GREEN PAPER A2

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BUSINESS MANAGEMENT SYSTEMS

CONSILIAN

BUILDING SOLUTIONS FOR BUSINESS PROBLEMS

Communication and control

FRAMEWORK *n.*

1. 'A fundamental structure, as for a written work; especially a skeletal support used as the basis for something being constructed; incorporating a set of
   - Assumptions
   - Concepts
   - Values
   - Practices that constitute a way of viewing reality'.

Source: www.thefreedictionary.com

The purpose of this series of consultation papers is to test the assumptions, concepts, values and practices that will guide the development of an industry-wide framework for managing property assets.

Revision control

Rev 1	21.08.2007	Preface amended
Rev 2	20.09.2007	Section 'People, processes and place' deleted. Minor edits.
Rev 3	12.11.2007	Executive summary and pages 7 and 8 added. Major revisions.
Rev 4	28.11.2007	Pages 14 and 15 re-written. Minor edits.

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Preface

Opinions differ about whether physical asset management is a traditional, timeless method of managing resources or an emerging, modern discipline; but in either case, asset management has always been a 'hands-on', practice-driven approach, usually defined in terms of its working tools and techniques Nevertheless, asset management must be more than a collection of tools and techniques. Green Paper A1 explained why the mechanical use of checklists, templates and other formal procedures cannot substitute for detailed knowledge of the business and a creative vision for its future; it recommended the use of a 'whole systems approach' in order to deal with the complexity of an asset management system which combines buildings and facilities with other business resources at a strategic level.

Green Paper A2 builds upon the recommendations of the previous consultation paper, exploring a number of frameworks, models and metaphors drawn from various areas of management theory in order to gain consensus about the role and general principles of business management systems, which is an essential step toward our goal of creating an industry-wide framework for managing property assets. It is said there is nothing as practical as a good theory: understanding the general principles and methodologies that support specific tools and techniques can explain why they don't always operate as expected; knowledge about their limitations can prevent them being used in situations when they might fail or even do damage; but most importantly, no successful method or approach to a problem can be designed outside a valid methodology - see inset.

'We can't solve problems by using the same kind of thinking we used when we created them.'

Albert Einstein

We look forward to receiving your comments - you can respond on-line to the questionnaire on the next page and you may edit the document or annotate the text wherever the pencil icon is shown. The final draft of this paper will be released as a White Paper after it has been endorsed by the project's steering group.

CONSILIAN

November 2007

After you have read this paper, please take a moment to reply to the following questions:

1. Does the paper adequately explain the concept of a business management system?

Yes	Partly	No
☐	☐	☐

2. How relevant is this document to you / your organisation?

Very relevant	Some relevance	Not relevant
☐	☐	☐

3. Is the length of the document:

Too long	About right	Too short
☐	☐	☐

4. Is the technical content:

Too high	About right	Too low
☐	☐	☐

5. Please add any other comments here:

Thank you for your comments. Please submit the form on-line using the button below:

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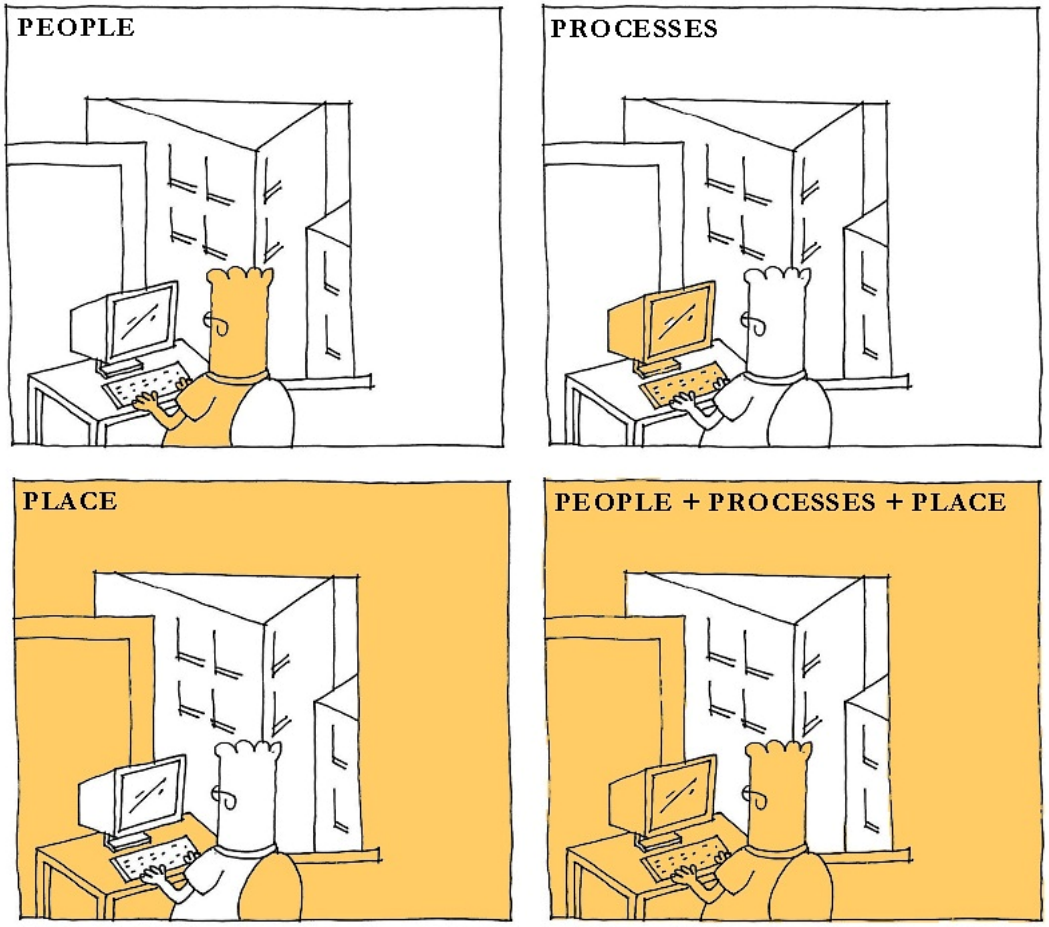
Contents



Systems are simply windows upon part of the world being examined. In each of the images shown on this page the material situation or 'real world' is not actually changed by the observer - it is what it is - but any explanation of its internal processes or dynamic will be shaped by the perspective of the observer, who selects certain elements as foreground and relegates others as background. [6]

Framing a System

after 'Dilbert' by Scott Adams

Executive Summary 1

Green Paper A2 outlines a number of theories and methodologies which help to clarify the purpose and function of an asset management approach. Its findings are presented for discussion; when agreed, they will provide the necessary theoretical basis for the development of an industry framework for managing property assets.

The Introduction sets out the major challenge for property asset management – how to combine the technical, operational aspects of property management with an approach which maximises the strategic potential of business accommodation, and which is fully integrated with other business resources, such as people, finance and ITC systems. Integrated approaches are complex in comparison to individual approaches, so that new ways of thinking are recommended to manage this change.

The first section (pp 3-5) introduces business management systems in general terms: it describes the conventional Plan, Do, Check (Study), Act model in terms of a deliberate, top-down sequence of analysis, planning, implementation and control; it explains why this model is often substituted in practice for a very different process of bottom-up, small-scale initiatives and ad-hoc adjustments; it identifies the need for methods that avoid the conflict and ambiguity between these two models.

The next section (pp 6-8) examines the links between organisational structure and management systems: it describes the main social and technical aspects of a typical organisational structure and identifies the position of business management systems within this arrangement; it introduces a simple rule for calculating the effectiveness of any management system; it links this rule to the design of organisational structure and the development of strategies for managing complex situations.

The following section (pp 9-11) picks up the challenge in the first section to resolve the ambiguity between top-down and emergent planning; it compares the design and function of management systems in different types of organisation; it identifies the dilemma for managers between central and decentralised models; it proposes a design for a business management system which is based upon the invariant patterns of information flows and control mechanisms found in living systems.

> The question is not: 'How well am I managing this system?' but rather: 'How well is this system allowing me to manage?'
>
> **Green Paper A2 (page 15)**

The final section (pp 12 -14) explains the assumptions behind formal methods of planning and controlling business activities which are found in most text books and management system standards; it describes the limitations of these methods, particularly in the role of strategy formulation; it suggests alternative methods based upon an understanding of how the system operates as a whole; it redefines the Plan, Do, Study, Act cycle as a learning system and recommends the use of models.

In conclusion, the paper restates the goal of this project: to enable managers to integrate property and the rest of the business. Individual organisations will need to develop bespoke management systems - Green Paper A3 will outline a generic framework, or set of principles, that can be used to achieve this goal - see inset.

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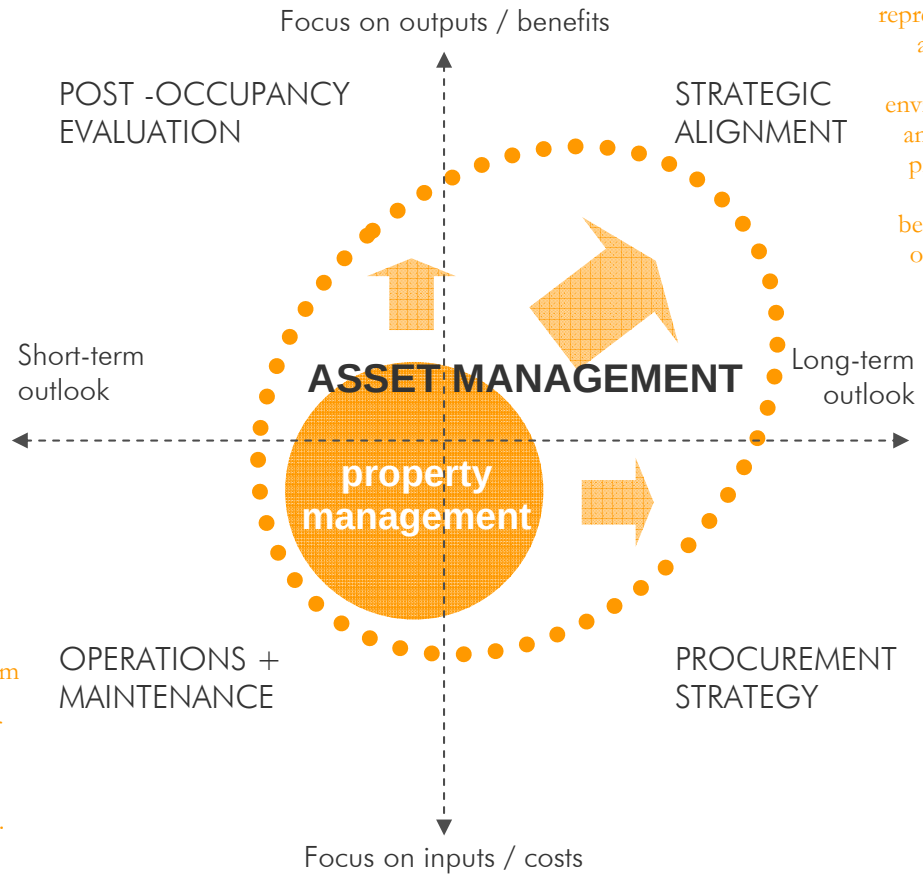

Asset Management is shown as the area within the dotted line, which represents the permeable boundary of an 'open' system. It is framed at a higher level by the business environment in which it is embedded and at a lower level by the technical processes of property management which it contains. AM mediates between the strategic delivery of the organisation's long-term objectives and the conventional short-term focus of property management.

Property Management is shown as a solid circle, representing a 'closed' system which operates relatively independently to the rest of the business. It focuses on short-term matters, particularly minimising cost.

The Route to Property Asset Management

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Introduction

In his book *Property and the Office Economy*,[2] Rob Harris describes a shift in corporate attitudes whereby offices are: 'no longer perceived to be a passive, inert by-product of doing business, but rather an active component of business survival … being increasingly available as *accommodation* rather than *property* ' However, 'Real estate is only one aspect of an organisation's business infrastructure. The other key elements are people and technology. The three areas are increasingly interdependent, and changes in one area can have a dramatic impact on the others … As this trend continues to bring greater complexity to the management of organisations, so it will become more critical to have joined up thinking in key resource areas …' leading to the goal of 'integrated business resource management'.

