Modelling Organisations using

The Viable System Model

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Introduction

This paper is intended as a short introduction to the Viable System Model for those unfamiliar with it. It deals with some of the basic concepts embodied in the model, the modelling process, and its use in practice.

Why we need Organisational Models

We all interpret the world through models, these can be explicit, or tacit. For all managers in all organisations, their ability to manage a situation or organisation effectively is in direct proportion to the accuracy and relevance of the models they are using to understand it. We can't manage what we don't understand (except by luck).

In many situations, managers rely on the tacit models that they have built up themselves over a lifetime. This is particularly true for management teams that have worked in the same organisation or sector for a long time. In these situations, managers' tacit models can very accurately reflect reality, providing the management team with a good basis for dealing with the sort of day to day problems that typically beset their organisation. However, tacit models do have a number of potential weaknesses.

1. The fact that they are tacit means they can hide big differences in perception between managers.
2. Being based on experience, they can sometimes fail to give a good handle on new problems.
3. Being personal, they tend to reinforce individuals' strengths rather than supporting their weaknesses.
4. Informal models tend to be too simple to cope with the complexity of large organisations.
5. They can restrict the capacity and willingness to initiate and deal with radical change as opposed to incremental change.

As organisations become larger and more complex, so the need for the use of explicit formal models that managers can use to share their understanding and to communicate about the situation, tends to increase. Organisations operating in fast changing environments also require the use of explicit formal models.

By far the most common organisational model in use in management today is still the hierarchical model. So pervasive is this, that it is often possible to see managers who claim to have rejected this model still operating within its paradigm, and unable to

tackle problems in any other way. The hierarchical model has a number of disadvantages. Principally, these are to do with what it does and doesn't model. The hierarchical / family tree / organogram models the formal power structure of the organisation. More cynically we could say that it models the blame structure. What it doesn't model is any of the more fundamental things about the organisation: what it is, what it does, how it does it, its processes, formal and informal structures, communications and information transfers, or decision making. The VSM offers a more sophisticated alternative, one that can be used both for diagnosing existing organisations, and for designing new ones.

In developing the VSM, Stafford Beer sought to develop a "science of organisation", by setting down the principles that underpin all organisations, and create viability, which is the capacity to exist and thrive in sometimes unpredictable and turbulent environments. The criteria of viability require that organisations are or become ultra-stable, that is capable of adapting appropriately to their chosen environment, or adapting their environment to suit themselves. This is in contrast to hierarchies, which are inherently unstable structures, designed as they are to allow a small group or a single individual to change the direction of the whole organisation at will.
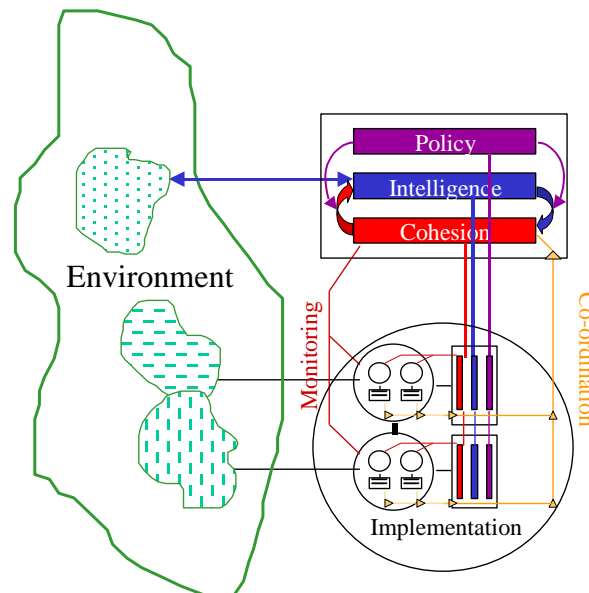

Figure 1   The Viable System Model

The VSM models the structures of the organisation and the relationships between them. This includes key processes, communications, and information flows. A key

concept is that of complexity, and how the organisation and its management handle the complexity of both their environment and their own activities. The model deals with this inherent complexity by unfolding in a fractal structure, in which systems are made up of sub-systems which have the same generic organisational characteristics, in other words, viable systems are made up of viable systems which are themselves made of viable systems.

