) right through to his latest works, „Heart of Enterprise" and „Diagnosing the System for Organizations" (Beer 1979, 1985) _taken great pains to explain, describe and expose the model in various ways, it nevertheless takes a considerable amount of serious, conscientious and hard work to grasp it. More is required really to master it.

With the exception of „Towards the Cybernetic Factory", in which Beer uses rather advanced mathematics, the difficulty is not technical; it is conceptual. The VSM requires a different way of thinking. Although in most instances one can quickly learn how to draw the diagrams, without the necessary change of thinking these remain empty pictures.

Unless one actually masters the basic ideas of complexity and variety in Ashby's sense, including the all important law of requisite variety (Ashby, 1970) as well as the concepts of relative autonomy, recursion, closure, identity and cohesion in Beer's precise sense, VSM diagrams will not only fail to enhance one's understanding of organisations, but will lead to confusion, disappointment and rejection – albeit for completely the wrong reasons.

On the other hand, if understood and correctly applied _ which in most cases will need some experimentation _ the VSM is a most useful tool to understand the way systems work. In fact, if the model comprises _ as Beer contends _ the necessary and sufficient conditions for viability of any system, it becomes unnecessary to look at the proliferation of other socalled „systems approaches" and „system theories". In this sense the VSM is itself one of the most important and potent variety reducers of organisational complexity that we have at our disposal.

Without variety reduction we cannot hope to cope with the complexity of the systems we have to deal with. Variety reduction is thus a necessity. Not every way of reducing variety, however, preserves the really important aspects of a system _ in particular, its viability. One really has to stop and think about this: the model contains the necessary (!) and sufficient (!) structural elements required of any (!) system concerning which we want to understand why and how it happens to be viable (!).

This is one of the strongest statements that one could make about a model. At the beginning one needs a good deal of trust in the intellectual and scientific integrity of the author if one is to accept it. However as one learns how carefully Beer goes about his process of reasoning, such trust begins to seem justified _ despite the great demands which are made of the reader with respect to various scientific fields and disciplines. These range from advanced philosophy, logic and mathematics, through biology and neurophysiology to psychology, economics and management.

„Impossible" may be the first reaction to these demands. Yet is not systems science supposed to be interdisciplinary? If so, how is it possible to avoid total, hopeless dilettantism in attempting to engage in these different disciplines?

As I have said, the difficulties with the model are not technical in nature, but conceptual. The VSM is a conceptual tool. As such it enables one to cross disciplinary boundaries without having first to master the technical terms of each discipline in which it was conceived.

Perhaps the best way to start _ for me at least _ is with the question: what kind of problems is the VSM designed to tackle? In my opinion _ for _which however 1 find justification in the original works _ it is concerned with problems of control.

Cybernetics is the science of control _ and communication. This we know from one of its founding fathers, Norbert Wiener. Management is _ as Beer has put it _

the profession which corresponds to this science.
Here then we have the starting point and precondition of any science deserving of the name _ a problem. The problem is control in a general sense. 1 would emphasize at this point that it is in principle wrong and misleading to jump immediately to the discussion of special kinds of control, such as „biological“ control, „economic“ control, „psychological“ control, etc. To do so is to bring back disciplines with their self_invented boundaries _ boundaries which certainly do not exist in nature.

The same wrong way of thinking is introduced if we talk about different kinds of System, such as „physical“ System, „biological“ System, „economic“ System, „social“ system. A system is a system and its control (not its „controls“) is an integral, albeit non_tangible aspect of its „architecture“. A social system has its physics as well as its economics, its humanistics as well as its ecology. Only if this is understood and accepted can we hope to gain some insight into how a system works and what about it is systemic.

The concept of control encounters certain other difficulties. Most people associate with it ideas of power, coercion, unilateral authority and command. But this is not what is intended _ although it is true that the cited phenomena can be manifestations of control.

Control exists whenever certain states or events that could in principle happen do not actually happen; more precisely, whenever we talk about a subset of a Set of states. This is why, as Gregory Bateson once put it, cybernetic explanation and understanding is more often negative than positive. By contrast, causal explanation is usually positive (Bateson, 1972).