In local and central government, similar pressures upon the property function have brought about the introduction of an 'asset management' approach, described by the Institute of Asset Management as: 'the optimum way of managing assets to achieve a desired and sustainable outcome.' [3] A report by Andrew Howarth (National School of Government) for OGC in 2006 states: 'Whilst specialist knowledge or technical competency is very important to the everyday running of property and estates, asset management … implies a wider understanding of the part property can play in the delivery of the organisation's primary objectives. There are, therefore, differences between the property management view of assets and the asset management view of property.'

The distinctions between property and asset management are described on the opposite page, but the apparent polarity between one approach (centred on short-term, tangible inputs) and the other (focused on long-term, often intangible outcomes) does not mean that the two methods are opposed or separate. Property management delivers the wider objectives of asset management and is in turn embedded within the overall business context, interacting with other management systems. In other words, asset management mediates between the delivery of the organisation's strategic objectives - the 'there-and-then' - and the day-to-day management of buildings and facilities - the 'here-and-now'.

'If a system is to be stable the number of states of its control mechanism must be greater than or equal to the number of states in the system being controlled.'

Law of Requisite Variety: Ross Ashby (1963)

Rob Harris notes that a shift towards an integrated approach will increase the 'complexity' of the whole system. Managed in isolation to other parts of the business, buildings and facilities usually comprise a complicated, but nevertheless understandable process, which shows linear, predictable behaviours. However, when other processes and people are taken into account, the system becomes complex and far more difficult to control, often appearing to acquire a life of its own and developing a stubborn resistance to change. Ashby's Law (inset) implies that the complexity of any management system must be at least as great as the diversity of the situation it is seeking to control. This rule, explained on page 7, provides a common-sense justification for the key proposal of this paper: a specification for managing property assets should be sufficiently simple to encourage widespread use, but it should not be so simplistic that it cannot deal with the complexity that emerges when property is considered as an integrated business resource.

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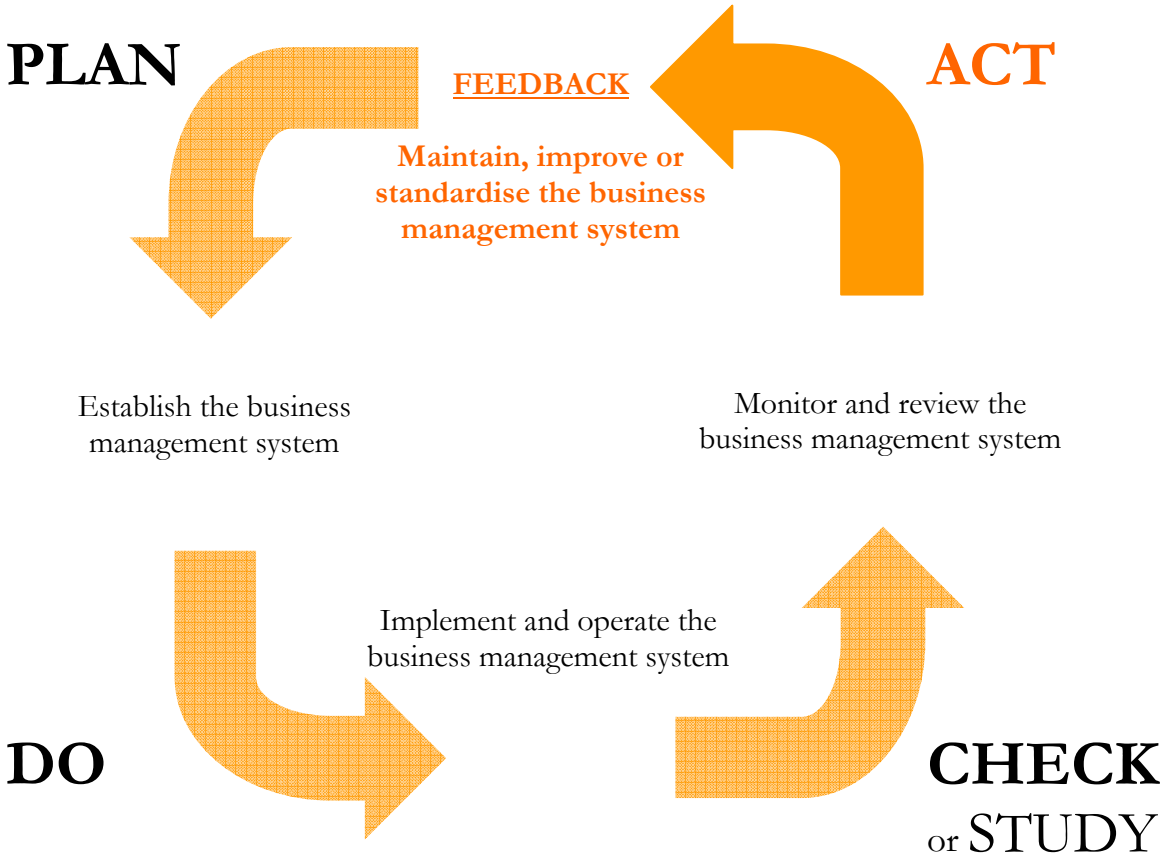

The Plan, Do, Check, Act (PDCA) Cycle

Business management systems 3

A business management system is the means by which an organisation plans and controls its operations so as to achieve its objectives. In simple terms, a management system governs the way in which an organisation operates. All organisations use management systems for activities such as human resource management, accounting, quality management, procurement, and many more. These systems might not be written down or even consciously thought about, but whilst an organisation continues to function it is certain that some form of management system will be in place.

The ability to coordinate activities and improve communications across the enterprise becomes essential when organisations reach a certain size, when operations become more complex and difficult to comprehend, and when the level of significant risks is increased; symptoms that suggest the need for a management system include an inability to identify costs, inadequate integration of activities, poor communication across different functions or levels, and difficulty in tracking performance or identifying potential areas of improvement. [9] At this stage, managers often seek to improve matters and achieve more consistent outcomes by introducing a management system, ordering activities into a systematic, logical sequence that can be repeated in a methodical way.

Management systems include two distinct types of activity: first, is the forward process of setting overall goals, developing strategies and outlining tasks and schedules to accomplish these goals at a future date – this process can be called action planning; second, is the preparation of detailed targets and budgets that are used to monitor, control and account for the results of past activities – this activity can be called performance management. [10] When the two processes are joined in a continual cycle so that action planning leads to performance management which then feeds back into the planning stage, we have the Plan, Do, Check, Act (PDCA) Cycle - or Plan, Do, Study, Act (PDSA) Cycle - made popular by Deming in the 1950's and by the Total Quality Movement in the 1980's - see diagram on the opposite page.

'To have a perfect system is impossible – to have a system is invaluable'

GK Chesterton

Deming's message was that the key to improving quality is to reduce variation through statistical analysis coupled to clearly defined, repeatable processes. The PDCA cycle is an iterative process designed to achieve continuous improvement: Plan involves identifying a problem or a need for improvement and devising a solution; Do implements the plan, usually on a small scale or as a pilot project; Check or Study monitors the results and assesses how the results compare to the planned goals; Act involves making corrective actions where necessary. The Act stage is particularly relevant to the topic of this paper: it is this stage which allows the organisation to 'hold the gains' by documenting planned solutions which have succeeded as standards. Deming's work focused on manufacturing processes but the PDCA cycle has since been transferred to other sectors. The next two sections in this paper explore some limitations of the PDCA cycle outside manufacturing processes, whilst subsequent sections suggest modifications for its application to a business management system for property assets.

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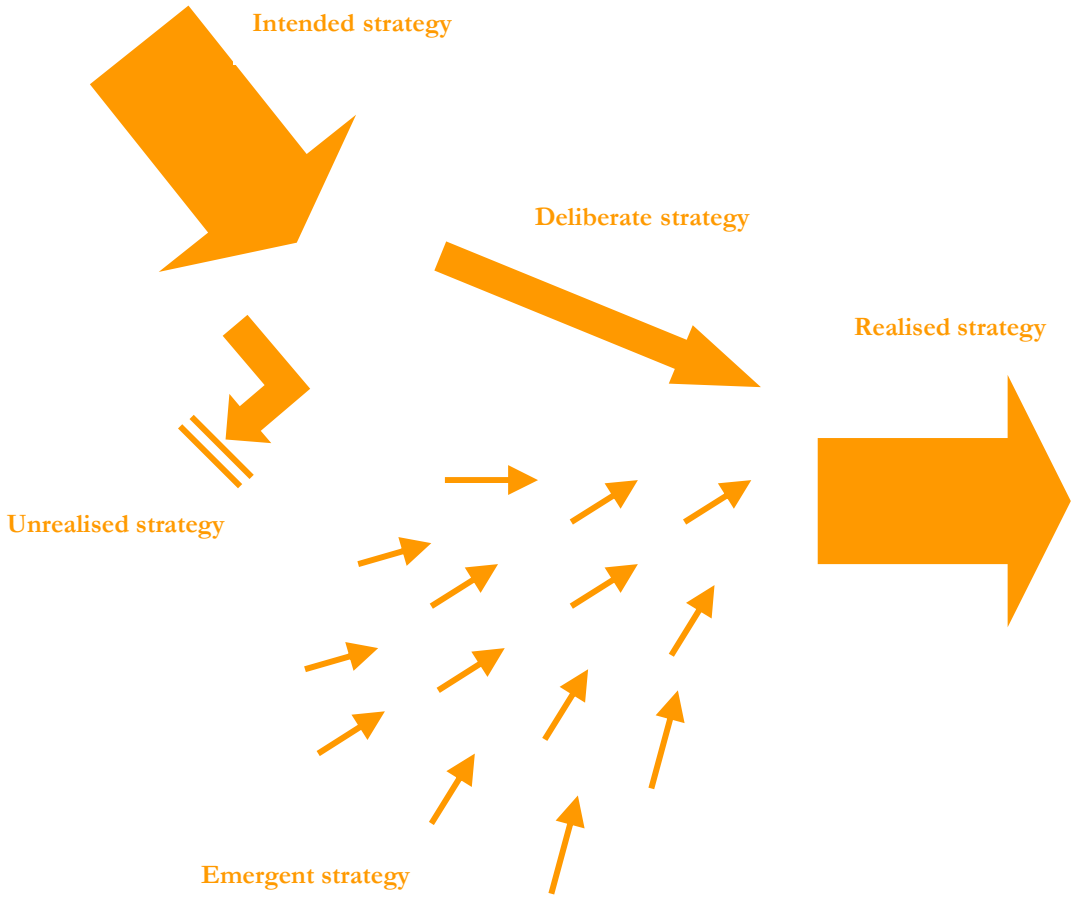

Forms of Strategy

Source: Mintzberg (1994)

FORMALISATION & EMERGENT STRATEGY

"Mintzberg (1989) … argues that many earlier accounts of strategy formation attempt to place it within a strongly rational framework in which options are sought out, compared and then strategy is agreed upon… Such views stress the role of analysis and decomposition in their reliance on formal planning cycles and the development of operational plans from the strategies … (he) argues that many successful strategies are 'crafted' rather than planned. What he means by this is that humans are very adaptive and can be very good at learning from what happens.

Thus, strategy formation does not usually take place in some isolated ivory tower where abstract ideas are contemplated. Instead, it takes place in the current context of the organisations, which may include a host of smaller activities, some of which may develop into strategies for the whole organisation … small-scale actions from one part of an organisation may start to converge into patterns, which may then become deliberate strategy. The same could apply to external opportunities …This view has a number of interesting implications.

The first is that organisations must do their best to preserve and, preferably to develop individuals with creative vision. That is, people who are able to recognise patterns, both in what the organisation already does well and in what seems to be happening elsewhere.

The second implication of crafting is that successful senior managers need deep knowledge, both of their business's internal operations and of the external environment. Useful patterns cannot be imagined if there is no understanding and appreciation of what is happening.

This re-emphasises the need for strategy formation to be an integral part of managerial work at all levels and not some adjunct operation performed by planning professionals. The crafting of strategy is about detecting small changes which may lead to big things, of helping emergent patterns to take a desirable shape.

