Management Cybernetics

by

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Cybernetics is based on the Greek word meaning 'steersmanship'. Regrettably the word has captured popular imagination and we have words such as cyberspace, cyborgs, cyberman etc. The word **cybernetics** was first used by Norbert Wiener in 1947, who defined it as "the science of control and communication in the animal and the machine." As applied to management, Stafford Beer defines cybernetics as "the science of effective organization." Today the use of cybernetics as a term finds a home in engineering and technology, particularly in the area of robotics, and in management. The term management cybernetics implies both effective organization and steersmanship. Whether it is the CEO or the Prime Minister, they are both steersmen - they set the direction in the face of calm and turbulent conditions. In this brief, we introduce two concepts from cybernetics: managing complexity using the tool of the 'black box' and Ashby's Law of Requisite Variety.

The Black Box

Given the interest in Business Process Redesign/Reengineering (BPR), the notion of the 'black box' will be readily understood by many. If we accept that the complexity in an organization of any size is such that it is impossible for managers to 'know' all that happens inside the organization and how work really gets done, then we can treat the organization itself (or division, department or shopfloor cell) as a black box.

A black box has one or more inputs and one or more outputs. Process managers set performance targets, monitor the output against these targets and take corrective action (feedback) to alter the inputs so the outputs may better meet the set requirements. To further increase the complexity of process management, in addition to the inputs there is always the possibility of disturbances impacting on the process. These disturbances, depending on what the system-in-focus is, can be input product or service variability, competitor strategies and actions, restructuring ordered by higher level management, industrial action or disturbances from the environment. The 'black box' or business process may be decomposed into sub-processes. These can be viewed in a similar way and can be linked up serially and in parallel. The black box approach to modelling complexity is shown in Figure 1.

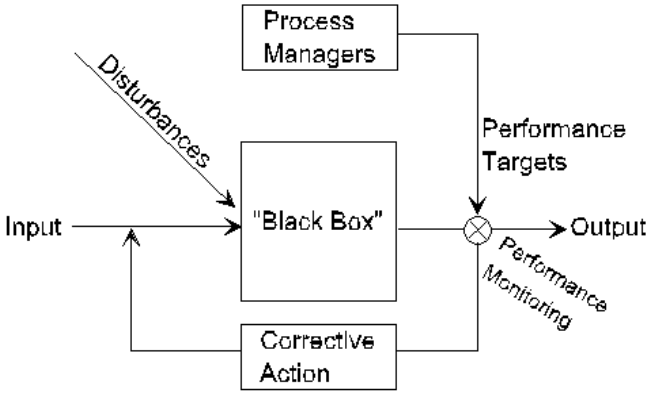

Figure 1

As we move away from functional based work to team based process management, we expect people to take ownership of the processes that they are charged with managing, continuously improve the process, communicate with customers and suppliers - in short we expect them to use their brains and manage their own personal 'black boxes'. Where empowerment is practised process workers will manage the 'black box'. Hierarchical or command-and-control organizations tend to be organized around functional specialisms. Here the intent is to have efficiencies at the level of the function rather than process. It is now recognised that customers will benefit most from a process view of the organization which involves multifunctional collaboration - multidisciplinary teamworking.

In summary, the black box approach to modelling complexity is a key tool in helping to set boundaries around the area of interest; recognise all the *actors* involved in the process; define input/output *products* and *disturbances* of the process; and cascade and integrate the management of business process improvement.

Ashby's Law of Requisite Variety

Variety is a measure of the number of possible states of the system. Variety is thus a measure of the complexity of the system. However, in order to 'control' a system, the regulator of the system needs to absorb the variety of the system. This is in keeping with the Law of Requisite Variety which states that 'only variety can destroy variety'. Richard Tanner Pascale in 'Managing on the Edge' interprets this by stating: "for any system to adapt to its external environment, its internal control systems must incorporate variety."

An organization exists in its market place. It buys raw or semi-finished products or services from its suppliers, and adds value to the product or service so that it can make a profit/surplus and thereby survive. Every organization has a management team that 'steers' / leads the organization. As we may expect, the variety of the marketplace is significantly greater than the organization, which in turn has significantly greater variety than its management. But we all know that most organizations manage to survive in the marketplace and that managers to varying degrees are successful in steering their organizations. The fundamental strategy intuitively adopted by both managers and their organizations is to *balance variety*, by increasing/amplifying their own variety whilst reducing/attenuating incoming variety. If we make this strategy a conscious rather than an unconscious process, we can actually increase the range of options available to us and the effectiveness of those options in managing complexity. This process is shown in Figure 2 where we have separated the organization from the marketplace and management from the organization for ease of understanding. We have used the symbols from electronics/ communication theory to represent amplification and attenuation.

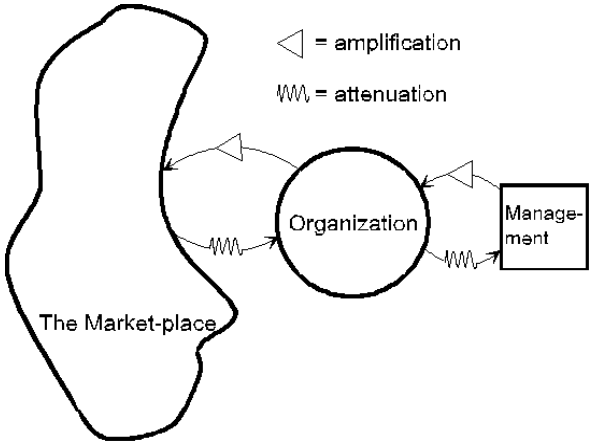

Figure 2

The management to organization loop is about the internal 'control' of organizational resources; the market to organization loop is about how the organization interacts with the market. Supply chain management is a good example of the latter loop. Advertising and sales visits are instances of amplifying organizational variety. Market research and customer/quality complaints are other examples of organizational attenuation. To close the 'loop' we need to balance amplification with attenuation for a specific system-in-focus. Many marketing fiascos and even company failures can be traced to a fundamental imbalance in operating this loop.

Recommended Reading: Designing Freedom (a good introduction) and The Heart of Enterprise are both by Stafford Beer and published by John Wiley and Sons.

Note: If this paper has been of interest be sure to read the paper on the Viable System Model available on our web site.