

## **Developing a Balanced View of Management Ecology**

Eric Wolstenholme  
University of Stirling  
Stirling, FK9 4LA, UK  
Tel: 0786 467378  
Fax: 0786 67359

### **Abstract**

Many approaches to change management have tended to focus on specific dimensions or functions of organisations at the expense of others. For example, there has been organisational analysis, strategic analysis and more recently business process analysis. Strategy, organisational structure and process are inextricably linked via information and delays and form a management 'ecology', where changes to any one of the elements have repercussions for all. This paper suggests that a balanced understanding of organisational ecology is required to generate effective and appropriate planning and change which must be linked to management culture, involvement and beliefs. A description is presented of the way in which the author is currently using system dynamics modelling to assist change management. The paper is written to assist System Dynamicists in bringing the role of System Dynamics as a change management tool to the attention of managers, at a time when there is much confusion about alternative approaches to analysing organisational change.

## Developing a Balanced View of Management Ecology

### Introduction

Business re-engineering, and process re-engineering in particular, (for example, Hammer, 1993) is rapidly gaining significance as an approach to planning and change management and rightly so. For many years management thinking has been dominated by two trends.

The first trend is characterised by the use of high level approaches which focus on specific dimensions of organisations, for example, organisational and strategic thinking. Major assumptions in these methods are that the thinking can be carried out by senior management in isolation from the core operations staff of the organisation and that either the operational processes do not exist, are too distasteful to warrant recognition or will take care of themselves!

The second trend is characterised by the use of low level approaches which focus on specific sub-activities of the organisation. Major assumptions in these methods is that overall change can be achieved by changing the culture and beliefs of management at all levels in a piecemeal way.

Should we be surprised, therefore, that the outcome of change management initiatives is often less than desired. It is suggested that planning and change should indeed have the aim of changing management attitudes and beliefs, but that the way to do this is by a top-down systemic approach which recognises the need to understand the inter-connectedness of strategy and process and is able to avoid some of the 'unintended consequences' of imposed strategic change.

Strategy, organisational structure and process are inextricably linked via information and delays and form a management 'ecology', where changes to any one of the elements have repercussions for all and a balanced view between them is needed to design and implement appropriate change. Systems modelling as a means of systemic thinking provides a unique framework to support the development of this view. It provides an opportunity for managers to share mental maps and models and to generating generic insights from examining the behaviour of organisations under change initiatives.

This paper presents a concise description of the use of systems modelling in developing an appropriate process perspective and testing out alternatives for change. It is written to assist System Dynamicists in bringing this message to the market place and to explain the role of System Dynamics to a wider audience, at a time when there is much confusion about alternative approaches to change management.

### Business Processes and Aggregation

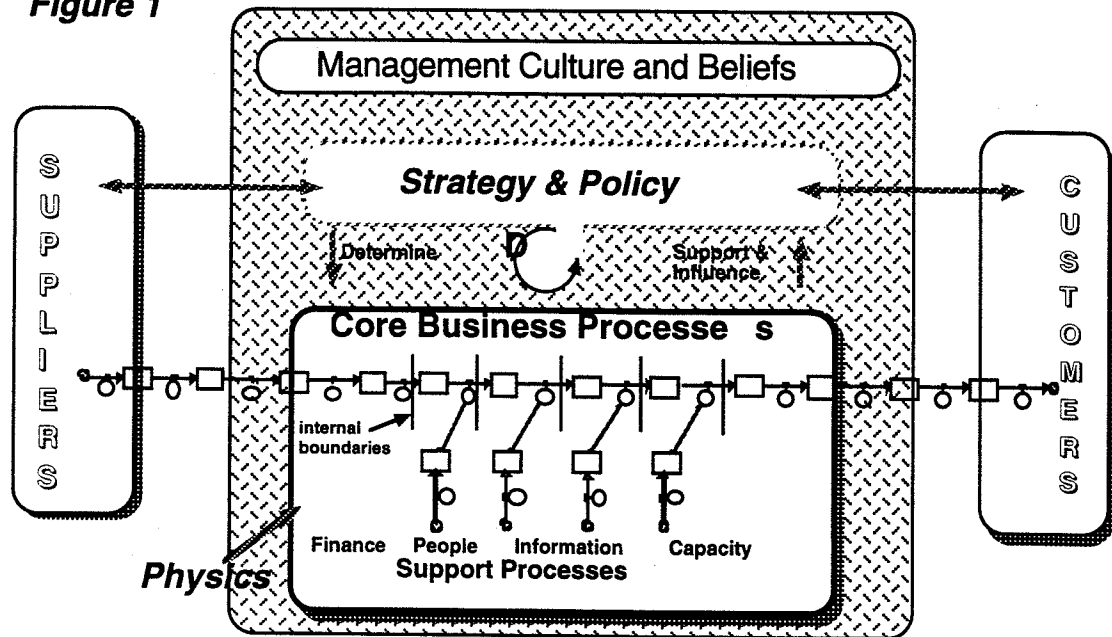
Much attention is currently focussed on business processes. Yet few people have a clear vision of what a process is. In general, a process can be defined as any series of inter-connected activities organised together for a purpose. In organisations the core processes are the major physical, value-adding processes of the business which can be thought of as running horizontally through the organisation and acting at 90 degrees to the conventional support processes and the vertical, functional internal boundaries of the organisation. Ideally, the core processes directly link suppliers to customers.