Much of the analysis takes place later, when the implications of possible strategies have to be explored, turning hunches into policies and plans. Thus, one role for modelling might be in making sense of the strategic vision which emerges as strategy is crafted." [20]

Michael Pidd [11]

Systems for action planning

Formal management systems start at the point where policy is received from top management and translated into a long-term plan of action or strategy. No formal system is able to fully prescribe the steps of the strategy formation stage itself, which will always be more an art than a science, but some systems describe techniques for strategy formation, such as SWOT analysis and gap analysis. Following this stage, the strategic plan is developed into a series of objectives and budgets, usually by other departments, which are in turn developed into targets and more detailed plans and budgets to be carried out at an operational level.

The expected practice in any management system is that planning precedes action and, in most cases, strategy is passed from the centre to functional units and used to drive projects and programmes. However, with the exception of major acquisition or disposal programmes, most realised property asset management strategies are the cumulative result of a series of decisions by mid-level managers rather than top management - accommodation is often an afterthought in most business organisations. Theory and practice also conflict when capital projects are underway but the strategy that initiated the project is changed or made obsolete; and ideas such as 'management by objectives', where managers involve staff in setting their own objectives, tend to move in the opposite direction to most formal management systems.

'Few, if any, strategies can be purely deliberate, and few can be purely emergent. One suggests no learning, the other, no control.'

Henry Mintzberg (1994)

Formal methods for action planning assume an orderly, deliberate process where each step leads logically and smoothly to the next. But a claim that only 10% of intended strategic plans were successfully realised was famously dismissed by Tom Peters as being 'wildly exaggerated'. [10] According to Professor Barwise at the London Business School: 'While the mainstream of management thinking is still towards further development of this structured, analytical approach, we are also … seeing some powerful counter flows.' The top down analysis, planning, implementation and control model, where strategies appear fully developed and are passed down the hierarchy to be put into operation, is still regarded as the text book approach but, as Professor Barwise concludes, the formal concept of action planning: '… is seen as a useful abstraction rather than an accurate description of what managers actually do.' [12]

Henry Mintzberg is one of the few management writers to study in detail what managers actually do. His interpretation of more than thirty years' data across a range of management roles in various countries suggests that the difference between theory and practice is not so much proof that managers are neglectful in adopting theory, but more likely an indication that the textbooks do not have all the answers. He notes that strategic planning is a dynamic activity – 'the process of integrating decisions at a point in time becomes not strategy making, but simply *planning's approach* to strategy making.' Mintzberg's insights into emergent strategy points towards the practical need for a business management system to permit the 'counter flows' to formal, top-down planning - see inset and opposite page.[10]

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STRATEGIES & PROGRAMMES

OBJECTIVES & BUDGETS

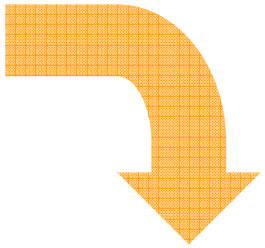
PLAN

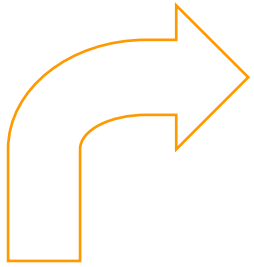
ACT

ACTION PLANNING

– **'planning by direction'**

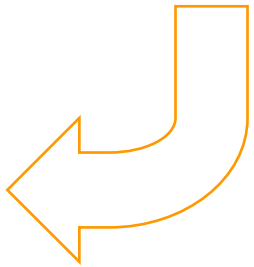
Judgemental
Long-term
Rational
Goal-directed
Non-incremental
Broad brush

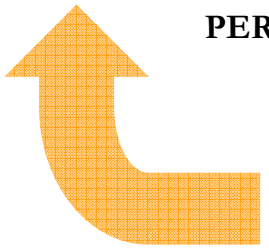




Deliberate Strategies (top-down)

Emergent Strategies (bottom-up)





PERFORMANCE CONTROL

– **'planning by inducement'**

Quantitative
Short-term
Political
Activity-focused
Incremental
Narrower data

DO

CHECK

Mintzberg's 'Great Divide' of Strategic Planning + counter flows within the PDCA Cycle
- what can happen when action planning and performance control compete

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Systems for performance control 5

After setting a course of action, or taking a decision not to do something, all organisations face unforeseen events which force them to adjust their plans along the way. For this reason, a means of compensating for unexpected change is an essential part of any management system: a control mechanism which checks that planned operations are on track; regulates input or output variables of the system within set limits; or varies them in a pre-determined way to achieve future goals.

In the PDCA cycle, performance control follows action planning in a continuous loop: each activity reinforces the other. The two activities need to be harmonised if they are to work efficiently; for example, the inappropriate use of measures and targets can have the effect of driving perverse behaviour or holding organisations to a level of attainment below their natural potential - see inset. According to architect Frank Duffy, performance measurement is essential for managing property as a strategic business resource: 'What is absolutely necessary, if office architecture is to become truly relevant to business, is to have reliable measures that link business performance with the capacity of buildings, environmental systems and interiors to accommodate and enhance that performance. Both sets of measures must be expressed in the same terms if the equation is to work. Both sets of measures must relate to organisational purpose.' [13]

'When a measure becomes a target, it ceases to be a good measure.'

Goodhart's Law

In practice, performance control can precede action-planning so that the two activities are placed in opposition; for example, the routine extrapolation of previous annual plans often acts as a default strategy in the absence of any deliberate plan. Budgets can also be used to guide the organisation instead of being derived from strategies; for example, zero-based budgeting starts by questioning the legitimacy of policies and programmes; similarly, ad-hoc budget revisions are often used to impose percentage updates across the board. A key weakness of formal planning methods is that when performance management competes with action planning it tends to be more successful because it works with the system, rather than imposing external control. Action planning usually requires structural reorganisation, which can be resisted, but performance control tends to sit on top of the existing structure, making it easier and less risky for managers to use this method as a means of inducing desired behaviour - in this way performance control often ends up displacing action planning.

Conflict and ambiguity between action planning and performance control leads to what Mintzberg has named the 'Great Divide' of strategic planning, reflecting the difficulty in integrating a system of objectives and budgets with a system of formal strategies and programmes: 'While the links on each side of our divide may seem clear - for example, between objectives and budgets - the crossovers between the two sides are more often assumed than specified.' When the similar confusion identified in the previous section about whether strategies precede programmes or the other way round is also taken into account, the situation appears messy - see opposite page. Mintzberg concludes: 'Our point is not *where* to draw the line; it is *how* can such lines be drawn in the first place? Or, more to the point, *why* must such lines be drawn at all? Planning theory, by trying to draw arbitrary lines all over the place, has often served more to confuse issues than to clarify them.' [10]

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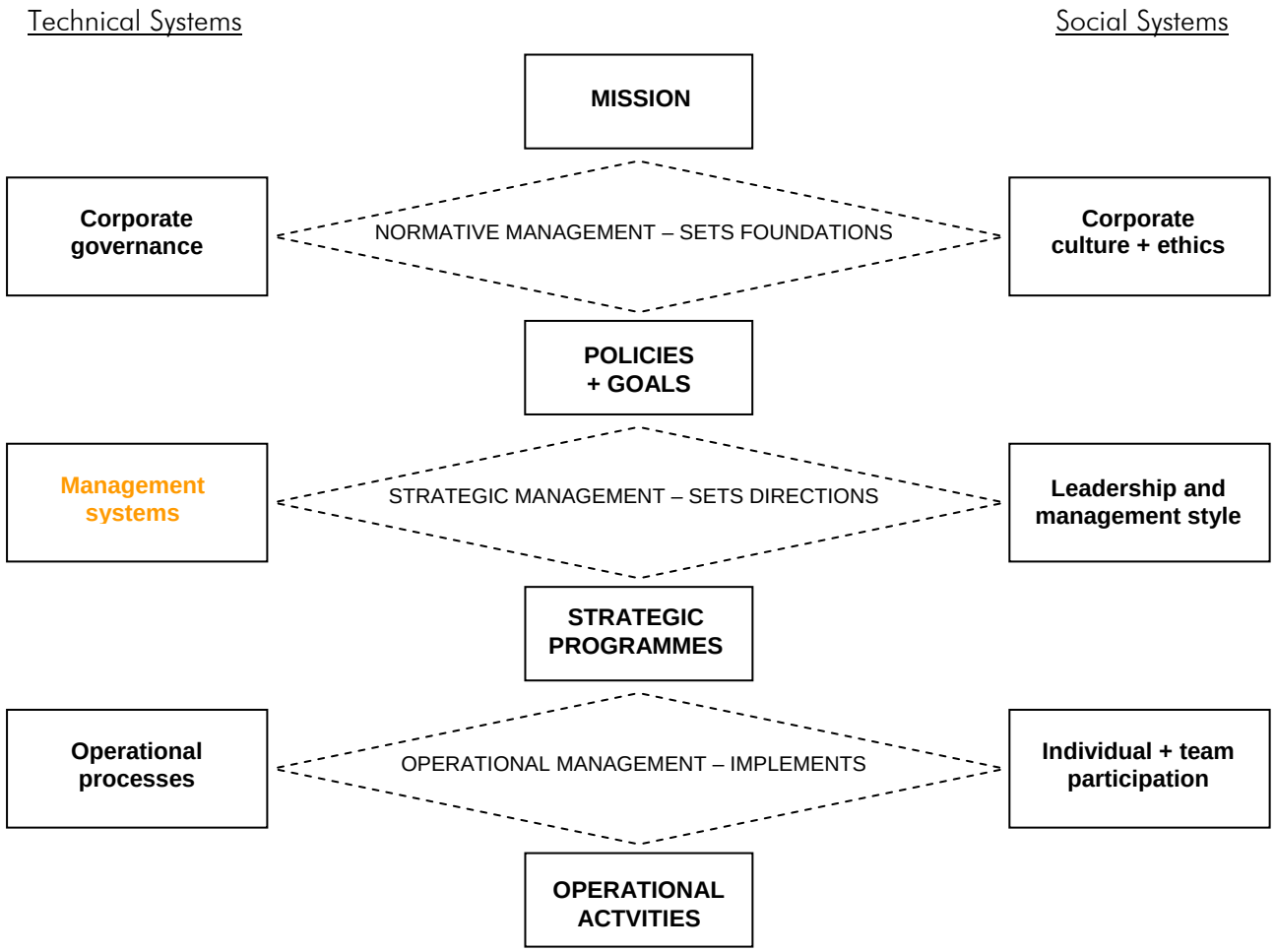

Management Systems and the Structure of a Business Organisation

adapted from the St Gallen Concept [7]

Organisational structure and management systems 6

The classic view of the structure of an organisation is drawn on the opposite page. On the left side there are hard technical factors, such as operating systems and processes; on the right side there are softer behavioural characteristics, including leadership and learning. In the centre, these components are arranged around a vertical cascade of policies, goals, strategies and programmes which translate the organisation's intangible vision into a sequence of explicit, operational activities. The diagram shows three levels of management hierarchy, which operate in the following ways:

- Normative management deals with the institutional arrangements which must be in place for the organisation to operate legitimately. These fundamental rules and principles concern the relationships between the organisation and its owners, senior directors, legislative requirements and society, which are regulated through codes or guidelines for corporate governance. Normative issues are by definition slow changing - the enduring ethos or identity of the organisation is translated into explicit, long-term goals and mission statements which are diffused through the organisation's culture and values.

- Strategy formulation is carried out by top management, either directly or facilitated by functional staff. Its purpose is to bring about a desired future through a series of programmes and projects which deliver the organisation's goals. Strategic plans are normally prepared on a five to ten-year time horizon and revised every three to five years; these decisions guide the development of a more detailed set of objectives and targets. The strategic layer of the organisation co-ordinates and regulates the subordinate operational processes and activities through relevant business management systems and standards.

- Operational management realises the strategic objectives of the organisation through its day-to-day business activities or throughput, starting with the identification of customers and ending with the delivery of the finished product. Networks which depend upon customer satisfaction are known as core processes, and they often span across internal, functional interfaces and include external supply chains. Other networks of activity support non-core processes such as finance, information technology, human resources management, procurement, as well as property and facilities management. [8]

'Good governance supports effective decision making; poor governance is often seen (in hindsight) as creating the climate, structures and processes that lead to poor decisions.'