Primary Activities

The start of the modelling process is the unfolding of the "primary activities" of the organisation. These are the activities that the organisation does that provide the product or service that the organisation exists in order to provide. So for a hospital, clinical care would be a primary activity. The infirmary at a chemical plant would not be primary, since the plant exists to produce chemicals, and chemical production would be primary. Similarly, the accounts department in a manufacturing company would not be primary, but the same activity in an accountancy firm would be.

We take the primary activities of the organisation, and break these down into their constituent sub-activities. Since these activities need resources if they are actually going to be carried out, the unfolding of complexity often corresponds to structural units, so divisions within the company, and business units or departments within the divisions and teams within the departments. We can carry on this decomposition, until we get down to the level of individuals actions.

Let's take as a hypothetical example a government's provision of roads. This might involve two activities - road construction, and roads maintenance, giving us two organisational units using the same technology and in the same geographical area and for the same customers. Most likely one road repair team and one construction team will not cover the whole country, it may only operate in a particular location, let us say Manchester. So to cover the whole country, there may be many such units that are divided by geography, perhaps on a county basis, all contained within the "Roads" agency, and each in turn containing a road construction and a road maintenance unit.

The "Roads" agency will itself of course be a part of a larger public sector body, say "Transport Infrastructure". In this case, it will be just one of several units that may be differentiated on the basis of technology, so roads may be one agency, railways another, urban light railways another. In this scenario, Figure 2 shows how the provision of roads is structured from the level of central government to an individual

road project, and most importantly, the way that the complexity of this provision has been handled.
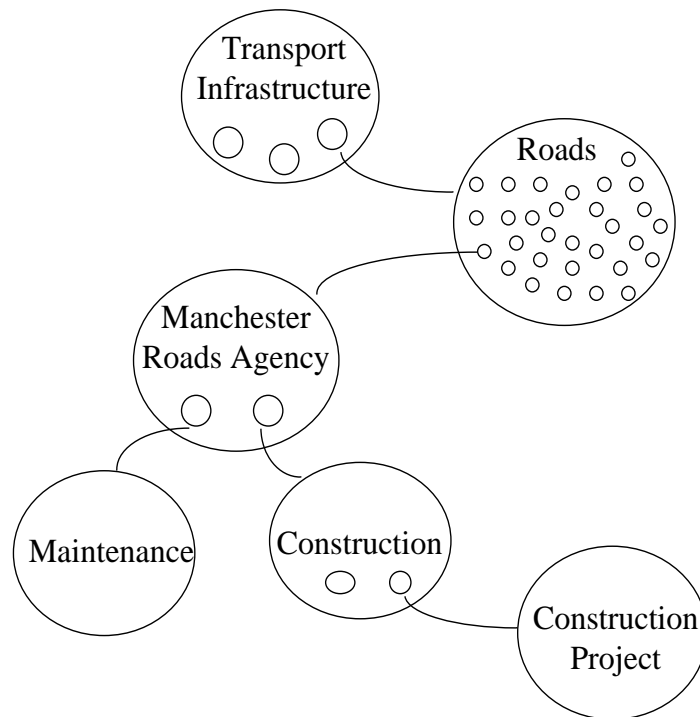
Figure 2

Although we have postulated this as a possible way of carrying out the structural division of transport infrastructure, it is by no means the only way of doing this. It could be done on a regional basis, with each county managing its own infrastructure, rail, roads, light rail, airports, etc. Or alternatively, it could be that regional division is done at the lowest level, and that all road infrastructure, both construction and repair is centrally controlled. A model for this might look like Figure 3.