The processes and organisational structure effectively form the 'physics' of the organisation which interconnect with strategy/policy and which are embedded with these elements in the culture, values and beliefs of the organisation. These elements of an organisation and their interrelations are captured in Figure 1.

One of the major problems in process analysis is that of defining an appropriate level of resolution of the process in time and space. Approaches to process definition are largely related to the discipline in which the process operate.

## A Systems Perspective of Management Ecology

Figure 1



For example, the perspective from the production and operations management area is, inevitably, horizontally orientated, very low level and linked to systems engineering, material resource planning and just-in-time methods. Likewise, the perspective from human resource management is vertically orientated and involved with all levels of resolution from the individual to the group. Although, an organisation is nothing without people this perspective is predominantly abstract. That is, it is possible to resolve team building problems without direct reference to the specific operations that management deal with on a day by day basis.

Process definition depends on the purpose of the analysis and this is where systems modelling provides a great deal of assistance. Firstly, it provides a distinction between the core processes of the organisation and the support processes. Secondly, it provides a unique perspective on process definition.

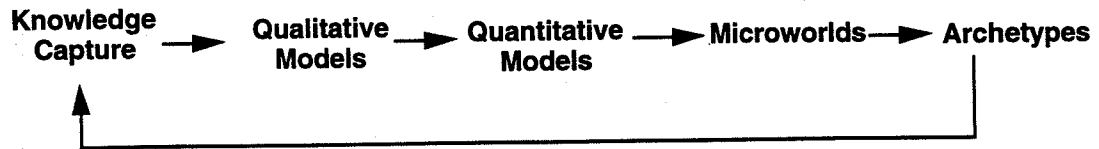
Observing a process can be thought of as using a telescopic zoom lens. Zooming too far back generates a field of view which loses touch with the day to day operating reality of the process and views activities over an excessively long time horizon. Zooming in close means becoming a prisoner of events and focussing only on reactive change. The ultimate close-up of an activity within a process would reveal only procedures and tasks rather than activities within a process.

### The Components of System Maps

System Dynamics recognises that **process** is only one of five generic elements which are required to define an organisation. Others are:

- \* **Information.** It is the feedback of information between parts of processes that provides the rationale for policies and decisions.
- \* **Strategies and policies.** It is strategies and policies that make processes work over time.
- \* **Organisational boundaries.** It is organisational structure which results in different parts of the same process being operated in different, perhaps, contradictory ways.
- \* **Delays.** It is **delays** in both physical and information flows which predominantly determine process behaviour and which distort management understanding of situations.

This set of elements is necessary and sufficient to define and analyse a process. The sequence of implementation of systems modelling is shown in Figure 2 and each of the stages will be outlined below.



**Figure 2.**  
**The Elements Of Systems Thinking**

### **Systems Modelling as a Process Mapping and Simulation Tool**

Originally, System Dynamics maps or flow diagrams were only used for the purpose of systems analysis as a prerequisite to simulation. Further, the maps did not contain organisational boundaries (Wolstenholme, 1985). The breaking-down and unravelling of the subject of system dynamics in the way described above from a sophisticated whole, that was ahead of policy makers ability to understand it, into a set of components that relate to other systems and management thinking is an on-going process in its own right.

System Dynamics is currently best thought of as existing in at least two parts. These are the activities of mapping and modelling, both of which can be carried out either qualitatively or quantitatively (Wolstenholme, 1990). The difference between process mapping and simulation modelling can be best explained as the same as the difference between constructing a road map and studying the flow of traffic. The former provides the static physics of the situation and the latter an appreciation of the dynamics of congestion and strategy/policy interventions to alleviate problems.