The Audit Commission

The diagram on the opposite page shows how management systems support corporate governance as part of the technical infrastructure of the enterprise at the level of strategic management; a specification for managing property assets should help promote all the aspects of governance shown in this diagram: a culture of openness and honesty; leadership which reinforces a vision for the enterprise by clarifying strategy and objectives; effective risk management through robust internal processes and controls; participation or 'buy in' facilitated by appropriate goals, permissions and flexibilities; accountability based on accurate feedback about individual and team performance and capacity - see inset.

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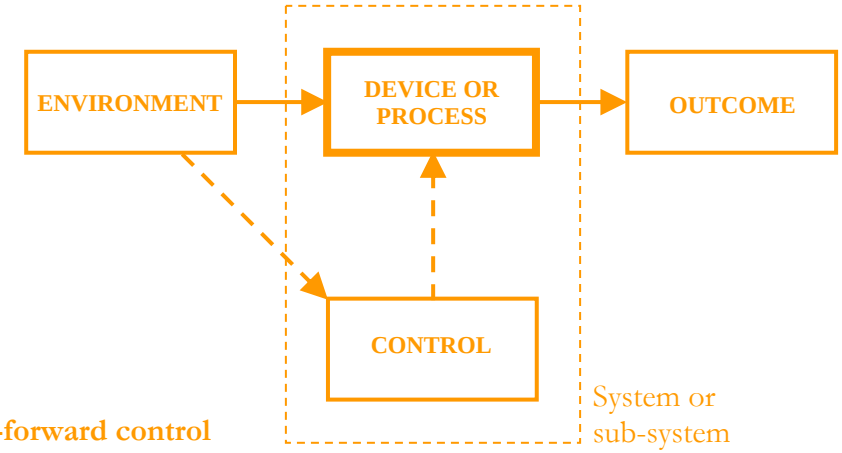
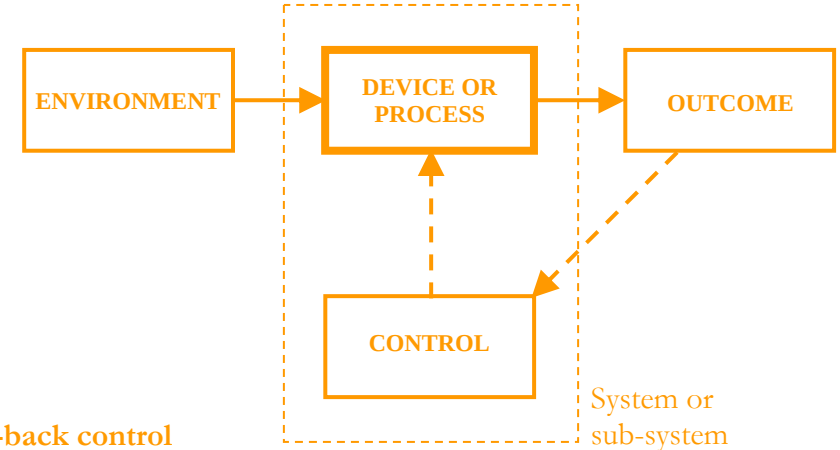


1 – feed-forward control



2 – feed-back control

COMMUNICATION AND CONTROL

Control is the mechanism which enables a system to adapt to changes in its environment. The operating system of a computer, the nervous system in an organism, and the management role in an organisation are all examples of control mechanisms.

In the diagrams on the left, some device or operational process produces a specific output or outcome. The system or sub-system within the dotted line is linked to other systems - all systems that are outside the boundary of the system being considered but are capable of varying the output of the system are shown in the box 'environment'.

Disturbances from the environment can affect the planned outcome of the system, so that some form of control, which is separate to the process, is needed to actively help the system maintain a consistent output within a certain range. But in order to regulate a system, the regulator must be able to generate at least as much variety as that exhibited by the system being controlled - this is the Law of Requisite Variety.

In the first diagram, control is achieved through a process of 'feed-forward' or 'pre-control' - monitoring the system's environment, detecting possible future disturbance, and taking appropriate action upon the system so as to block any unwanted changes or compensate for their effect. Feed-forward corresponds to the anticipatory or proactive 'action planning' systems described earlier.

In the second diagram a 'feedback' loop (negative or positive) returns data about the output of the system to the controller. After comparing this information against a pre-determined goal or standard, the controller can act on the system to guide it back to the target outcome. This situation corresponds to the reactive 'performance control' systems described earlier.

In theory, feed-forward is able to provide perfect control but its usefulness is limited due to imperfect knowledge about current and future states of the system's environment. By contrast, feedback information is known and can be readily applied - feedback is usually the default control mechanism.

The Law of Requisite Variety

Ashby's Law of Requisite Variety was presented in the Introduction to this paper. This law has special significance in the development of engineering control and communication systems but it is a general principle that applies to any system, whether economic, social, mechanical or biological. It has practical relevance for organisations that need to survive and grow in uncertain, turbulent environments and it is central to the design of business management systems - it has been claimed that Ashby's Law is as fundamental to the discipline of management as Newton's Laws are to physics. [1] However, this useful rule is often overlooked by management theory, possibly because it disproves the idea that 'command and control' methods - top-down, traditional hierarchies and the rigid imposition of rules and regulations - represent the best way to manage complex situations; it is no coincidence that the classic term for a regulator in mechanical engineering systems is a 'governor'.

Ashby's Law was derived from mathematical analysis, but in plain language it is very simple and seems little more than common sense - control can only be obtained if the internal regulatory mechanism of a system is as diverse as the environment with which it interacts - see inset and diagrams on opposite page. Note that the variety is requisite: if the control system is too complex the system will not operate efficiently; but if it lacks sufficient internal differentiation, it might not be able to cope with variable demand, or the system might fail entirely. One interpretation of this rule is that adaptive, flexible systems which generate a large range of diverse options are better able to manage change than systems which are tightly optimised around a rigid set of initial conditions - in Ashby's words: 'only variety can destroy variety.'

'Insanity is doing the same thing over and over again, expecting different results.'

Albert Einstein

Another reading of Ashby's Law is that control is limited by the amount of information available to the controller and the way in which this information is processed and communicated. This is because the effectiveness of a control system depends upon its ability to identify relevant disturbances outside the system and to convey an appropriate response - the right information, at the right time, and in the right place. Both explanations are really different sides of the same coin: a complex system viewed in terms of the information it processes (as a communication device) will show a massive amount of variety; the same system viewed in terms of the values of its critical variables (as a control device) should show minimal variation. As the pace of external change increases, improved communication channels and information processing are needed to retain control.

Ashby defined 'variety' in mathematical terms as the total number of possible states of a system. However, this concept is not directly relevant to managers, partly because most of the hypothetical states of an organisation are unlikely to occur and partly because the size of the numbers involved will be vast. A more practical definition of variety is the number of 'distinctions' which a person is able to make in a given context. Any control system is dependent upon measurements to find differences in the system over time - setting limits on the scope and scale of the variables within the system which can be identified and captured by an observer. The Law of Requisite Variety implies that the selection of measurements, as perceived by all relevant individuals, is a fundamental aspect of any management system.

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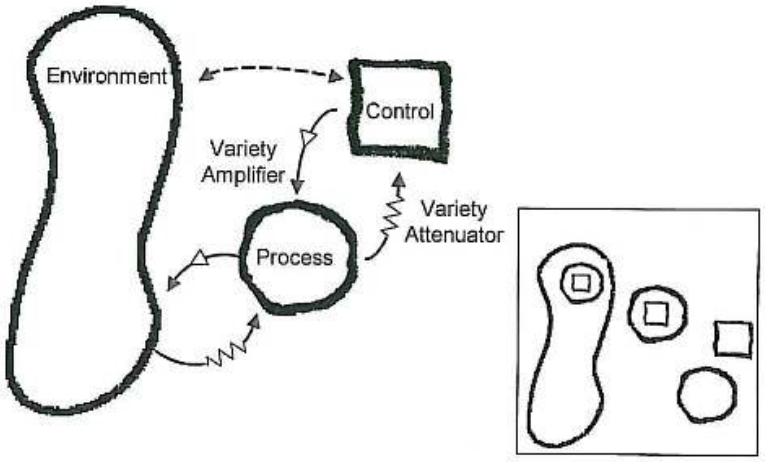
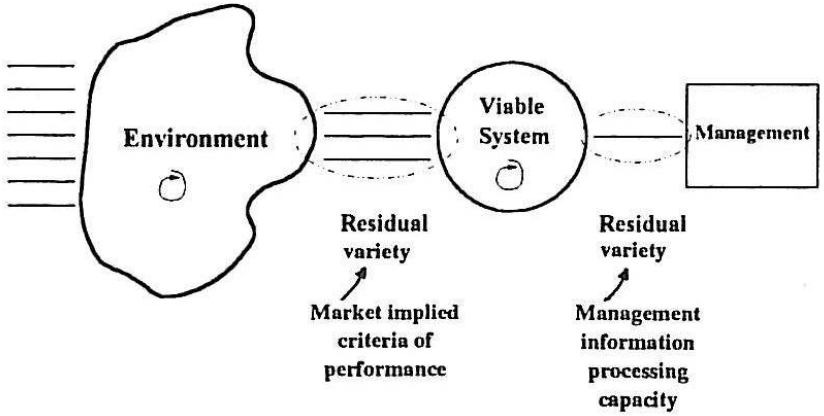


Source: Charles Edward Herring



Source: Espojo, Schumann, Schwaninger, Bilello

REQUISITE VARIETY

The diagram at the top of this page illustrates the three fundamental components of any control system as described by Ashby's Law of Requisite Variety. These components are nested within each other - see inset - but they have been pulled apart in the main diagram to make their inter-relationships clearer.

Ashby's Law states that if the variety (complexity) of a system (process) and its environment are not held in balance, then the system cannot be controlled and may be overwhelmed. However, the variety of a system is always less than its environment and the variety of a controller is always less than the system being controlled; at first sight this condition appears impossible to achieve.

Equilibrium between these three components can only be achieved if the system acts to reduce or attenuate the effect of the environment whilst increasing its impact on the environment. The same process must occur between the system and its controller. Practical examples of how this process operates are given on the opposite page.

RESIDUAL VARIETY

The diagram on the bottom left of this page shows how requisite variety is achieved by a manager (or any other control system) by using the variety of the system itself as well as the variety of the controller.

A viable system is an organisation which is able to adapt to its environment through a process of self-regulation and self-organisation. The role of management in this case is to absorb the residual variety of the system – that is, the complexity of the system which cannot be absorbed directly by the system being controlled.

The viable system arrangement is more economical in its use of resources than conventional 'command-and-control' methods, which rely on multiple levels of hierarchical control to achieve requisite variety.

Management systems and residual variety

Ashby's Law states that in order to regulate a system, the regulator must be able to generate at least as much variety as that exhibited by the system under control. At first sight, however, this condition appears impossible. It is clear that any system will be more complex than the sub-systems it contains: an organisation's business environment is more diverse than the enterprise; the range of possible actions of any team is greater than the repertoire of responses by its managers. How, for instance, can a few executives on a board of a company or a government department regulate a large estate of specialist operational property without understanding the full complexity of the system under their control? The diagram on the top of the opposite page indicates two strategies for resolving this apparent contradiction: management can block, filter or attenuate the impact of unwanted external disturbances; or management can amplify or lever its influence on its environment.

There are countless ways in which a manager can reduce the number of distinctions needed to regulate a situation or task. One of the best ways to do this is to build a model of the system being controlled; by definition, models provide a simplified representation of real, complex situations. On the one hand managers can filter information by requesting reports or through techniques such as management by exception, and on the other hand they can amplify their influence on a situation by delegating or hiring staff and consultants, creating strategic alliances, organising training courses, running advertising campaigns, and working through supply chains. Some strategies are difficult to categorise: ISO 9000 requires organisations to appoint a specialist quality manager - this might amplify the variety of management, but if it leads to staff taking the view that quality is not their concern then the variety of the system will be greatly reduced and performance will suffer; similarly, IT systems can be useful tools to amplify or attenuate variety, but they often end up swamping managers with unnecessary information and restricting their available options.

The key to understanding how Ashby's Law affects management systems is to recognise that no individual can deal with all the variety at all times, but that the organisation needs to be designed as a whole to absorb day-to-day disturbances and still achieve its aims. In such a situation, the role of management is to deal with the variety remaining in the system after the background complexity has been absorbed through the processes of self-organisation and self-regulation - see diagram at the bottom of the opposite page. At board level, this residual variety might be as simple as a yes / no decision.

