

The Viable System Model as a Framework for Understanding Organizations

by

Raúl Espejo and Antonia Gill

Introducing the Model

The Viable System Model (VSM) is not a new idea. Created by Stafford Beer over twenty years ago, it has been used extensively as a conceptual tool for understanding organizations, redesigning them (where appropriate) and supporting the management of change. Despite its successful application within numerous private and public sector organizations, however, the VSM is not yet widely known among the general management population. There are two main reasons for this. Firstly, the ideas behind the model are not intuitively easy to grasp; secondly, they run counter to the great legacy of thinking about organizations dating from the Industrial Revolution - a legacy that is only now starting to be questioned. To deal with the second point in more detail, organizations have been viewed traditionally as hierarchical institutions that operate according to a top-down command structure: strategic plans are formulated at the top and implemented by a cascade of instructions through the tiered ranks. It is now widely acknowledged that this modus operandi is too slow and inflexible to cope with the increasing rate of change and complexity surrounding most organizations.

Technology developments have helped to usher in a new concept of a flatter, networked-type organization with a wider distribution of data to reach all those who actually perform the work - in real time. The ground is now fertile for viewing the organization in a new light. However, there is also much confusion about the nature of this new-style organization. Ask the members of any large organization to explain its structure to an outsider and a series of confused, confusing and often conflicting interpretations are likely to result. It is becoming increasingly apparent that it matters much less who reports to whom, as who needs to talk with whom and how all the pieces of a complex interrelated jigsaw fit together to form a synergistic whole. Yet it is precisely this sense of the whole that is so often missing.

A clear danger with these looser structures is that overall cohesion and synergy may be lost in the attempt to spawn a multitude of business units and profit centres capable of responding to different market pressures and organizational support requirements.

Knowledge and information then often become trapped in local networks reducing the chances of people working in co-operation with others across organizational boundaries. People working in different parts of the enterprise are simply unaware of related issues and activities which ought to concern them because the organization has lost its connecting tissue.

The Viable System Model offers a way of gaining both functional decentralisation and cohesion of the whole. It is underpinned by fundamental cybernetic principles of communication and control in complex organizations. These principles offer a way of providing true autonomy and empowerment within an integrated framework, together with the necessary supporting links between the individual parts. In short, the VSM provides a framework for designing flexible, adaptable organizations that balance external and internal perspectives and long and short-term thinking.

Organizations as Recursive Systems

The idea of complexity is fundamental to cybernetic thinking. Put simply, we are all surrounded by a far greater complexity than we can deal with by a one-to-one response. We cannot possibly 'see' all the varied intricacies, that others 'see', of our situation, but can only hope that by correctly recognising salient features and patterns (often through instinct), we can respond adequately to remain 'in balance' with those in our everyday surroundings.

Similarly, organizations have far less inner complexity than their environments: there is a natural imbalance that needs to be recognised and addressed through various leverage strategies that the organization employs to bring this complexity within its response range. And again, a management team or organizational steering group has far less complexity than the organization itself: it too must find ways of understanding the organization without knowing all the details seen by others.

A second key concept to understand, closely related to complexity, is that of recursivity. This concept is about the architecture of complex organizations and is based on the premise that all living systems are composed of a series of sub-systems, each having self-organizing and self-regulatory characteristics. The sub-systems each contain further sub-systems, and so on, right down to the level of the single cell.

These systems, at whatever level they occur, are by definition autonomous. They contain within them the capacity to adapt to change in their environment and to deal with the complexity that is relevant for them. Picture a Russian doll, only one that contains

twins, triplets, perhaps even sextuplets at every level; this will give an idea of how powerfully complexity is simultaneously generated and absorbed at every level through this unfolding process.

In the same way, we can unfold an organization from the most global to the most local level. With the increasing pace of change and the scale of complexity facing most organizations, the choice is becoming clear: devolve power, by supporting this natural unfolding process, or face extinction.

Unfortunately, in their rush to 'delayer' and rid themselves of costly bureaucratic controls, many organizations are currently charting their course to oblivion through other means: instead of creating recursive structures that provide long-term viability, they are blindly axing units without considering their actual and potential contribution to the viability of the whole. Without a framework to examine the functioning of the organization as a complete, living system, many cost-cutting exercises achieve one-off savings at the expense of longer term organizational effectiveness.

Recursive structures, then, are both efficient generators and absorbers of complexity and highly adaptive to change. They function in this way precisely because they consist of a devolving series of primary activities (those responsible for producing the goods or services of the organization) supported by sufficient regulatory and communication functions to enable them to operate effectively at every level.