Cybernetics asks, for example, why and how out of a fertilised egg there, grows a rabbit and not a dog, horse or flower. This leads to the concept of constraint, which in turn leads to an understanding in terms of control of a number of very interesting phenomena. These include learning, cognition, organisation, evolution, regulation and development.

Insightful examples of different types of constraint are given in the works of Gordon Pask, Heinz von Foerster, Ross Ashby, Gregory Bateson, Warren McCulloch and, of course, Stafford Beer.

Unless one approaches the VSM by this route one can neither understand nor apply it. I think therefore that most criticism of the VSM is not simply wrong; it is beside the point. So, alas, are many of its well_intended uses!
The accusation that the VSM is based an the idea of a machine is one example of misplaced criticism _ one which in my opinion owes more to an inadequate understanding of basic cybernetic concepts than to inherent weaknesses of the VSM itself. Critics assert that the VSM is mechanistic; they ask whether organisations really are machines. Certainly if we think in terms of classical mechanics _ the steam engine, the automobile or any other engineering construction _ then organisations are not machines.

It was to counter attempts to transfer this kind of machine thinking into the realm of society that Friedrich von Hayek (in Hayek, 1967) coined the term „constructivist“ as opposed to „evolutionary“ and „spontaneous“ in his classification of types of order.

Unfortunately, not even the introduction, by eminent cyberneticians, of the term „constructivism“ into cybernetics seems to have dispelled this kind of criticism _ although it must be said that the term has a different, if related, meaning in this context.

In Hayek’s „constructivist“ sense, therefore, organisations are not machines and not mechanisms. If however we look at the concept of „machine“ in Ashby’s sense (Ashby, 1970), then certainly organisations can be understood as machines; if they cannot, they are not organisations. Ashby makes it completely clear that his concept does not refer to a material thing, but to modes of behaviour. If, from whatever perspective we look at it, there is no trace of order in the behaviour of something which we are trying to understand, then there is no organisation; such a thing cannot be an object of observation, let alone of scientific research. Insofar as there is some regularity then there must be a machine, in Ashby's sense, which is producing it; that is, there must be a set of transformations _ including transformations of transformations. This includes probabilistic behaviour; it also includes novelty, evolution and creativity. It even includes vision, values and ethics.

To give an example of a well_intentioned but incorrect application of the VSM: to take the organisation chart of an industrial company _ or any other institution _ and simply reproduce it using the graphical symbols invented by Beer to express the properties of the VSM is to achieve nothing. This may seem obvious; yet it happens again and again. The point, as 1 have said, is that without the fundamentally important ideas of requisite variety, autonomy, recursion and closure there is no way of getting a better or even different understanding of a System than that which is provided by the organisation chart _ and that is not much.

Perhaps the best way to start applying the VSM is not to do so in the realm of industrial companies; one should perhaps experiment with the model and test one's understanding by modelling other kinds of Systems. A philharmonic orchestra, for example, or the family, a school class, a school, a political party or a typical non_profit_organisation such as a teachers' association or the Red Cross.

One advantage of this is that it forces us to get rid of all the preconceived notions that are implied by the organisation chart. To model a philharmonic orchestra, a school class or a family in terms of the kind of organisation chart used in industry is, to put it politely, of no use whatever. If then we ask what alternative ways of understanding such systems are offered by current organisation theory, we soon learn how little help they can offer. This is a valuable lesson in appreciating the usefulness of the VSM.

Another advantage is that in the context of the VSM _ remember that it contains necessary and sufficient conditions for viability _ questions about the purpose of certain systems cannot be answered in the superficial and stereotyped ways that they are answered in the industrial context. In an industrial corporation, for example, we will often find a „strategic staff unit or a „department of corporate strategy“. Do these units represent System Four of the VSM? The odds are they do not. They may be part of it, but most certainly they are not the entirety of System Four in the Sense used in the VSM. Even if they were we would have to ask _ at which recursion level? What are their interlinks with other recursion levels?

Again, we will usually encounter a „Board of Directors“. Does this represent System Five? Again, the answer is probably not. What then is System Four in the context of a philharmonic orchestra or a family? Or, indeed, all the other components of the VSM, Systems One to Five? Are they in any way viable systems in themselves? In what recursive architecture are they embedded? What gives them coherence and identity and how is requisite variety achieved for them? Does it make a difference whether the orchestra plays a Beethoven Symphony or a piece of Verdi _ and is the long dead composer therefore part of the system?