> 'The inherent variety in demand requires the system to be designed to absorb it, not force it through pre-specified routines.'
>
> **John Seddon (2003)**

The choice of strategies used to attenuate variety in the system or amplify the variety of a manager will depend upon the social and technical context - the organisational structure - within which the manager operates. Management systems within organisations structures which resemble tall pyramids reduce the residual variety faced by managers by introducing intermediate levels of management and imposing constraints on the behaviour of the lower levels. Flatter structures, having a broader span of control and shorter feedback loops, achieve requisite variety by empowering people to respond more autonomously to problems. The following section of this paper explores the implications for the design of a business management system in the context of both types of organisation.

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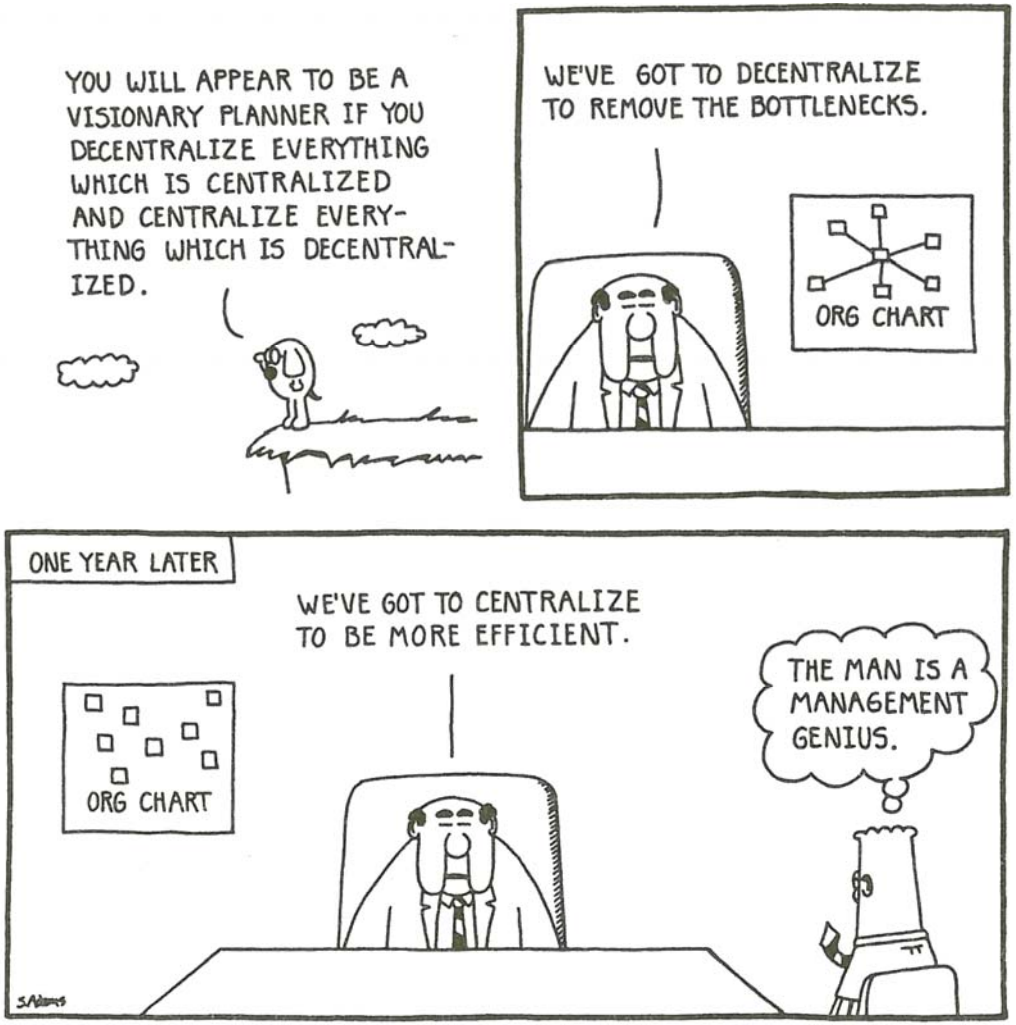

Centralisation and Decentralisation

ORGANISATIONS AS MACHINES

Managers within machine organisations often attempt to achieve improvements through top-down command and control methods: adding more layers of supervision; requesting more reports; imposing additional rules and procedures; standardising operations; and setting more targets.

Very often, the effect of these interventions is to drive the organisation into a centralised form of bureaucracy, which is inflexible, dehumanising and unable to capitalise upon the full potential of its employees who focus on trying to beat the system.

In response to this situation, managers then try to 're-engineer' the system, dismantling some of the regulatory structure to create a de-centralised arrangement where various units or divisions are re-organised in a semi-autonomous arrangement under an overall framework of control.

Oscillation between centralised and decentralised structures comes about because managers rarely question the assumptions of command-and-control and re-engineering - the idea of 'organisations as machines', where the emphasis is on control of the individual components of the system, rather than building control into the parts themselves.

Stafford Beer wrote: 'If reorganisation means primarily that what is now centralized should be decentralized and vice verse, and that all the chief characters in the drama should change places, then the dilemma is not addressed at all. The model for this kind of reorganisation was beautifully delineated in the Mad Hatter's Tea Party.'

Command and control systems

In his book *Images of Organisation*, [15] Gareth Morgan explores eight metaphors for understanding organisations. The first of these metaphors is 'organisations as machines'. Our tendency to think of organisations (as well as many other aspects of modern life) in mechanistic terms is so ingrained that is taken for granted. A successful business is often described as a 'well-oiled machine' or 'running like clockwork' or an 'efficient assembly line'; a less fortunate organisation might 'break down' or be 'stalled' and need 'fixing'. Consultants arrive with 'tool kits'; managers look for 'levers for change'. The idea is that an organisation resembles a piece of machinery that can be precisely designed and assembled so that all the parts fit together perfectly and interoperate in an efficient way under perfect regulation.

The practice of organising people and equipment along mechanistic lines is ancient - at least as old as the pyramids, but the increased use of machinery in the Industrial Revolution accelerated this trend. During this period, people adapted to meet the requirements of technology rather than the other way round, and when industrial practices were extended to administration, the bureaucratic organisation emerged. All forms of organisation require some degree of bureaucracy, but in its classic form the bureaucratic organisation is characterised by the separation of specialist roles and tasks, precise rules and regulations, and hierarchical control.

Typically, bureaucratic managers reduce the complexity of the organisation's environment by either shutting it out (a provocative definition of a bureaucrat is 'one who has the power to say No but not to say Yes') or by taking it over (vertical integration), as Henry Ford did when he bought overseas rubber plantations to supply his assembly lines. Within a machine organisation, managers deal with internal complexity using 'command and control' methods: imposing a rigid, top-down system of interlocking policies, strategies, objectives and targets, underpinned by management information and budgetary systems to provide close supervision and control.

The need for predictable, efficient management systems is greatest for activities involving significant health and safety risks or responsibility for large amounts of money or valuable assets, so that command and control systems are often found within regulated utilities, military and civilian forces, banks, institutions and government departments. This model also works in situations where people can be treated like machines - replaceable, standardised, 'cogs in a wheel', who are 'paid to do not to think', performing routine tasks within environments such as fast food outlets, call centres and administrative offices.

'Asset management seems to be pursued in a narrow context within departments not fully joined up with strategic thinking.'

Sir Michael Lyons (2004)

Morgan explains that although metaphors can provide useful insights into organisations, they only provide partial ways of seeing which can obscure other perspectives. Classical management theory and 'scientific management' theory both claimed to be 'the one best way to organise'. Stressing the need for rational, efficient management systems, these theories institutionalised the idea of organisations as machines but overlooked the fact that they actually consist of people. Many of the dysfunctional products of command and control systems, such as organisational silos, information and operational bottlenecks, lack of flexibility, low performance and poor morale exist because of this oversight - see inset and opposite page.

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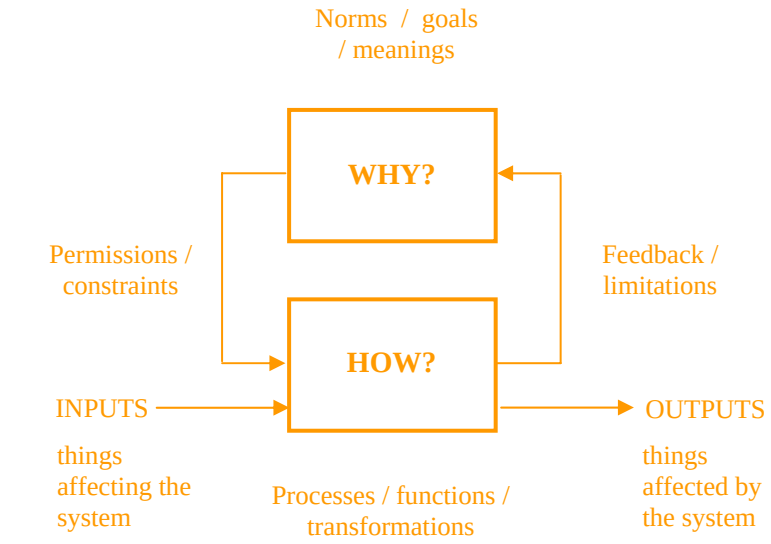
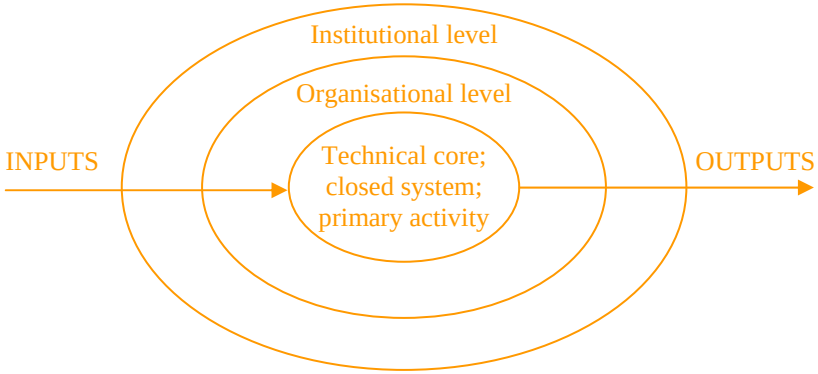


Two layers of organisation



Three layers of organisation

Source: Takahara and Mesarovic

ORGANISATIONS AS LIVING SYSTEMS

For biologists, thinking in terms of hierarchical structure is a useful way to simplify complexity and at the same time retain vital interconnections between the parts. Hierarchy theory is a useful framework for developing business management systems. It combines analysis with holistic thinking whilst avoiding the problems of 'brute force' reductionism.

According to hierarchy theory, the behaviour of any system is explained in terms of a duality: looking up for an explanation of the purpose or meaning of the system - answering the question 'why'; and looking down for an explanation of how the system operates - answering the question 'how'. Each level of hierarchical structure is connected by information flows: higher levels specify the conditions for the lower levels by setting overall constraints and granting permissions; lower levels provide reciprocal feedback information about what the subsystem can and cannot achieve operationally.

Both information flows are crucial - whilst higher level units specify boundary conditions for lower level systems, these constraints or permissions must be appropriate or else performance at the lower level might decline, affecting the whole system. [17] Similarly, if the flow of dependency from the bottom up is overlooked, this will result in a misleading picture of the nature of hierarchical systems and the role of the parts of the system in maintaining the effectiveness of the whole.

In a hierarchical system, processes at each level of the organisation tend to operate at different rates. In a stable, protected environment, when change occurs slowly and the future is predictable, processes at higher levels change at a relatively slow rate, representing a constant setting or context for the quicker activities they encompass. (16) But in a more turbulent environment, or in times of uncertainty and change, this equilibrium can be disturbed and, at least for a period of time, the lower levels can influence the established levels of the hierarchy. [18]

Adaptive systems

A popular source of ideas for understanding organisations from the end of the First World War until the current time is biology - the second metaphor that Morgan investigates is 'organisations as organisms'. Thinking of organisations as living systems brings to the foreground aspects such as survival and viability, life cycles and growth, adapting to changing circumstances, the organisation's environment, and the new field of business ecology. The inclusion of human needs and patterns of behaviour is appropriate in such a model, but when people are managed as individuals rather than as replaceable parts, then the rigid arrangement of the machine organisation is replaced by a more accommodating system, where people have minds of their own, employees are valued resources, and their participation is vital.