Elementary cells, at the level of the shop-floor in a manufacturing environment for example, are thus effectively subsumed within larger primary (autonomous) activities. Each primary activity, from the level of the elementary cell to the total organization, has its own value chain, that is, its own inbound and outbound logistics and related (support) services. This architecture of complexity - the recursive structure - enhances the operational complexity of the organization and makes it more cohesive.

Once this point has been grasped, together with the principles for viability set out below, organization redesign efforts and communication/information infrastructures can be directed towards achieving viability for the organization at least cost - financially, materially and in people terms.

The Five Essential Functions for Viability

An autonomous unit (or viable system) needs to have five key systems in place if it is to operate effectively in its environment. These are: Implementation, Co-ordination, Control, Intelligence and Policy. We set out below a description of the nature and purpose of each of these different systemic functions.

First, however, a word of precaution. Our discussion is particularly concerned to highlight the management design principles behind these systems. We are necessarily concerned here with 'soft' issues

of management - with relationships between people and groups of people. It is entirely misleading to attempt to use the model mechanistically: it is above all a thinking framework which helps people to share a common language and model of their organization to manage more effectively its complexity and aid debate and adjustment. Its effective use requires a common understanding of the philosophy and relational management approach behind the model. Therefore, the language we use is noticeably different from that traditionally used by either business experts or information systems professionals - although the model itself (which is shown at the end of this section) looks anything but 'soft' in appearance! Our message is this: "there is rigour in this softness", so please bear this in mind as we present the model's features.

1 Implementation

Primary activities, those responsible for producing the products or services implied by the organization's identity, are at the core of the recursive model. The organization's products and services are produced at different levels of aggregation by its embedded primary activities and the value chain of the organization as a whole implements its overall purpose. We generally stop unfolding the structure at the point where a small team of people is responsible for a complete work task (eg a manufacturing cell). Although in theory an individual person is also a viable system, we are dealing with a model of organization or co-operative work between individuals.

Therefore, we would expect to see most viable systems, at whatever structural level they occur, containing further sub-systems as a way to help them handle the complexity of their environments. These sub-systems are responsible for carrying out the value-adding tasks of the system-in-focus.

2 Co-ordination

A viable system also has systems in place to co-ordinate the interfaces of its value-adding functions and the operations of its primary sub-units. In other words, co-ordination is necessary between the value-adding functions as well as between the embedded primary activities. 'Co-ordination' is unfortunately all too often used as a substitute term for top-down direction and control in today's management vocabulary - as if by changing the term used, the autocratic manager's actions will somehow become more palatable. The sense in which we wish to use the term is 'co-ordination by mutual adjustment' between support functions and between autonomous units. This is an area where IT systems can be extremely helpful in avoiding more direct and intrusive human intervention - provided they are designed with the correct principles in mind.

The essence of workflow or business process redesign is to pay careful attention to this requirement for co-ordination between value-adding and support functions through the design of effective two way communications and mechanisms for mutual adjustment. In particular, primary sub-units sharing the same 'parent' unit need to operate synergistically: because of the way they are derived through the modelling process, they are logically connected in terms of their operations and often, also, in terms of the external markets they serve. It makes no sense to set them up in direct competition with one another, or to have them operate blind to each other.

The more teams can share common standards, approaches and values, the greater the chances that spontaneous lateral communication will occur, resulting in less 're-invention of the wheel' and more chance of synergy. The stronger these lateral links, which are of both a technological and human nature, the less the requirement for management to attempt to impose control from above and the greater the sense of autonomy and empowerment experienced by the subsumed primary activities.

3 Control

Although effective use of the communication channel can considerably lessen the requirement for supervisory control, two-way communication between sub-unit and meta-level unit remains a prerequisite for viability. This is the channel through which resources are negotiated, direct line management instructions are issued (on an exception-only basis) and accountability reports flow upwards to keep the meta-level management in touch with events. One way of reducing the use of direct commands is by designing good 'exception reporting' systems. 'Management by objectives' also plays its part in preventing too much direct interference by management in the running of operations.