The critical issue is that the provision of roads to all areas of the country is a complex task, and the way that this complexity is dealt with has profound implications for the way that the organisation operates and the way that it is managed.
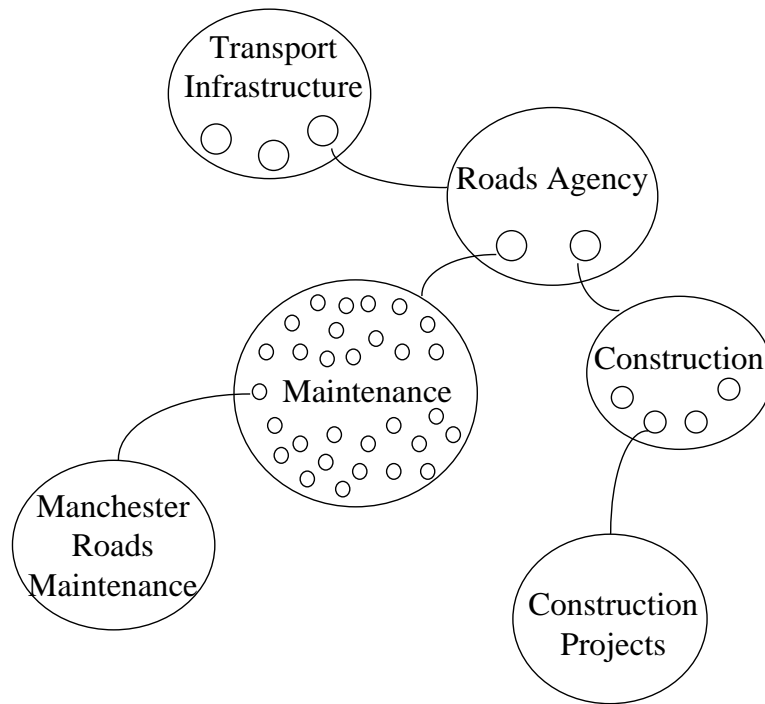
Figure 3

For example, in the first model in which we postulated a Manchester Roads Agency that handled both maintenance and construction, we can easily imagine that it would be possible for the two to swap resources of both personnel and plant as needed. The implications of this may be a more efficient use of resources, but a drop in the speed of response of the road repairs service when maintenance resources were committed to construction.

In contrast, such a pooling of resources would be near impossible using the second model, since construction is controlled centrally, and only maintenance is managed at a local level. There are of course many other implications not only for the operations but also for the management. It is necessary to unfold the organisation's complexity in this way if we are to understand what these implications are for any organisation. In particular, this method allows us to start to look at where within an organisation decisions can be taken, and how resources may be allocated.

Having arrived at the unfolding of complexity, and looked at the implications of how that is done, we then take each level, and go on to look at the organisational processes that are needed to create a viable system: Co-ordination, Cohesion, Monitoring, Intelligence, and Policy.

Co-ordination

Co-ordination has to do with mechanisms to ensure that different primary activities don't conflict with one another. Co-ordination mechanisms can be very simple, but extremely powerful and we often take them for granted; imagine the chaos in a school if there was no timetable to ensure that all the pupils didn't try to get into the same Maths lesson in the same room at the same time whilst the Chemistry teachers had nobody to teach.
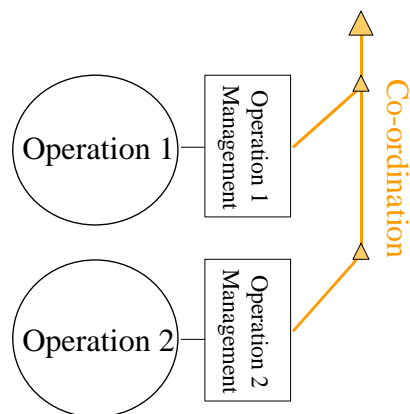

Figure 4.   Co-ordination

Typical co-ordination mechanisms are: common standards, protocols, operations / production scheduling, and as well as these formal mechanisms, common language and shared cultures that ease communication between operational units can be important as can mutual agreement between units. All these are designed to smooth problems between operational units, and to prevent the activities of one disrupting those of another.

