Introducing the VSM: Re:Thinking Organisation

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“the truths of cybernetics are not conditional on their being derived from some other branch of science”

Ross Ashby, 1956
Managerial Cybernetics

• What is Managerial Cybernetics?
• How does it work?
• Why do we need it?
• What is the benefit?
• How is it used?
Managerial Cybernetics

• Common conception of cybernetics
  – Dr. Who, Cybermen, Cyberspace (the Internet)

• Plato - 417 – 347 BC
  – Kybernetes, ‘steersman’, ‘steering the ship of state’, ‘governance’

• Weiner – 1947
  – ‘Control and Communication in the Animal and the Machine’

• Beer – 1959
  – ‘The Science of Effective Organisation’
Managerial Cybernetics

- Developments, Applications, Critiques:
  - Clemson: 1984:
    » Cybernetics: A New Management Tool
  - Jackson & Keys (Eds): 1987
    » New Directions in Management Science
  - Espejo and Harnden (Eds): 1989
    » The VSM – Edited Papers
  - Espejo & Schwaninger (Eds): 1993
    » Organisational Fitness
  - Flood & Jackson: 1991
    » Creative Problem Solving
Managerial Cybernetics

• Own Contribution
  – 1991: Passing on a Family Business or a Family Business
  – 1995: Towards a Participative Methodology for the VSM
  – 1998/99 (with Peter Dudley)
    That’s Not Very Big is It?
    Size Doesn’t Matter
    It’s What You Do With It That Counts
  – 1999 – date:
    About 50 other papers and presentations
  - 2009 UK CST Report:
    - Critical Interactions of the UK National Infrastructure

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'The branch of Management Science that studies the structural, informational and human aspects of any organisation as an integrated whole'

Beckford & Dudley, 1998
Managerial Cybernetics

Values, Skills, Behaviours

Information Systems

Closure

Effectiveness (Viability)

Process, Structure, Decisions

People

Organisation
Managerial Cybernetics

• Provides an alternative way of thinking about organisations in terms of:
  – Purpose
  – Structure
  – Behaviour (people)
  – Interaction

• Offers different insights into:
  – Efficiency (Productivity)
  – Effectiveness (Performance)
  – Sustainability (Viability)

• How those things can be managed
• It is a model – a representation
• A way of thinking about the world
• An abstraction from the full reality of a situation
• It is therefore:

“neither true nor false, it is more or less useful”

Beer, 1985

I find it most useful!
The Basic Cybernetic Model

Inputs → Process or Operation → Effector
The Basic Cybernetic Model

Inputs \rightarrow \text{Effector or Operation} \rightarrow \text{Detector} \rightarrow \text{Outputs}
The Basic Cybernetic Model

Inputs → Effector → Process or Operation → Detector → Outputs

Measurement of Output
The Basic Cybernetic Model

Inputs → Comparator → Measurement of Output → Outputs

Effector → Process or Operation → Detector
The Basic Cybernetic Model

- Inputs
- Modification of Input
- Comparator
- Measurement of Output
- Outputs
- Effector
- Process or Operation
- Detector

Inputs → Modification of Input → Comparator → Measurement of Output → Outputs

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The Basic Cybernetic Model

Plan, Do, Check, Act – the Continuous Improvement Cycle

Inputs

Modification of Input

Comparator

Measurement of Output

Effector

Process or Operation

Detector

Outputs
The Basic Cybernetic Model

Management

Modification of Input

Inputs

Modification of Output

Outputs

Effector

Process or Operation

Detector

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The Basic Cybernetic Model

Management

Expectations
Money
Materials
Machines
Skills
Behaviours
Information

Effector
Process
or
Operation
Detector

Outputs

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The Basic Cybernetic Model

Management

- Expectations
- Money
- Materials
- Machines
- Skills
- Behaviours
- Information

Effector
Process or Operation
Detector

- More (or less!) money
- Products
- Services
- Waste
- Learning
- Happiness (or not)
- Information

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The Basic Cybernetic Model

Management

Effector or Operation  Process  Detector
The Basic Cybernetic Model

Management

Using these inputs and within these constraints, Do THIS
The Basic Cybernetic Model

Management

Using these inputs and within these constraints, Do THIS

Using those inputs and within those constraints (or not!), I did THAT

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The Basic Cybernetic Model

Management Question:
Which input should I change to bring outputs in line with expectations?

Effector or Operation
Process
Detector
The Basic Cybernetic Model

Management Question: Which input should I change to bring outputs in line with expectations?