Does great_grandfather who died 60 years ago _ and whom the children never knew personally, but who was a well known and well respected politician of his time _ still play a role in how the living members of the family conceive of the family as a system? Accordingly, is the transfer of values, opinions, political creeds and „Weltanschauung“ from one generation to the next to be included in a VSM of that particular family?

What roles are played by mutual love, respect and responsibility in the VSM of that family? What roles are played by professional standards, interpretation and „Zeitgeist“ in the VSM of the orchestra? Does matrimonial law and marriage settlement have to be included in the VSM of the family? Has the concept of „double_bind“ to be part of the mode]? What about health care, the economic responsibilities of the parents or the will of aunt Mary? Is there not a succession of VSM's over time as the family passes through different stages of development: from a loving couple who then become parents, through the stage of puberty of the children with all the particular problems of developing children, trying to find their own identity and autonomy, up to the day they leave the family without abandoning it? What are the inner bonds and ever-changing threads of coherence? Do friends, relatives and enemies, neighbours, teachers, jobs, parents_in_law, churches, drugs, religion, television, books and pop music have to be included in a model of whether and how the family is viable? How do we include a disabled child, sickness and divorce?

I think this should be enough to show how far reaching the questions are which follow from the VSM, and how useless an organisation chart or, for that matter, organisation theory would be in helping us to understand one of the most important organisations of society. Mutatis mutandis, the same would apply to other organisations. The VSM covers them all if, as Beer claims (correctly in my opinion), it is a model of any viable system. This at least is the standard against which we have to test the model.

We should beware however of one possible misunderstanding: the VSM is not a model of all the interesting traits of any particular system; it is a model of the viability of any system.

Applying the VSM

As a consultant I have used the VSM on a number of occasions, in various contexts and in various ways. This use has gone from industrial companies to service and knowledge organisations and from profit to non_profil institutions. I have studied such organisations both through the glasses of the VSM and through those of other models.

Among the most interesting cases were knowledge organisations _ i.e., consulting and engineering companies. The case I will develop in what follows is that of an international operating company in construction planning and engineering, with more than 1000 employees, most of them highly qualified specialists (architects, construction engineers, technicians, health care specialists and computer experts). The company has about three dozen branch offices and ten different major business areas, from office buildings and industrial factories to hospitals and tourism facilities. It has about a dozen areas of competence such as architectural design, construction engineering, factory automatisation, sanitary_, electrical_ and air_conditioning engineering. It does business in three to four languages; this is partly reflected in multilingual employees and executives.

Over the last few years the company's revenue growth rate has been very high, at 15_20% per year. Around and out of the core business of construction a number of highly specialised consulting activities have developed _ such as Organisation and data processing, facilities management, investment counselling, etc. Part of the company's growth has been due to the acquisition of formerly autonomous small to medium size engineering, architectural and consulting businesses, in most cases still centred around and run by their founders and owners.

Starting point

Work an organisational issues within an industrial company typically starts with the study of an organisation chart that supposedly shows the actual and/or intended structure.

Work an a knowledge organisation can also start in this way, but the likelihood is that there is no organisation chart, or that people will immediately point out „this is not really how our company works...“. If they do have an organisation chart, without exception it is some form of matrix_Organisation, typically not in two but in many dimensions, and can hardly be expressed clearly an a two_dimensional sheet of paper. Sometimes 1 receive not a graphical representation but a verbal description of the organisation; this is actually much more helpful, although further analysis usually shows that a number of important things are left out.

The next step is usually a description of present problems, which it may or may not be possible to solve without the use of organisational tools. Examples are: rapid growth, shortage of management, strategic direction, personnel turnover, co_Ordination problems, profitability.

Analysis and diagnosis

Every company of course has a structure, whether it is expressed or described graphically or verbally. The useful question is whether the company is a viable system, and whether its structure, as conceived by the people who are running it, is relevant to the issue of viability; not every structure is conducive to survival and viability. On the contrary, in most cases people think about structures not in terms of viability, but in terms of economic efficiency, of pictorial simplicity, of hierarchical relations and the like.