Whereas the machine metaphor regards organisations primarily as 'closed' mechanical systems with predetermined goals and set behaviour, the organic metaphor emphasises the fact that organisations are 'open' to their environment. Organisations continually interact with internal and external customers, exchanging resources and information as inputs and outputs of their business processes. In place of the compartmented, functional structure of bureaucratic organisations, open systems have porous boundaries which permit cross-functional processes. An example of a process-based management system standard is the revised version of ISO 9001.

The survival of living systems depends upon their ability to maintain a balanced relation with their environment. The same concept applies to organisations in a business environment where the most important criterion for an enterprise is to remain viable. Organisations that operate in dynamic, turbulent environments require management systems which allow them to adapt to external changes in order to survive; in these situations goals are simply means to meet the end objective of survival. This situation might not apply to bureaucratic organisations in stable, protected environments, where procedures and targets can become ends in themselves.

Living systems and ecosystems are organised as whole systems that contain further whole sub-systems, each nested within the larger system like Chinese boxes; the idea that biological or management systems can be arranged in such a way that levels are ordered in relation to other levels implies they have a hierarchical structure, but the term is used here to describe a naturally emergent framework, not to imply the imposition of power or authority within a chain of command. This type of organisational structure is differentiated and held together by a two-way process of feedback and information flows rather than command-and-control methods- see opposite page.

'The more teams can share common standards, approaches and values, the greater the chances that spontaneous lateral communication will occur … '

Raul Espojo and Antonia Gill

The concept of an adaptive system refutes the rule of 'one best way to organise' - different kinds of organisation will need to manage property in the context of their own environment in different ways. A management system for adaptive organisations should focus on the relationships and interfaces between critical subsystems and their environment, setting out broad principles and policies in a way the matches contingent situations rather than creating a mechanical list of prescriptive requirements. Instead of focusing on controlling and directing, the specification should encourage collaboration and communication.

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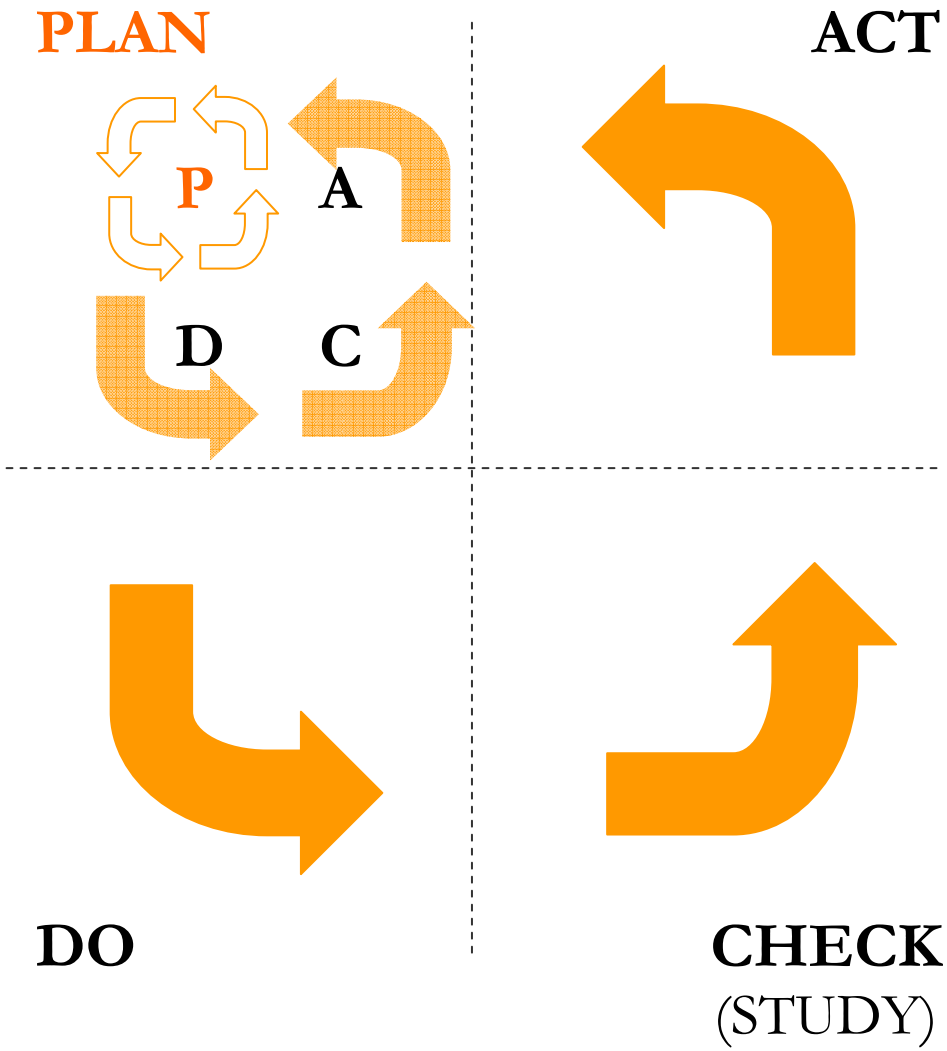

STRATEGIC INVESTMENT DECISIONS

Deming's Plan, Do, Check, Act (PDCA) cycle has been adopted by various management system standards, including the IAM's BSI PAS55; it is also the basis for RICS government guidelines for asset management

The PDCA cycle was designed for manufacturing activities - it was intended to bring improvements at the tactical level of production. But whilst the use of this model has been extended by consultants, text books and business schools to include strategic planning and control in modern, post-industrial organisations, there is evidence that practice does not follow theory..

Professor Barwise explains: 'In a fast-changing environment, successful strategies tend to emerge from a series of decisions, often initiated by mid-level managers close to markets and technologies. There may well be no detailed written strategy (i.e. Plan)at all … strategic decisions that form the building blocks of this kind of 'emergent' strategy usually involve resource allocation, often including substantial capital investment. '

The diagram on the left redefines the PDCA cycle, reflecting this distributed, evolutionary process of strategic planning. Business unit and operational plans are shown being developed and implemented as a series of recursive PDCA cycles, each with its own nested set of objectives, targets and budgets, embedded as a 'wheel within a wheel' and surrounded by a wider corporate function which allocates, monitors, and where necessary intervenes in the use of capital resources.

Professor Barwise concludes: 'Even within the business units, strategic investment decisions do not typically flow from an explicit prior strategy: the relationship between the explicit strategy and the individual strategic projects is complex, two-way and mostly implicit.'

Distributed, self-organising systems 11

The third metaphor which Morgan investigates is 'organisms as brains'. He asks: 'is it possible to design "learning organisations" that have the capacity to be as flexible, resilient, and inventive as the functioning of the brain? Is it possible to distribute capacities for intelligence and control *throughout* an enterprise so that the system as a whole can self-organise and evolve along with emerging challenges?' Morgan explores three aspects of this metaphor, which are summarised below.

Organisations, like brains, exist in order to process and communicate information and to support decision-making. Information technology and communication systems are vital to all organisations, and in many instances they are changing the very way organisations do business, so that the management of data is central to the design of a business management system. However, investments in new technology are often made to reinforce bureaucratic principles and command-and-control methods instead of fulfilling their far greater potential of creating a 'networked intelligence' that involves everyone in the organisation. Another parallel is that the human brain combines rational, analytical reasoning (left-brain thinking) with creative, intuitive processing (right-brain thinking) which leads to the idea that linear type of thinking inherent in a formal management system cannot substitute for the creative process of strategy formation – this idea is explored further in the next section.

The concept of the 'learning organisation' goes beyond the ideas in the previous section of organisation that can adapt to match environmental challenges, and challenges the separation of thinking and doing exemplified by the machine organisation and its spokesman Taylor, who once said: 'You are not supposed to think. There are other people paid for thinking around here.' As organisations shift from capital-asset-intensive to human-asset-intensive activities there will be increasing emphasis on 'knowledge workers' and the need to assemble intelligence across the organisation.

'The whole is something over and above its parts, and not only the sum of them all.'

Aristotle

Morgan explains that the brain, which is 'the most highly coordinated and intelligent system of which we are aware', operates on holographic principles - the surprising characteristic of a hologram is that the information for the whole is enfolded in the parts, so that any part represents the whole. The brain does not have a centre but different parts of the brain are highly specialised, and experiments have shown that when specific parts of the brain are damaged or removed that it is able to self-organise and regenerate on a continual basis. Complexity theory has shown how sophisticated patterns and order can emerge in bottom-up fashion in many living systems based on holographic principles, including brains, by following a minimal set of simple rules rather than any explicit plan.

Organisations and other networks designed according to holographic principles (see page 16) offer many advantages: they would be extremely resilient and capable of regenerating quickly after experiencing severe shocks; they could exploit the full potential of the networked intelligence of the organisation; they would allow high levels of innovation, growing large while staying small; they would offer a humane and satisfying environment for employees, attracting high quality staff. Examples of distributed, self-organising systems have been around for many years - refer page 15 - so that an interesting question is why this model isn't better established.

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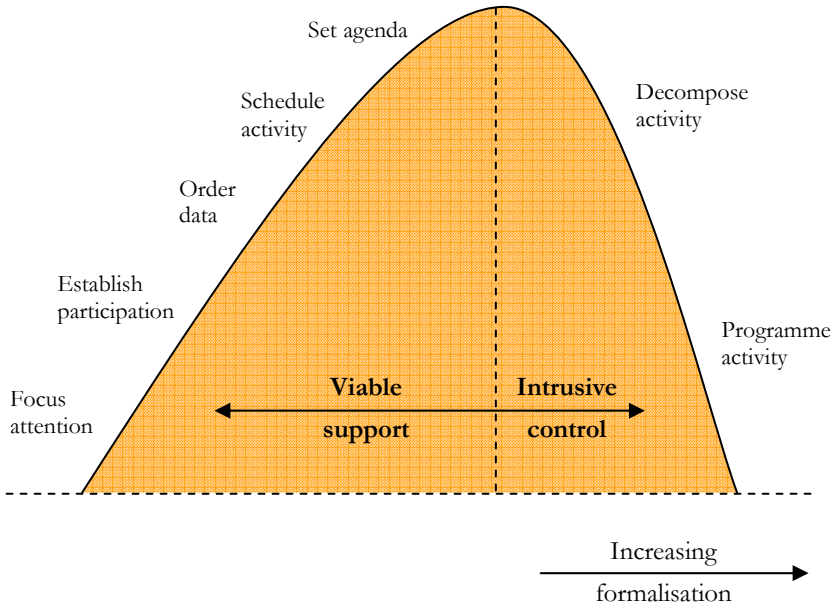

The 'Formalisation Edge'

Source: Mintzberg (1994)

Formalisation

Formalisation is the practice of planning and controlling activities through explicit policies and procedures. All formal management systems share a common method: an activity or process is first reduced to its separate parts; each part is then articulated - preferably in measurable terms; finally, the separate parts are rationalised and re-assembled into an integrated whole. [10] The key assumption of formalisation is that complex situations can be managed more effectively if they are first simplified by breaking them down into separate parts by a process of analysis, progressing from one logical stage to the next: 'What makes formal methods attractive is their simplistic nature: they are conceptually easy to grasp; they simplify, they structure information needs; they outline a series of next steps. In short the belief system of goal based planning provides a vehicle for ordering (and sometimes ignoring) complexities that would otherwise paralyse action.' [10]

Clear, written procedures can provide a cohesive structure and create order in imprecise circumstances; they offer certainty in unpredictable situations; they may provide a more rigorous way forward for managers than simply following their instincts. However, despite the benefits of formal methods applied to routine activities within organisations, there is no clear evidence that shows how the same methods can be completely transferred without change to an activity which is as elusive as good management. There is a risk that prescriptive management systems, however well-intentioned, can simply drive managers towards a rote compliance with the documented clauses of a formal specification, rather than using the system as a model for instilling good practice and driving improved performance.