Inputs
- Expectations
- Money
- Materials
- Machines
- Skills
- Behaviours
- Information

Effector
- Process or Operation
- Detector
The Basic Cybernetic Model

Management

Are we doing things right?
The Basic Cybernetic Model

Are we doing things right?

Efficiency, Productivity, Behaviour, Quality, Profitability
Multi-Process Cybernetic Model

System One
Multi-Process Cybernetic Model

- Autonomic
- Autopoietic
- Dynamically Stable
- Performance Focused
- Self-Improvement Focused
- Multi-faceted
- Wholly Inadequate!
• Wholly Inadequate! Why?
• Because:
  – Rightness is internally defined
  – Rightness is about NOW
  – Rightness cannot be challenged within that model!
    • Goedel’s incompleteness theorem?
      – ‘Within the limits of any formal language there are propositions that are undecidable’
    • Russell
      – ‘The Barber shaves everyone in this town who does not shave himself, who shaves the Barber?’
• Wholly Inadequate! Why?
• Because:
  – Rightness is internally defined
  – Rightness is about NOW
  – Rightness cannot be challenged within that model!
• BUT – most organisations work that way!
• What is needed?
  – A mechanism that enables the ongoing redefinition of rightness!
Complete Cybernetic Model

Environment:
Market
Society
Technology
Customers
Complete Cybernetic Model

System One

System Three

System Four

Environment:
Market
Society
Technology
Customers

Are we doing the right things?
Complete Cybernetic Model

System One

System Three

Environment:
Market
Society
Technology
Customers

Are we doing things right?

Are we doing the right things?
Complete Cybernetic Model

System One

System Three

System Four

Environment:
Market
Society
Technology
Customers

Tension

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What is right?
Values
Beliefs
Identity

Environment:
Market
Society
Technology
Customers

System One

System Three

System Four

System Five

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Complete Cybernetic Model

Doing the Right Things:
Effectiveness, Sustainability
Complete Cybernetic Model

Doing the Right Things:
Effectiveness, Sustainability

Doing things right:
Doing the Right Things:
Effectiveness, Sustainability

Doing things right:
Efficiency, Productivity, Behaviour, Quality, Profitability

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Complete Cybernetic Model

Doing the Right Things:
Effectiveness, Sustainability

Doing things right:
Efficiency, Productivity, Behaviour, Quality, Profitability

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Conventional VSM
Complete Cybernetic Model

- Autopoietic
- Ultra-Stable
- Customer/Market Focused
- Adaptive
- Learning
- Empowered
- Viable (Sustainable)
• Self-producing (Maturana & Varela, 1992)
  – (Self-approximating – Dudley, 2000)
• All ‘viable’ systems are autopoietic
  – Name one?
• Autopoiesis is an essential property of viability
• Pathological Autopoiesis
  – When parts of the system pursue their own ends, not those of the system to which they belong
  – Bodily instance of this?
  – Cancers
Why do we need it?

• It makes explicit the true role of the manager
• We can use it to model:
  – any process
  – any discipline
  – any ‘dimension’ of the organisation
• It provides:
  – the basis for Information Systems design
  – a methodology for thinking about organisations which:
    • enables diagnosis
    • enables prognosis
    • enables effective treatment
    • the basis for meaningful measurement of performance
Problems and issues of contemporary organisations cannot be resolved within the limitations of any one discipline:

They can only be understood and expressed from a supra-disciplinary position which embraces all relevant aspects of the matters under consideration

Managerial Cybernetics provides a robust ‘tool kit’ which attempts to provide this!
2009 Committee on Science & Technology Report on National Infrastructure:

JB modelled the interactions of Water, Energy, Transport, Waste, Ict

Outputs informed G8, G20, Budget, IPCC
So, why do we need it?

- ALL organisations are, to some extent, dysfunctional, most commonly because:
  - They fail to adequately investigate the environment
  - Dealing with today dominates thinking about tomorrow
  - The ‘identity’ of the organisation is not explicit
- The cybernetics of any situation will assert themselves so that ALL organisations necessarily answer to the ‘laws’ of cybernetics
- If we design the cybernetics we can make them work in our favour!
A REAL Organisation
Complete Cybernetic Model
Spot the Difference?
How much more does the right hand diagram tell us about the organisation?

The left hand diagram simply tells us who to blame for failure!

The right hand diagram (and the thinking that underpins it) tells us:

HOW the organisation works
WHY it works that way
HOW to fix it!
A Real One!