Where co-ordination mechanisms fail, we find problems such as: process bottlenecks, failed production planning, turf wars between departments, conflicting messages to customers (internal or external), and appeals to higher management to sort the mess out.

Cohesion

"Cohesion" has to do with those management processes that build the primary activities into a greater whole, and so link sub-systems with the system of which they are a part. The fractal nature of the VSM allows us to look at these relationships in a structured way.
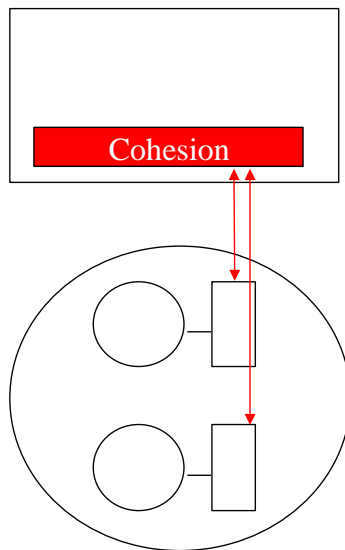

Figure 5.   Cohesion – Managing Resources & Performance

Key elements of managing the cohesion of the organisation are Resource and Performance Management, and critically, the balance between the two.

To ensure viability, the processes for managing resources and performance need to be communicative and participative. Performance measures and targets need to be agreed between sub-systems and the management of the system of which they are part. This is in contrast with normal practice in many organisations where they are practiced as 'top down' commands and controls. The arbitrary imposition of either performance targets or resource allocation, risks unrealistic demands and expectations of parts of the organisation and increases the probability of failure. The agreement of performance targets and measures needs to be matched and balanced by a reciprocal allocation of resources. Once again, if this process is carried out as a one way 'control' process, then the organisation is at risk of under-resourcing some activities, thereby once again increasing the risk of failure in delivery. Very often, resource

allocation and the setting of performance targets are dealt with by different parts of management and are not connected. Since in most cases, the resources are the principal means of delivering the performance, clearly, these two activities need to be linked together as a conversational loop in which a sub-system, say a department, bids for resources with its line management in order to deliver agreed levels of performance. Since the resources may be of different sorts, financial, personnel, IT, infrastructure etc. this resource/performance bargaining process can be problematic, especially in organisations where the management is fragmented along functional lines. To be effective in these key line management processes requires managers to be able to integrate decision-making across functions.

For managers dealing with these issues of performance management, and resource allocation, the objective is to ensure that the organisation is able to deliver its objectives. There are two major problems. Firstly, to ensure that there is an alignment between the objectives of the sub-systems as represented by agreed measures of performance, and those of the whole system. Secondly to balance resources between the competing demands of sub-systems in order to ensure the best use of resources, and the optimisation of the performance of the system as a whole.

Charged with ensuring that performance is delivered, the temptation for system managers is to involve themselves in the activities of their sub-systems, and to attempt to micro-manage operational problems. Denying the managers of the sub-systems the autonomy they need to solve their own problems is a major problem in many organisations, and results in what we call the archetypal problem of the "Control Dilemma". This is a situation in which the organisations faces increased levels of complexity in its environment, often in the form of demands from customers to deliver improved levels of service: better quality, shorter lead times, higher volumes, better customer service etc. Faced with these demands, operations need to adapt, and change to try to match these increased expectations. Management, fearing a loss of control of the situation, press the sub-systems for information and reports, and bombard them with instructions, advice and initiatives. The sub-systems now face a double challenge, not merely do they have to respond to the needs of their environment, but also the increased demands from management. Their ability to deal with the real problems they face is actually undermined by their need to cope with demands from management. At the same time as inhibiting the organisation's capacity to respond to new problems at an operational level, attempts to micro-manage also

undermine senior manager's ability to focus on the strategic issues that are their legitimate area of concern, and so the organisation suffers at two levels.