However, another important channel is used as an adjunct to direct control: the monitoring channel. The control function needs an assurance that the accountability reports it receives are indeed an accurate reflection of the status of primary activities. Often the information provided in accountability reports tends to reflect personal biases and other natural communication problems. There is thus a need to corroborate this information with an alternative source. This is achieved by developing a monitoring channel that runs directly between the meta-level management and the operations of the sub units, by-passing the sub units' management. At a simplistic level, this is the 'management by walking about' principle. To be effective in terms of organizational viability, however, this monitoring must adhere to certain design rules. It must be sporadic, rather than a regular, anticipated occurrence. It must be infrequent, otherwise it risks undermining the authority

and trust vested in the management of the sub unit. It must be an openly declared mechanism, of which everyone concerned is aware: the intention is not to play 'big brother', employing secretive tactics and games of subterfuge; it is simply to demonstrate an interest in knowing what is going on at first hand. If employed sensitively, cross-checks and audits should communicate a message of caring to those involved in the operations in question, without resulting in defensive behaviours from the intermediate level of management. Lastly, the monitoring channel should only link two adjacent levels of recursion: misusing it to conduct lower level investigations from on high corrupts the integrity of the system, is unworkable at a practical level because of the complexity involved and implies a complete breakdown of trust through a significant cross-section of the organization.

4 Intelligence

The Intelligence function is the two-way link between the primary activity (ie.Viable System) and its external environment. Intelligence is fundamental to adaptivity; firstly, it provides the primary activity with continuous feedback on marketplace conditions, technology changes and all external factors that are likely to be relevant to it in the future; secondly, it projects the identity and message of the organization into its environment. These loops must operate in balance, to avoid either overloading the system with a swamp of external research data without the capacity to interpret and act on that data; or the alternative risk of communicating outwards in a strong fashion, without having a corresponding means to listen for feedback from the marketplace. The intelligence function is strongly future focused. It is concerned with planning the way ahead in the light of external environmental changes and internal organizational capabilities so that the organization can invent its own future (as opposed to being controlled by the environment). To ensure that its plans are well grounded in an accurate appreciation of the current organizational context, the intelligence function also needs to have at its disposal an up to date model of the organization.

5 Policy

The last function, giving closure to the system as a whole, is the policy-making function. This function is by definition low-variety (in comparison with the complexity of the rest of the organizational unit and the even larger complexity of the surrounding environment); it therefore needs to be highly selective in the information it receives. This selectivity is largely achieved through the activities and interactions of the Intelligence and Control functions. The main roles of Policy are to provide clarity about the overall direction, values and purpose of the organizational unit; and to

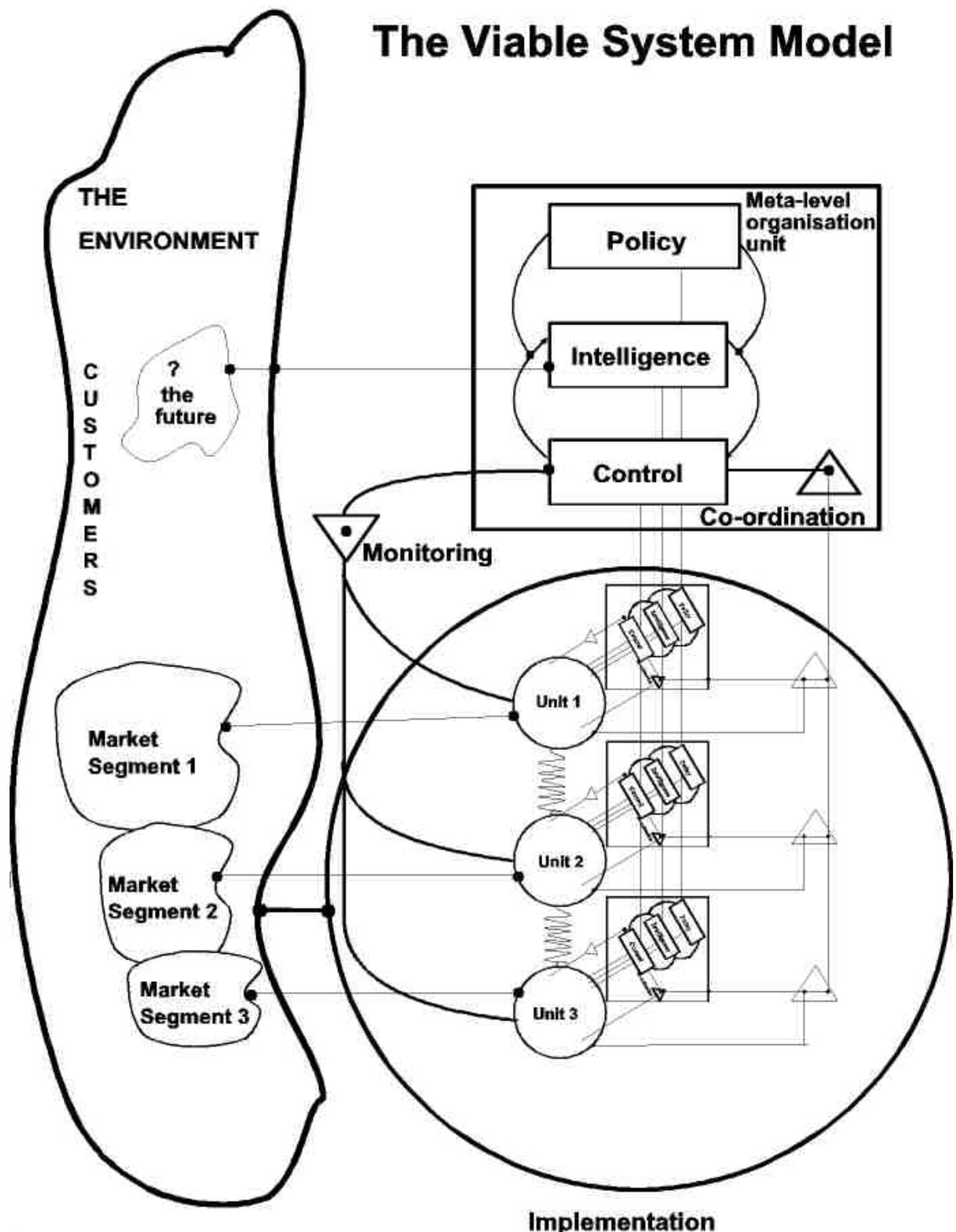
design, at the highest level, the conditions for organizational effectiveness. The decisions that the Policy function makes are few and far between and constitute, in the main, a final sanity check against direction, values and purpose after extensive debates and decisions have been carried out within and between the Intelligence and Control functions.