In what follows, I will concentrate an those aspects relate immediately to the VSK and are of particular importance in a knowledge organisation:

Variety

The First question, if one looks at a company through the viable systems model is, of course, how muck complexity or variety is there, and how much regulatory variety is needed to fulfil Ashby's Law. „How much“ does not necessarily imply a quantitative analysis, although certain numbers present themselves: customers, offices, employees, products and Services, languages, countries or regions. Other aspects have to be looked at a little closer. For example: how many different ways are there to form project groups for typical business assignments out of the given number of people distributed over different office locations and representing a given number of specialisations. The analysis showed that at any time the company had simultaneously to run several hundred projects of very different size and importance.

It was clear that an astronomical number of different team compositions was possible in principle and that a particular selection was dependent an at least two dozen parameters _ size of the project, type of customer and business, kinds of specialisation, availability of people with respect to already scheduled work, geography, language, experience and so forth.

Moreover, project groups did not remain constant but had to be changed over time depending on the progress of the work.

In such complex cases variety analysis can be done numerically only in part; most of it is necessarily a matter of estimating proportional sizes. As Beer puts it again and again, what counts is not precise numbers but the balancing of varieties in the interactions of structural units. According to my experience, in a knowledge organisation variety analysis is of particular importance because it is so easily confused with data; closely related as variety and data are, they are not identical and 1 think that this is a systemic aspect which is very frequently overlooked _ though Beer has often, much more clearly than others, elaborated an this point.

In knowledge organisations in particular, problem_solving often requires the use of computers. Since it is data or Information that computer experts focus on, they tend to ignore the underlying variety which, by contrast, is a matter of the basic categories, classifications and ways of descriptions employed by managers trying to understand the system. If we do not understand variety, computers are more often than not used in the wrong way. The predictable result is either information overload or, what may even be more dangerous, the aggregation of data in ways which make it impossible for the system to be under control.

While the First mistake is rather easily recognised and can be corrected, the second one can go undetected for a long time and lead to irreversible damage. To repeat, if we do not understand variety we cannot design adequate measures or controls. The consequence is that a number of managerial tools cannot be applied _ tools such as management by objectives, management by exception and so on. Since in a knowledge organisation measurement by itself is much more difficult than it is in an industrial organisation, a clear understanding of the concept of variety is of utmost importance.

As an example one may think of the problem of implementing computer aided design. The Intention usually is to lower cost and increase the speed of the design process. But while the questions raised may be important and the stated objectives may eventually be achieved, numerous other problems arise in the process. How much variety does the design process of a complex building entail? How complex does the whole system therefore really need to be?

The System does not consist simply of hard_ and Software; it consists of an entirety of people discharging their various design tasks, including customers and subcontractors, as well as related contracting and accounting procedures, aesthetic norms, technical standards and so forth. It is not even sufficient to think in categories like these, because in the end, the whole mode of operation of such a company may need to be dramatically changed.

Recursion levels

The next question is concerned with the recursive architecture of the entire system. This issue is never dealt with in traditional organisational theory, nor in conventional organisational practice. Levels of organisation, as expressed in organisation charts, are rarely identical with recursive levels.

Today, organisational discussions tend to be concerned with the hierarchy of power and the number of managerial levels; the trend is toward flat pyramids with fewer managerial levels.

Meaningful as this trend may be, it is nevertheless completely different from the question of recursion levels within the context of the VSM. Here we are concerned with questions of autonomy, of viability within viable systems, of coherence and of fulfilling Ashby's law of requisite variety. As Beer puts it in his recursive system theorem: „In a recursive organisational structure, any viable systems contains, and is contained in, a viable System.“ (Beer, 1979).

In setting out to model a system as a viable entity we are therefore not at all concerned with levels of power, or the power hierarchy, but rather with a hierarchy of viability. This demands that we model the system in such a way that at each level we find again all the components of the viable system model.

In our case, discussions led to the result that at the lowest level (beyond that of the individual person) there was the single project: this basic level had to be a viable unit, albeit for a limited time span. It was clear in fact that a huge amount of variety had to be absorbed at that particular level. It was obvious to all involved that the successful management of individual projects required that the project management team possess a great deal of autonomy and that the individual project by itself should have all the ingredients of a healthy and effective structure.