The more that managers can allow autonomy in the units they manage, and rely on performance reports from these units, the more effectively the units will be at delivering the performance demanded by their operating environment, and hence the more likely that the organisation will succeed in fulfilling its objectives. For this to happen requires that the relationship between managers and the units they manage be based on a foundation of trust. Monitoring is a key process in developing this trust.

Monitoring

Monitoring is one of the least well understood arts of management. Done well, it builds trust between managers and the units they manage. Done badly, it can destroy trust almost faster than anything else.

The purpose of monitoring is twofold: firstly to allow managers to have confidence that what they think is happening in the units they manage really is happening, and secondly to provide those they manage with the confidence that their managers do actually understand the issues they face.
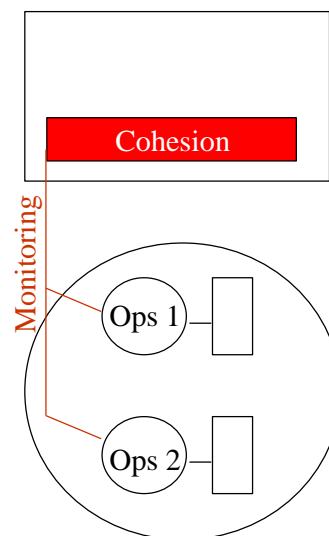

Figure 6.   Monitoring

To be effective, monitoring has to be a sporadic, in-depth activity that bypasses unit management and engages with the reality of the unit's activities. It has to be sporadic since otherwise, the manager doing the monitoring would be overwhelmed by detail,

and would undermine the autonomy of the unit management, thereby precipitating the control dilemma. It has to be in depth so that the monitor gets a good enough understanding that they can have confidence in the validity and meaning of regular reports, and so that staff of the unit being monitored, know that management's decisions are based on reality. This last point is critical, as often strategic or operational plans are undermined by the perception that decision makers are 'out of touch'.

Adaptation

Viability implies the ability of the organisation to go beyond merely doing what it does, and doing it well and efficiently. It implies the ability to change: itself, its activities, its form, its identity, and the environment in which it operates. So to be viable, organisations need to be able to adapt, and furthermore, the mechanisms for adaptation need to present in all the sub-systems and sub-sub-systems of the organisation.

In the VSM, balancing the interests of 'Cohesion' which has to do with the 'inside & now' of the organisation, is 'Intelligence' which looks outside the organisation and into the future.
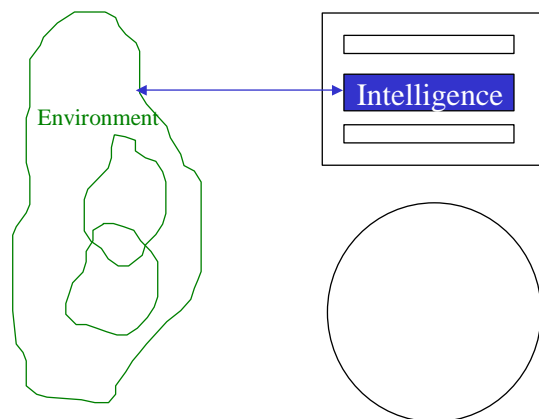

Figure 7   Intelligence

Typical intelligence activities are: forward planning, forecasting, marketing, technical / product development. Many of the disciplines that manage the cohesion of the