One of the key conditions for organizational effectiveness relates to how the Intelligence and Control functions are organized and interconnected. Intelligence and Control offer complementary perspectives on the definition, adjustment and implementation of the organizational unit's identity. Each needs to be given weight in the policy-making process; decisions over-influenced by either of the two filters are likely to be both costly and ineffective. They also need to be highly interconnected, so that most of the emerging Intelligence and Control issues can be cross-checked with reference to the other filter before reaching the attention of the Policy function. This has important implications for designing multi-function workgroups that do real work together and reach critical decisions after careful debate and a sharing of perspectives. Only by designing these processes with reference to a good model of how the organization works can the Policy function effectively discharge its mandate.

The VSM in Summary

Below we illustrate the model in full through two levels of recursion.

The Viable System Model



Clearly, the five functions reinvent themselves at each level, giving the whole structure a strength and integrity that comes from having well formed and well interconnected parts. Each line (or channel) in the model is of course two way - a communication loop that needs to be designed and managed with the idea of complexity

management in mind (filtration from the high variety side, amplification from the low variety side, in order to manage the complexity differential inherent in most relationships). The VSM and the language of managerial cybernetics that underpins it are useful tools in helping organizational members to take a systemic view of their communication processes. A shared understanding of the organization as an integrated whole is a powerful platform for various kinds of change. The modelling tools define an underlying structure for communications in support of viability, whilst providing a valuable template for both structural organizational design and the mapping of strategic IT architecture. Being recursive in nature, the VSM has the advantage of being flexible and robust - both prerequisites in fast-changing environments. It is flexible since new strategic business units can easily be inserted into a particular level of recursion without having to make dramatic changes to the surrounding structures. It is robust in having a long term focus that is rooted in the very identity of the organization; therefore, integrated structures that are based on the VSM evolve over time as the organization stays continuously in tune with its environment and operational needs, rather than being victims of radical, discontinuous change. For example, many organizations tend to oscillate violently between centralised and decentralised forms of control, reacting to different perceived pressures at different times. This kind of oscillation can be costly, wasteful and ultimately damaging to longer term effectiveness, as structures, systems and human relationships are thrown out of the window with every 'restructuring' announcement. The VSM, by contrast, provides the ability to respect the relational and recursive nature of the organization, to nurture it into a healthy balance both internally and externally, making it intrinsically adaptable to change. The process of reinvention then becomes a continuous, spontaneous dynamic of the organization, rather than something that is imposed discontinuously from some external source.

References

- S. Beer, *Diagnosing the System for Organizations*, Wiley, Chichester (1985)
- R. Espejo and R. Harnden, *The Viable Systems Model - Interpretations and Applications of Stafford Beer's VSM*, Wiley, Chichester (1989)