According to Mintzberg, a key limitation of formal methods in business management is that strategy formulation, which relies upon managers' knowledge, intuition and creativity, is ultimately inaccessible to formal planning procedures and analytical methods - see inset. He claims that: 'Because analysis is not synthesis, strategic planning is not strategy formation. Analysis may precede and support synthesis, by defining the parts that can be combined into wholes. Analysis may follow and elaborate synthesis, by decomposing and formalising its consequences. But analysis cannot substitute for synthesis … Formal management systems are only useful after the most important decisions have already been made … Ultimately, the term "strategic planning" has proved to be an oxymoron'. [10]

> 'Take apart any model of strategic planning, box by box, and at the heart of the process where strategies are supposed to be created, you will find only a set of empty platitudes, not any simulation of complex managerial processes.'
>
> **Henry Mintzberg (2004)**

Nevertheless, some aspects of formal methods can usefully contribute to strategic planning. Formalisation can provide support by focusing attention and ensuring clear objectives, keeping track of issues, disseminating information, generating commitment and promoting interaction, building consensus, collating data and providing useful checklists, scheduling activities and setting deadlines. Beyond this point, the risk is that formalisation becomes a tool for imposing control or even substituting the manager's role itself, rather than facilitating a process already in place and responding to it in its own terms [10] - see diagram on the opposite page.

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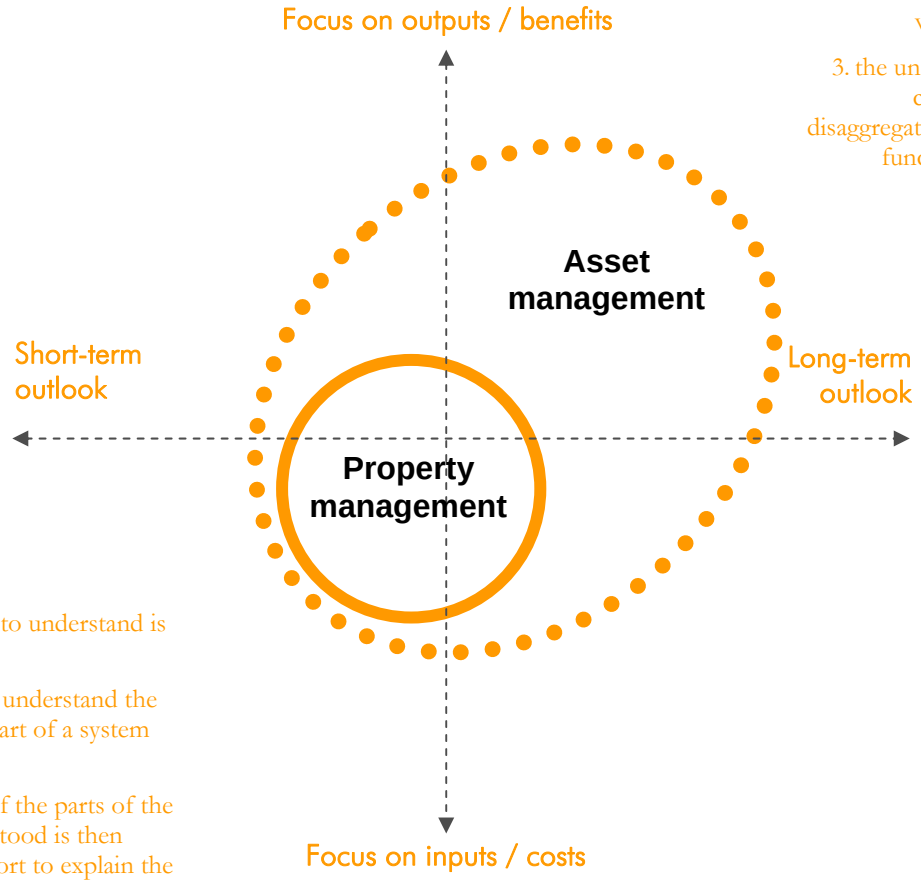
Synthesis

1. something we want to understand is identified as part of one or more larger systems
2. an effort is made to understand the function of the larger system(s) of which the whole is a part
3. the understanding of the larger containing system is then disaggregated to identify the role or function of the system to be understood.

Russ Ackoff [20]



Analysis

1. something we want to understand is taken apart
2. an effort is made to understand the behaviour of each part of a system taken separately
3. the understanding of the parts of the system to be understood is then aggregated in an effort to explain the behaviour or properties of the whole.

Russ Ackoff [20]

Alternative methods

Asset management includes the traditional focus of property management on the efficient use of resources as well as the need for buildings and facilities to support the strategic objectives of the business in an effective way. Russ Ackoff explains: 'Analysis of a system reveals its structure and how it works. It provides the knowledge required to make it work efficiently and to repair it when it stops working. Its product is know-how, knowledge, not understanding. To enable a system to perform effectively we must understand it - we must be able to explain its behaviour - and this requires being aware of its functions in the larger system of which it is a part.' [20]

These two approaches are different but not opposed; in the context of asset management, each serves its own purpose and one complements the other. Analytical techniques are suited to solving technical problems where there is hard data and agreement exists about the issues that need to be solved and what a solution might look like; for example, designing the building's mechanical services. Synthesis is better suited to dealing with more messy, open-ended situations, where there may be little or no hard data and not necessarily any clear agreement about the issues to be solved or what a solution might be; for example, creating an architectural design for a building. However, synthesis alone cannot provide a solution; it merely proposes a range of alternatives from which a solution can be drawn. Analysis is then required to evaluate the practicality and relative merits of the proposed solutions.

'Analysis and thought are frequently treated as synonyms, but analysis is only one way of thinking; synthesis is another.'

Russ Ackoff

Moving up the hierarchy of a complex system inevitably means shifting from a focus on technical processes to higher levels which explain the significance or overall purpose of the system. It is usually at these higher levels, involving people, politics and cultural factors, where the most difficult problems originate and where they need to be resolved. In the diagram on the opposite page property management issues within the solid circle are usually susceptible to analytical thinking and direct control whilst issues outside this circle are often more ambiguous: asset management and other integrated methods require more creative approaches in order to reach a solution, so that the management response and outcome may be less prescriptive. A specification for managing property assets should incorporate both approaches.

Most business management standards adopt 'hard systems' thinking, where it is assumed that an optimum or 'correct' solution to any problem already exists and simply needs to be revealed. By contrast, 'soft systems' thinking starts with the observer's perception of a situation - it expands the hard systems approach to include the observer as part of the system. The assumption here is that there is no correct solution; different people may interpret a situation in various ways and, in a sense, they may all be correct. [21] Charles Handy made this point about deciding the effectiveness of prisons: 'It is not clear, for instance, how the outcome of a prison should be measured, partly because we haven't made up our minds whether the purpose of prison is to punish, to deter, or to rehabilitate the inmates.' [22] A key conclusion of this paper is that selecting measures and defining the boundaries of the system are crucial steps *[in the identification and analysis of business needs]*.

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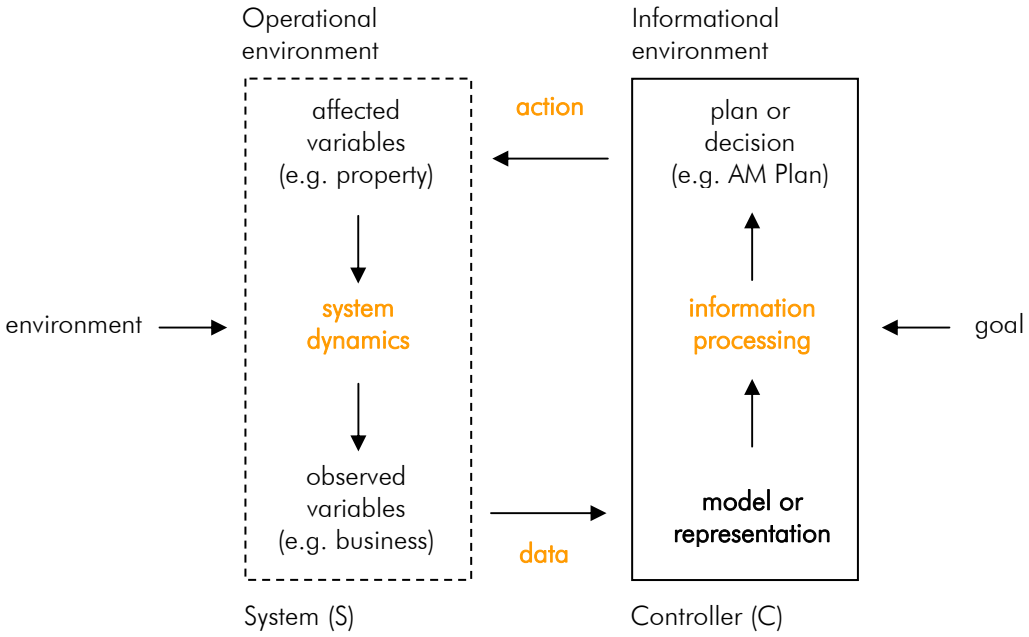
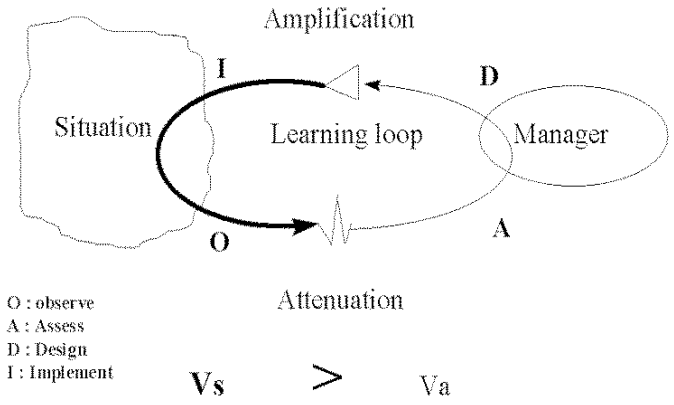


REGULATORY MODELS

We all interpret the world through models - tacit or explicit. The result of any management decision cannot be better than the model on which it is based, except by chance - this is simply a restatement of the Law of Requisite Variety. The model must be sufficiently complex to capture the full dimension of a situation but simple enough to be communicated and understood.

The diagram at the top of this page illustrates the importance of regulatory models, including the data which feeds into the model, and the way in which the outputs of the model are translated into action. Note that without adequate data or feedback from S, then C operates blindly; without action, C can classify information in an academic fashion without generating practical knowledge; but most importantly, if C lacks an adequate model of S (i.e. a model that represents the dynamic of the system), the data received from S might be useless and the information processing by C will not be valid, so that action to meet the system's goals is likely to be ineffective or might even be counter-productive.



THE LEARNING ORGANISATION

A whole systems approach to management stresses the importance of experimenting and learning by doing as a way of improving the capacity and performance of a system - discovering what works and what does not.

The diagram at the bottom of this page shows how individual and organisational learning or improvement can be thought of as a process with four stages which take place either as events in the real world or ideas in the minds of managers. In this process, a deliberate decision made within the organisation leads to some concrete action, which in turn prompts assessment of the results of the previous actions and decision before searching for new ideas about what should happen next.

Communication and control

Previous sections of this paper have highlighted the difficulties of attempting to manage complex, open systems using methods which are derived from the control of closed, mechanical systems. The branch of systems theory that is possibly the most developed attempt to apply whole systems thinking to business organisations is 'cybernetics', sometimes defined as 'the science of effective management'. Cybernetics is an inter-disciplinary approach that studies the flow of information within systems, particularly how feedback is used by systems as a means of self-regulation. The same principles, or natural laws, are found as corresponding patterns in biological and engineering control systems - a more formal definition for cybernetics is the 'science of communication and control in the animal and the machine'.

Cybernetics redefines what we mean by control; how it is exercised and its limits. In place of command-and-control methods, where managers attempt to constrain or limit the actions of lower-level systems, the control of complex systems is focused on obtaining a desired outcome. Control becomes an indirect function which takes into account the whole system, including aspects such as leadership and direction, training, tools and techniques, and incentives for cooperation and performance. The role of management is to create an environment that fosters desired outcomes and makes maximum use of lower-level regulators – it is less about specifying the precise means to an end and more about establishing and clarifying the end goal itself.

'Every good regulator of a system must be a model of that system.'