organisation (financial control, personnel, operations management) have a counterpart within intelligence: finance planning, training & development, capacity planning. All these are activities that look at the organisation's place within its operating environment, and the future, and seek to prepare the organisation for a new future. Strategic decision-making is a process of matching current reality to future needs or objectives. So a typical decision process would start with an assessment of "where we are now", deciding "where we want / need to be in the future", and then planning how to get from where we are now to where we need to be. Within the VSM, "where we are now" is within cohesion management, whilst "where we want to be in the future is handled by intelligence. Balancing the two is "Policy". Successful strategic decision-making requires a rich debate between elements of cohesion, between elements of intelligence, and between intelligence and cohesion. This set of conversational processes need to be overseen by the policy function. Failure to adequately structure these conversations results in a high failure rate for decisions (either not implemented, or fail on implementation).
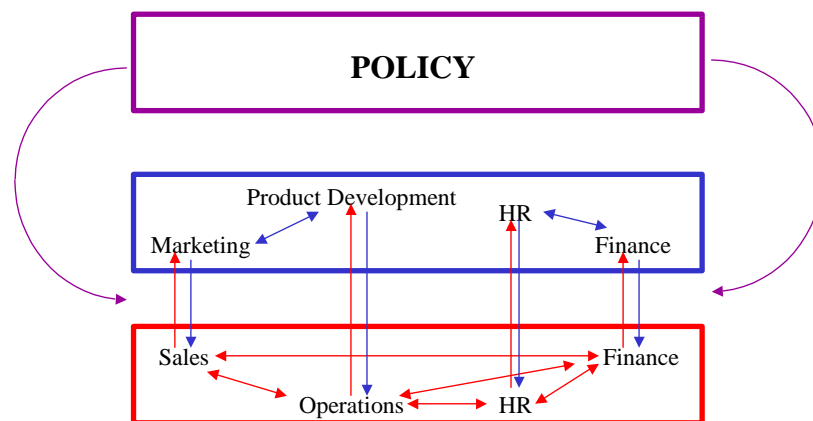

Figure 8   Strategic Decision Making

There are a number of archetypal strategy problems in this area, including:

1. Strategy dominated by Cohesion, resulting in stasis
2. Strategy dominated by Intelligence resulting in unachievable & unrealistic plans

3. Strategy dominated by one functional discipline (often finance in the UK) resulting in decisions that ignore key issues, and offer solutions that don't match the problem.

Typical examples include:

1. Reliance on outdated products / services, failure to resource new ideas / products / markets

2. Development of products without adequate capacity to produce or deliver them, development of new market niches without adequate products or delivery capacity, creating market expectation that can't be met, trying to move to an unachievable new area of the market

3. New IT driving strategic change without regard to market needs, responding to changes in customer taste by downsizing rather than appropriate product development

Figure 8 shows a typical set of strategy conversations. Different market opportunities are matched to the existing state of the organisation such that a practical and realistic conclusion can be arrived at. The choice as to which markets the organisation should develop with which products, is balanced against the capacity of the organisation to support this in terms of: financial, human, and production resources, together with an assessment of what needs to be done to develop each of these to cope.

A Fractal Structure

The fractal structure of the VSM (figure 1) means that the same mechanisms are replicated at level and in each of the sub-systems and sub-sub-systems that we revealed in the unfolding of complexity.

This means that decision-making is a multi-level activity, and not merely the prerogative of senior management as in a command and control system. This allows for strategy to be built up through the organisation as a series of conversational processes between different levels, so that the strategy for the organisation as a whole, both informs and is informed by the planning at divisional level. Similarly, divisional strategy both informs and is informed by departmental strategy, and so on down to the level of teams and individuals. Each level has a different perspective, focus of attention and often a different time horizon. The reconciliation of these is a negotiated process if weaknesses in planning are to be avoided. The fact that this

articulation (in both senses of the word) of strategy is not carried out in most organisations is the reason that the majority of strategic plans are never implemented. For strategy to be implemented requires plans to be, and to be seen to be both relevant and practicable.

Practicalities

The VSM is often perceived by those unused to it as enormously complex and cumbersome. Certainly, compared to the hierarchical model, it is more complex as it encompasses many more aspects of organisation, which the hierarchical model ignores. In practice however, in the hands of a skilled user, the VSM is an extremely fast and precise tool for both diagnosing weaknesses in existing organisations and designing new organisational structures. It can and has been used successfully on organisations of all types and all sizes from the small team to the nation state.

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