At the highest level of recursion it was obvious that we must be talking about the entire corporation with all its regional and disciplinary subsidiaries, including acquired companies, joint ventures and partnerships. But how should we conceive the intermediate recursion levels, and in what sense should they be autonomous and viable?

Failure to recognise the recursion problem will unavoidably lead to an overload of top management because between it and the systems operational units at the lowest recursion level there will be nothing which can absorb variety in a meaningful way. Corporate management will inevitably become bogged down in operations and no amount of power will be able to prevent the system going out of control, either in the management of its operational units or with respect to its System Four capacity _ in many cases in both respects.

This danger is particularly great in a knowledge organisation because, at its corporate level, we typically find executives who have their roots in the operations themselves. Even as executives they see themselves as specialists and experts rather than managers. They are proud of their technical expertise and are only too happy to have a legitimate excuse to go operational and ignore their executive tasks.

The most important problem in such organisations is therefore the question: what, at each level of recursion, should be the Systems One _ the operational units? In the industrial context this problem may have rather obvious solutions; there is not a great number of possibilities. For a knowledge organisation there is in principle a rather large spectrum of almost equally meaningful alternatives, it being possible to conceive a wide variety of viable groupings of operations.

There are of course obvious candidates such as geography and language context. Apart from these, in the realm of applied knowledge a large number of equally plausible groupings is generated by the fact that the company typically does not have a „product“ in the usual sense. Since many disciplines are represented by many different experts, the company we are considering could solve in principle almost any problem of design, planning and consulting; it in fact conceived of itself explicitly in terms of general problem solving.

Although a closer look revealed that this view was a little exaggerated, the spectrum of possibilities was certainly large and no single criterion could be justified logically or was, so to speak, naturally superior. One had to make decisions about this issue.

This was, in fact, one of the important lessons I learned while working with knowledge organisations. By contrast with industrial companies, almost anything can be or can become a viable system in a knowledge organisation; clearly, therefore, we can make the requisite decision only by looking at the amount of regulatory variety that is the unavoidable consequence of deciding to define the Systems One in a particular way.

To give but two examples: one could put together the architects on the one hand and the construction engineers on the other. By implementing the structural components of the VSM one could certainly design these units so as to enable them to become viable systems. In fact there are companies which are successfully organised in that way. The result would be to greatly decrease the corporation's ability to produce integrated problem solutions for buildings as such _ or, seen from a regulatory perspective, it would need a tremendous amount of control and co_ordination capacity in order to solve the regulatory problems posed by its choice of that form of organisation.

Another alternative would be to establish interdisciplinary groups which would focus an the integral design of buildings given their particular purpose and function; that is, an hospitals as a whole, rather than their architecture, or an office buildings as such, rather than an the problem of construction engineering for office buildings. This would then call for regulatory activities with respect to other questions, for example idle capacity when there is a temporary lack of demand for hospitals or for office buildings. And would this sort of organisation not lead to overspecialisation with attendant difficulties in transferring know_how from one business area to another?

The discussion of these issues led to the design and establishment of a particular departmental and divisional structure; that is, it led to two recursion levels in between the global organisation and the basic project groups. This design attempted to minimise requisite regulatory variety, which of course could not be measured in a strict sense, but which nevertheless could be discussed, evaluated and critically judged.

Interaction issues

As soon as we split up a whole into parts, regardless of how it is done, we produce a problem of reintegration. It is certainly one of the oldest insights into the working of systems that the whole is greater than, or at least different to, the sum of the parts _although I concede that the term „sum“ is here used somewhat vaguely. On the other hand, it seems to be the interaction of parts which produces the whole.

It is therefore of utmost importance to examine what 1 call the interaction issues between the operational units of System One at each recursion level. In my opinion these interactions are, on the one hand, the prime location of friction and therefore conflict potential within the System and an the other hand the prime location of whatever kind of synergy the System may make possible.

Such analysis of interactions should lead not only to a realistic estimate of the regulatory variety needed; it will also, as a rule, lead to new ideas as to how and where this regulatory variety should or could be supplied.