Mapping is commonly used in general change management and systems methods. Simulation is still not a commonly used tool and great care must be taken in introducing it into change management sessions so as to not deter managers from sharing its benefits by providing an over-dose of quantification. A contemporary way of suggesting to managers that we should always simulate organisations in order to understand their behaviour is, perhaps, to say that business processes are intrinsically dynamic and serious process re-engineering can only be carried out by studying the behaviour of processes over time (Wolstenholme, 1990; Stevenson, 1993).

Systems modelling as a process re-engineering method is therefore concerned with both mapping processes at an appropriate level of resolution for a particular purpose and with simulating process behaviour over time with the objective of re-design.

### **Identifying, Testing and Implementing Re-engineering**

Once a map has been created it can be used to trace out the way in which the behaviour of the organisation will evolve over time from the interaction of strategy, process, information, delay and organisational structure. Together these components interlock to form feedback loops which bring processes to life and which create the behaviour or dynamics of the process over time.

Simulation need not involve a computer and may just involve teasing out the implications of change. However, very sophisticated but easy to use purpose-built software now exists which can assist the visualising of process evolution over time, for example, 'Ithink' which allows hierarchical process modelling on both Macintosh and Windows platforms (Richmond, 1994).

System modelling can be used to identify and test out alternative ideas for change. It is possible to base such analysis around a process framework by modifying any of the elements of a process to improve its behaviour. For example, it may be beneficial to:

- \* change the physics of the process by introducing new routes through it,
- \* identify, create or destroy informal routes which always emerge as process approach their carrying capacity.
- \* changing the information and policy used to operate the process,
- \* change who is responsible for particular activities in the process. An interesting question is whether one group of the organisation should be responsible for complete processes rather than for perhaps one activity across all processes?
- \* eliminate delays or stock sizes in the process (as in just-in-time and computer based material resource planning),
- \* examine how processes and their responsibilities can be extended both up-stream and down-stream. This is basically the same as vertical integration but is perhaps better thought of in process terms as horizontal integration.

### **Microworlds**

Once an acceptable model has been established, the insights from it must be disseminated throughout the organisation to be of lasting benefit. To do this most effectively other managers should be allowed to rediscover the insights themselves by experimenting with the model and hence experiencing the process by which the insights were created. It is now common practice to develop models into free-standing microworlds to facilitate this process.

### **Generic Insights**

As systems maps or models, either qualitative or quantitative, are developed they increase in complexity and a powerful attribute of applying systems modelling is to try to condense a map down into its basic feedback loop structure or 'archetype'. A number of system dynamics practitioners have attempted to define such a set of archetypes (Senge, 1990; Wolstenholme, 1990, Wolstenholme and Corben 1993).

The purpose in applying systems modelling and identifying archetypes is to assist managers in understanding the fundamental causes of undesirable situations and to avoid compounding problems by applying reactive change to events based on point-in-time information.

The real causes of major problems are often rooted in our own past actions and rarely caused by external agents. Feedback can be described as the return of ghosts to haunt us and it is important that the effects of policy on real operational processes is explored through time prior to implementation to minimise unintended consequences.

Archetypes also provide a unique way of transferring insights from one domain of analysis to another. The collapsing down of a model from one (donor) situation into a generic archetype and unfolding it in another is a very powerful way of generating new insights in the receptor domain (Wolstenholme, 1990).

### **Model Conceptualisation**

A further extension of the idea of breaking the subject of System Dynamics into a number of building blocks can assist the conceptualisation of maps and models. Models can be created by starting from any of the five components and proceeding in a stepwise modular manner or, as originally suggested in System Dynamics, from observing real world behaviour and relating this to a combination of the interactions of the five building blocks.

### **The Wider Implications of Systems Modelling**

Systems modelling is a necessary framework for business process re-engineering. However, it is much more than process re-engineering. It involves (Senge, 1990):

- \* taking a true systems view of an organisation with managers to share mental models about the inter-connectedness of process, organisational structure and strategy,

- \* linking strategy with its consequences for operational processes and showing unintended consequences of intuitively sound strategies.
- \* testing out re-engineering ideas using maps, models and computer microworlds which managers can use to road test new ideas and experience the resultant system behaviour,
- \* identifying high leverage intervention points in organisations where maximum improvement can be realised for minimum resource input,
- \* developing the ability of managers to think in generic and archetypal terms and to create ideas for change through understanding rather than reaction,
- \* disseminating insights into system behaviour through a focus on leadership style. A style of leadership which would be compatible with systems thinking would need to focus on encouraging managers to share visions and understanding of management ecology. The leadership implications come from recognising that to produce lasting and meaningful change leaders need to continually re-design and re-engineer their organisations.
- \* disseminating insights into system behaviour through a focus on learning. Learning comes from recognising the generics of situations, avoiding repeating past mistakes and the power of transferring insights to other situations.