The Conant-Ashby Theorem

The vast number of variables and interactions in a complex system means that its properties and behaviour can never be fully known or predicted with hard, objective certainty. For this reason, managers rely on models or concepts which they have developed over time as simplified representations of real-world situations. Management models may be tacit or explicit; they may be informal, guiding principles or formal rules. Decision-making cannot outperform the quality of the model on which it is based - see inset - but without comparison against a better model, managers are unable to assess the adequacy of the models they possess. Faced with a situation that is ultimately unknowable, system thinking methods emphasise the need for managers to develop and constantly improve models - discovering what works and acting on this knowledge. In other words, control depends upon a constant cycle of experimentation and learning - refer opposite page.

Kofman's model (1992), describes the learning process as an OADI cycle, which is described on the opposite page. In Kolb's four-stage learning cycle (1984), 'concrete experiences' provide a basis for 'observations and reflections', which are assimilated and distilled into 'abstract concepts', leading to actions, which are then 'actively tested' creating new experiences. John Boyd's OODA Loop - Observe, Orient, Decide, Act - has been widely adopted in US business and military strategy; its message is that organisations which move through this cycle faster than their opponents will eventually win. Each of these models has parallels with Deming's PDCA cycle, but whilst the PDCA cycle is a tactical model designed for manufacturing operations, the others are designed to deal with strategic complexity. Nevertheless, the key stage of the process in each model corresponds to Act, where data is synthesised into a model which informs the subsequent planning or decision-making stage.

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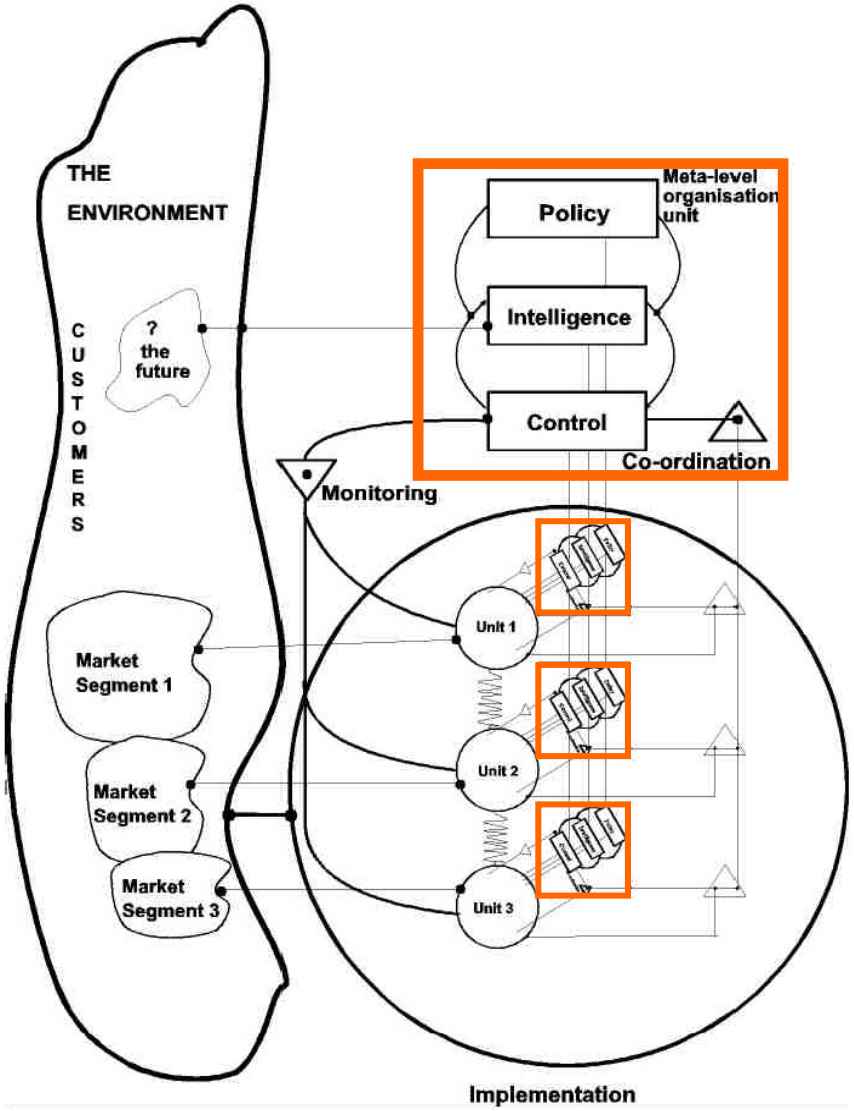

THE VIABLE SYSTEM MODEL

The Viable System Model (VSM) borrows from the patterns of information flows and control systems found in the nervous systems of living organisms. It is in fact a blueprint for the 'brain' of an organisation. Like a brain in a living organism, the VSM has a fractal or holographic structure, where each control function is distributed at every level of each core business processes within the organisation - shown within the circle.

The starting point of the system is the core operational processes or activities represented by the small circles - each circle represents a distinct part of the organisation's value chain; for example, procurement, manufacturing etc.

The tactical task of coordinating these processes into a cohesive, stable system (the large circle) is represented by the triangular elements, which are connected at the level of the meta-system by the triangle within the large square.

Now that the interactions between the operational activities are stable, the next job is to optimise these interactions, in particular by allocating resources between them - this role is carried out by the supervising function labelled 'control'.

The next step is strategic - to ensure that the stable, optimised activities can survive by continually adapting to their external environment, so that control is closely linked to the function labelled 'intelligence', which looks at the outside world, considering future threats and opportunities.

Finally, the interaction between future, outside intelligence and present, internal control are guided within the overall context of 'policy', which provides the normative rules and represents the ultimate authority of the entire system.

An auxiliary function called 'monitoring' supports the control function, providing sporadic inspection of the operational activities. The purpose of this function is to ensure that received information is accurate.

Summary and conclusions

The job of managing buildings and facilities is complicated, requiring expert skills and knowledge. Buildings themselves are also complicated; they are assembled from thousands of components using sophisticated construction techniques. Nevertheless, whilst buildings are not simple, they are knowable: each component and junction can be specified and represented in a working drawing. Similarly, the task of caring for the building during its operational life is a process that is well understood. But when people and other business resources are integrated with property management, there are too many variables and interactions for such a situation to be fully understood or for the behaviour of the whole system to be predicted with any certainty - the situation moves from being complicated to complex.

The underlying challenge in creating a specification for managing property assets as an integrated business resource, and a key theme of this paper, is the issue of managing complex systems. This paper has described the conventional response to this challenge, which is the use of formal methods - breaking the system down into separate parts and re-assembling the parts into an orderly, linear process where one step follows logically from the next. However, according to one of the main concepts introduced in this paper, formal methods are likely to fail in the context of complex systems because they lack requisite variety. The direct transfer of formal methods used for complicated processes, as found in engineering or manufacturing, to a complex activity such as asset management has no theoretical basis.

Whole systems thinking - introduced in Green Paper A1 - offers an alternative approach to formal, mechanistic methods. A whole systems approach to management control is focused on obtaining a desired outcome, and the primary source of control (as defined in this paper) in an organistion composed of people is in creating an environment where people will naturally behave in such a way as to achieve the goals of the system - refer inset. Moving from the command-and-control model described in this paper, the question is not: 'How well am I managing this system?' but rather: 'How well is this system allowing me to manage?' Traditional, formal methods of management are fundamentally about exerting control *over* people and processes, whereas a whole systems approach substitutes direct control for the ability to influence planned outcomes *through* people and processes - acting on the system as a whole.

'Do not assume that people can be held responsible for performance, for their performance is governed by the system within which they work.'

W Edwards Deming

Whilst there is common agreement that formal approaches cannot deal with the full complexity of tasks such as asset management, command-and-control methods and their associated bureaucratic structures are familiar; we know how they look. Therefore the problem is how might we control matters if we move away from these models? The diagram and text on the opposite page describe an alternative management framework known as the Viable System Model. This model will be explained in more detail in the next consultation paper, which will provide the outline of an industry specification for managing property assets. Although individual organisations will need to develop bespoke, private systems for their own use - Green Paper A3 will argue that the Viable System Model is ideally suited as a holistic framework for guiding this task.

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‘The aim should be to provide a minimum specification that creates an environment in which innovative, complex behaviours can emerge. The key is to provide clear direction, boundaries that must not be crossed, resources and permissions.’

Jake Chapman [5]

Guiding principles

The following principles of a design for a management system based on holographic principles (the organisation as a brain) are borrowed from Gareth Morgan's book, 'Images of Organisation'. Morgan explains that they define a mindset and approach rather than a blueprint or recipe:

1. BUILD THE WHOLE INTO THE PARTS

Awareness of the strategic importance of buildings and facilities to business performance and service delivery needs to be distributed throughout the organisation – 'from board room to boiler room.' The VSM is an example of an organisational design which follows this principle. A specification for managing property assets based on the VSM framework would permit the 'joined-up' approach advocated in recent reports to HM Treasury by Sir Michael Lyons and Sir David Varney.

2. FUNCTIONAL REDUNDANCY

The idea of redundancy follows from the previous heading – it contrasts with working in separate functional departments and other silos. Asset managers need a cross-disciplinary approach and the ability to manage and work within cross-functional teams. Systems for managing property should be aligned or integrated with other management systems.

3. REQUISITE VARIETY

The optimum amount of redundancy can be calculated by observing the principle of requisite variety – refer page 7. This principle suggests that when variety and redundancy are built at a local level – at the point of interaction with the environment rather than several stages removed, as happens under hierarchical design – the ability of the organisation to survive and evolve is enhanced. Individuals, teams and other units are empowered to find solutions around local issues and problems.

4. MINIMUM SPECIFICATION

The principles listed above allow the organisation to adapt to its environment and evolve, but asset managers and employees need the freedom to put these principles into practice. Some degree of autonomy is needed to find local solutions, so that managers should define no more than is necessary – refer to text on opposite page.

5. LEARNING TO LEARN

A management system can operate to trap an organisation in a process of 'single loop learning' that reinforce the status quo and hold the organisation at a static level. The idea of a learning organisation and 'double-loop learning' allows for the operating norms and rules of a system to be questioned and changed in line with changes in the wider environment. This process of learning requires a degree of freedom and openness that is not compatible with command-and-control methods.

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View of the World from 9th Avenue: Saul Steinberg (1976)

'Boundaries allow us to separate processes and localise them in the world, and this localisation generates both behaviour and events … Note that the observer provides the perception of the boundary.'

Howard Salthe [26]

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BSI MANAGEMENT SYSTEM INTEGRATION – A GUIDE		VIABLE SYSTEM MODEL – refer page 15		PDCA CYCLE
1	Management responsibility and leadership	-	Build the whole into the parts – page 16	-
2	Identification and analysis of needs	-	Framing the system / selecting measures	-
3	Policy and objectives	System 5	Normative arrangements	PLAN
4	System planning and implementation	System 4	Adaptation + strategic intelligence	PLAN
5	Allocation of resources	System 3	Operational control / the 'resource bargain'	PLAN
6	Communication and information systems	System 2	Coordination	PLAN
7	Process and activity management	System 1	Primary (customer-focused) activities	DO
8	Measurement and monitoring	System 3*	Intermittent audits	CHECK
		(Alerts)	(Early warning + emergency response)	-
9	Management review and improvement plan	-	Establishing a 'learning organisation'	ACT

Comparison of three existing Management System Frameworks

This project is supported by a wide range of government departments, private companies and professional bodies. Our aim is to develop and deliver a framework for managing operational property assets that will be widely accepted by the industry. The framework will be written for senior executives and property professionals - it will provide a set of governing principles and a generic template for an asset management system which can be used to:

1. Design and develop private asset management system standards which are consistent with a cross-sector specification agreed by industry and government
2. Integrate property asset management systems with other management systems and standards, such as BSI PAS55, ISO 9001, EFQM Business Excellence Model
3. Diagnose existing asset management systems and identify areas for improvement
4. Monitor and track performance over time
5. Benchmark performance against other organisations.

If you would like to take participate and be acknowledged as part of the team creating the framework please contact Consilian at:

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UK framework for property asset management - strengths

- Ambitious scope - £1 trillion
- Explicitly public and private
- Emphasises alignment with business objectives
- Cross discipline
- Measurement,standards,information and management
- Holistic approach

Sir Michael Lyons
Presentation at project launch, July 2005

John Seddon
Presentation at project event, June 2006

"Any initiative which illuminates the dynamic between a business and its assets and proposes practical measures for improving that process, without imposing additional bureaucracy, is welcome."

Sir David Varney
Commenting on the project, August 2006

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