The analysis can be done most effectively by involving all those who are sufficiently familiar with the operations of the system and who actually know, from their daily work, what kinds of problems, conflicts and frictions arise _as well as what are the unused resources and potentials of the system. A simple instrument, which is of great help, is shown in figure 1.

Operational Unit \ Operational Unit	A	B	C
A	X	Interaction of A with B	Interaction of A with C
B	Interaction of A with B	X	
C	Interaction of C with A		X

Figure 1

This table has the following meaning. First, there is no interaction of each operational unit with itself; this is rather a question of the inner working of each unit. There is however interaction between unit A and unit B. In studying this, different perceptions of this interaction will have to be taken into account, as it will most probably be seen differently by each of the involved parties.

The objective of the discussions is to elucidate these different perspectives and perceptions and to achieve consensus about the issues involved and potentials to be realised in the interaction. In practice, the participants have to discuss two questions:

1. What interaction problems with other units are we experiencing now and are likely to experience in the future? How can they be solved?

2. What potential synergies are there? How could they be realised?

The first step is to have these discussions within each unit. The second step is to have discussions across unit boundaries. Finally, it is usually necessary to involve not only pairs of units but all larger groupings, since the interaction between A and B, for example, is obviously different from that involving A, B and C.

Complicated as this may seem, in practice it is not. A two to three days meeting with appropriate preparation will be adequate. As a result we have a sufficiently complete survey of the interactional problems and the mutual relationships that exist within System One at each recursion level.

In addition, and what may well be much more important, people are given the chance to achieve a new and often different understanding of their relationships, as well as of systems concepts and problems. The models in people's heads begin to change.

How can we supply requisite variety to cope with the results of such discussions? Usually the problems raised fall into three categories:

1. Problems which can be left to the self_regulation of the units involved _ which they can solve among themselves without the intervention of other subsystems.

2. Problems which need rules and regulations, but which, after these have been designed, become routine matters.

3. Problems which can be dealt with only by higher subsystems because another logical framework is needed to solve or dissolve them. In terms of the VSM, these have to be dealt with by the metasystem.

It is of great practical importance to work through the demands which the system's structure makes upon the distribution of each task over the various systems (Systems One to Five) of the VSM, as this makes it possible to use the entire potential of the VSM. In the context of knowledge organisations this is particularly important because here we do not find any _ or only very few _ „given necessities“ such as are typically found, due to products and technology, in the case of an industrial organisation. Thus, for example, existing technologies for assembling automobiles or manufacturing paper imply a great number of relations to other organisational units; these relations are given and fixed, at least for the time being, simply because there is no other way of doing these things. They are therefore usually accepted as they are, and offer no regulatory problems.

By contrast, there is no one, given way of designing a building or solving a consulting problem. Tasks like these can be discharged in a number of ways.

People networks

„People are our greatest asset.“ This axiom may be accepted today in every well_run organisation. It is of existential importance for a knowledge organisation. Accordingly, within the context of the VSM one has to take a very close look at how the metasystemic functions _ the tasks of Systems Three to Five _ are discharged.

Although as a rule these functions certainly are discharged, we will not find departments as the core responsible elements; we will find groups or networks of people, many of them with a long history and evolution.

These have to be identified by means of what could be called sociometric instruments. Who is interacting with whom, in what capacity, how often and with what results? My experience is that these „groups“ are not groups in the Sense of socio_psychology; group dynamics play a role, but not an important one. Nor are they teams with strict functional division of work, clear discipline and so forth.

The groups are networks with a redundancy of potential command. At times there is very close and intensive co_operation and interaction in a team_like fashion; at other times, and in a different capacity, contact is very infrequent, loose and casual. But there is always a high degree of preparation and readiness _ a sort of standby potential for which we don't have a name, as far as I know, and which I have never seen described in organisation theory.

If necessary these networks, although apparently dormant, can jump into the most intensive sort of action at the snap of a finger. Each member can alert the entire net, there are no hierarchical problems. A great amount of unarticulated but strong shared experience and understanding takes place. Personal relationships exist but are not really important; there is friendship, yes, but it is not necessary, nor significant. There is however a strong Sense of common purpose.