The way in which some of these wider issues relate to the establishment of a systems viewpoint is shown in Figure 3.

Some of these wider factors which recognise the distinction between providing tools for analysis and changing management mindsets are embedded in the concept of **business** re-engineering as opposed to management **process** re-engineering. However, the advantage of systems modelling over business re-engineering is that it provides an integrated expansion of the tool set rather than overlying process issues with laundry lists of principles which cannot be tested out.

Systems modelling is rapidly growing in use across a wide range of businesses as an approach to change management. It forces rigorous thinking and provides a good compromise between the content-free approaches of most high level approaches to change management and the detail and clutter of most low-level approaches to business process re-engineering.

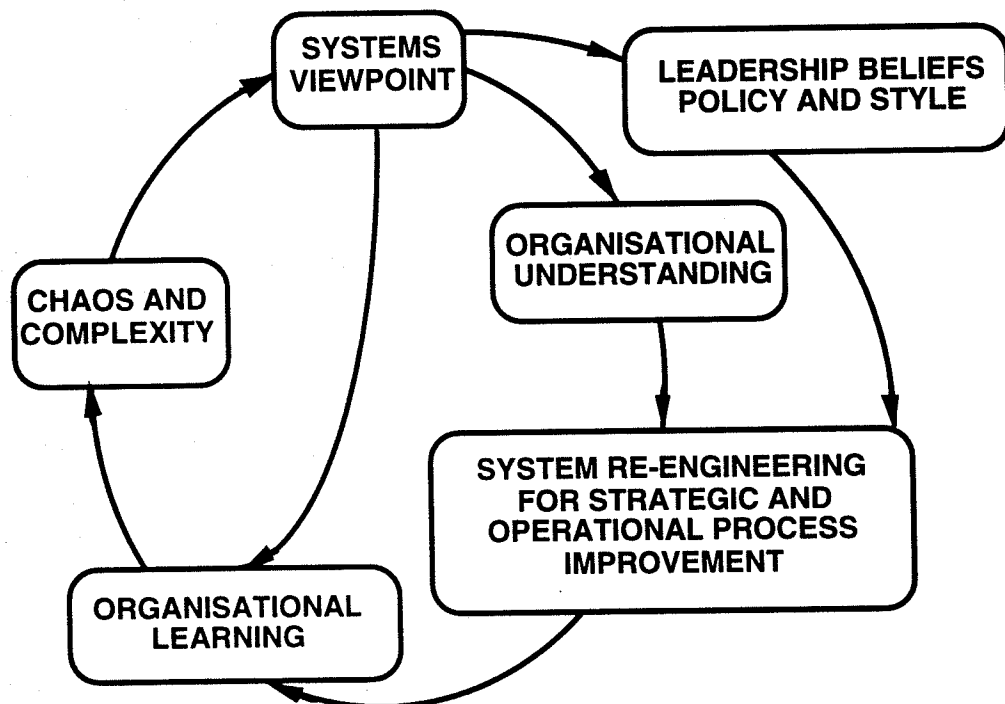


Figure 3  
The wider Implications of Systems Modelling

**References**

- Hammer, M. and Champney, J. 1993. Re-engineering the Corporation - A Manifesto for Business Revolution. Nicholas Brearley.
- Richmond, B. 1994. *ithink* Version 3 User Manual. High Performance Systems, Hanover New Hampshire, USA. (Available in the UK form COGNITUS Systems Ltd., 1 Park View, Harrogate, North Yorks, HG1 5LY).
- Senge, P. 1990 *The Fifth Discipline*. Doubleday.
- Stevenson, R. 1994 Strategic Business Process Engineering: A Systems Thinking Approach using *ithink*, in *Software Assistance for Business Re- Engineering*, Eds. Spurr, K., Layzell, P., Jennison, L, Richards, N..
- Wolstenholme, E.F. 1985 A Methodology for Qualitative System Dynamics. Proc. International System Dynamics Conference, pp1049-1058, Denver, U.S.A..
- Wolstenholme, E.F.1990 *System Enquiry - A System Dynamics Approach*. Wiley.
- Wolstenholme, E.F. 1993 A Case Study in Community Care using System Thinking. *Journal of the Operational Research Society*, Vol. 44, No. 9.
- Wolstenholme, E. and D.A. Corben 1993 Towards a Core Set of Archetypal Structures in System Dynamics. Proc. International System Dynamics Conference, Cancun, Mexico.