These are some _ certainly not all _ of the characteristics of such networks.

In my experience, practically without exception the real centre of management at all levels of recursion is found to exist in the form of such networks. Whatever the formal bodies may be (the board of directors, and so on) these networks are the real brain of the company. Important as they are, they can and do suffer from a number of pathologies. These need to be studied very carefully in order to understand the real working of the organisation.

Time and rhythm

It is surprising how rarely questions of time are discussed in organisational theory. Yet there can be little doubt that this is one of the most important dimensions of any system. It is my opinion that every system needs and has some sort of pace_making device, which patterns its behaviour in the time dimension.

This phenomenon of pace is not exactly what is meant by the dynamics of the system or its speed. It is however what gives the System rhythm. The regular sequence of day and night, the seasons, the recurrent patterns of a week _ these are obvious examples of how time structures our lives; other examples are the heart beat and the frequency an which our brain, or for that matter any computer, runs.

Since in a knowledge organisation there is so much fluidity and so many degrees of freedom, it is of particular importance to examine the pacemaking mechanisms of the system and, if necessary, to redesign them. The easiest way to do this is simply to list each and every organ of the company (institutionalised and formal management bodies as well as task forces and all kinds of regular or periodic meetings, conferences, and so on) and map the frequencies of their operation on the calendar axis.

In many cases it becomes obvious at a glance that the System must be unsynchronized, as if the violins played in waltz time whereas the trumpets played in march. Rhythm and pace are, in my opinion, potent means of variety engineering, of practical importance in integrating a system and making it predictable and calculable. This is one of the bases of self organisation and System coherence.

Implementation

In my experience implementation is always a matter of specifics and the individual case. It takes place within existing structures. Since in the case under discussion the company had so far survived quite successfully _ if success is assessed by conventional Standards _, it was necessary for the process of going about changing things to be a careful one.

Once a number of problems have been highlighted by the VSM, it is of no use simply to tell people that their company has a wrong structure. It is rather a matter of reinforcing this aspect, weakening that and inviting them to try something new on a local basis or to give up a particular procedure for a while.

The more people have been involved in the process of discussing their System, the easier this is. Step by step they can learn to think in new concepts. In this case it took rather a long time _ almost two years _ before I unveiled the entire structure of the VSM in graphical terms; I used, so to speak, the tactic of the Trojan horse, and only after we had achieved a number of changes did 1 tell them what I had in mind all the time.

To paraphrase a saying of Stafford Beer, they had to learn what and who they already were in order to become what they could be ...

Thus we began with small changes which looked sufficiently conventional not to cause unnecessary anxieties; we used familiar language to avoid resistance. In the end the organisational changes were rather large and, so far, can be judged as having been successful.
First, two new recursion levels were defined which looked at first glance like classic organisational levels but were intended right from the Start to evolve into viable subsystems. They were designed around major business areas with their own markets, customer groups, operative and strategic objectives and responsibilities.

This implied an extensive regrouping or rearrangement of labour and task division among departments and divisions, but above all it required a clear understanding of the operative and strategic work both of the divisions at each recursion level and of the overall corporate level.

Second, two sets of coordinative systems had to be designed and made effective. This again led to a new, task_orientated design of what had formerly been considered to be central staff work. Each recursion level was equipped, step by step, with its own infrastructure of viability, so to speak, so that they Gould realistically be expected to fulfil their regulatory duties. They had no longer any excuses with respect to their accountability.

Third, for the First time in the history of the corporation there was a top management with clear, well defined personal membership, tasks and responsibilities. This was the more important because by the nature of the various business areas, but also as a consequence of history, extreme decentralisation was an undisputed value of corporate culture; it had grown almost to the extreme of depriving the Corporation of coherence and manageability.

Fourth, the entire planning and goal_setting process had to be changed and, as a consequence, different accounting systems and other performance assessment processes were recognised to be necessary.

Fifth, and perhaps most important, people began to discuss problems in the language of the VSM. For some time this was no more than a matter of using new terms; for some it remained so. But many _ including, fortunately, a majority of the key people _ seem to have acquired a new and different understanding of the nature of their corporation.

Other Gases will be different and may allow or demand different procedures.

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