Employee Satisfaction

Customer Satisfaction

Regulatory

Financial Performance

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How does that work?
Track Access Agreements

Train Planning

Sales

Depots

Service Capability

Market Potential

Timetable Requirements

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Track Access Agreements

Key:
- Blue arrows represent processes and relationships.
- Pink arrows indicate potential areas for performance constraints.

Main Process:
1. **Ops**
   - Revenue Potential
   - Service Capability
   - Timetable Requirements

2. **Train Planning**
   - Passenger Volume Potential
   - Output Measures

3. **Sales**
   - Market Potential
   - Performance Constraints
   - Tickets Sold

4. **Delivery**
   - Catering Potential
   - Performance Constraints
   - Right Time Right Place Reliable

5. **Control**
   - Output Measures
   - Reg & Comp
   - Audit

6. **Finance**
   - Staffing
   - Parts

Other Areas:
- **Depots**
- **Volume Staffing Parts**

Performance Constraints:
- Revenue Potential
- Market Potential
-在校访问

Outputs:
- Volume
- Staffing Parts

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• It is in attempting to solve problems of organisations from WITHIN the various disciplines that causes many failures because:
  – the languages are incomplete
  – insights generated within a discipline emphasise particular characteristics which may not be perceived as important in another
  – the approach cannot adequately address interactions – the trans-disciplinary issues which can only be seen from a ‘meta’ or ‘supra’ position

• Managerial Cybernetics helps to overcome these limitations
Managerial Cybernetics provides the basis of meaningful performance measurement because:

- A formal statement is made of process capability in multiple dimensions
- Output can be measured against that known capability

<table>
<thead>
<tr>
<th>Expectations</th>
<th>More (or less!) money</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money</td>
<td>Products</td>
</tr>
<tr>
<td>Materials</td>
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<tr>
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</tr>
</tbody>
</table>

- The impact of increasing (or decreasing) resources or adding and removing constraints can be assessed
Performance Measurement

Capability

Expectations
Money
Materials
Machines
Skills
Behaviours
Information
Performance Measurement

What is being achieved with current resources, processes and constraints
Performance Measurement

Capability

More (or less!) money
Products
Services
Waste
Learning
Happiness (or not)
Information

Actual
Performance Measurement
Performance Measurement

Potential
What could be achieved
If the resources were changed and/or the constraints removed

Capability

Productivity

Actual
Performance Measurement

Potential → Latency
Capability
Productivity
Actual
Performance Measurement

Potential

Latency

Capability

Overall utilisation of “assets”

Productivity

Actual

Overall utilisation of “assets”
Performance Measurement

Potential → Latency
Capability → Effectiveness
Productivity → Actual
What can I use it for?

- Process Design & Modelling
  - Mushroom Farming, Cake Manufacturing, Steel Production
- Analysis & Design of Organisational Structures
  - Railways, Banks, Factories, Property Companies
- Analysis & Design of Performance Management Systems
  - Logistics, Banking, Dentistry, Healthcare
- Analysis & Design of Information Systems
  - Railways, Pharmaceuticals, Performance Chemicals
- A basis for “Artificial Intelligence”
  - Research Chemistry, HR Selection
How Can I Use it?

- Thoughtfully
- Participatively
- Adaptively
Prepare a Proposal

Client

Client Model of Issue

Check Understanding

Idealised VSM

Emergent Model of Issue

Shared Model of Issue

Outline Solution

Agreed

Prepare a Proposal

Yes

No

What has been misunderstood?

Check Solution

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VSMethod

FROM PHASE ONE
Revalidate Proposal and Required Outcomes

Client Model of Issue

FROM PHASE ONE
Revalidate Proposal and Required Outcomes

Client with Issue

Confirm Scope & Cost

Commence Project

Detailed Model

Outline Solution

Phase One

Confirm Scope & Cost

Commence Project

Phase Two

Prototype

Assessment

Cost/Benefit

Phase Three

Implement

Revise/Edit

Finalise

Phase Four

Validate

Assess Satisfaction

Advise Further Needs

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Benefits

- Reduced cost of operation
- Adaptive structure means change is embedded
  - a continuous rather than sporadic process
- Promotes autonomy & empowerment
- Blends local adaptation and global (corporate) coherence
- Ensures easy compliance with regulatory systems
- Promotes organisational learning
- Promotes experimentation and development
Research

- Extended acceptance of the approach
- Refined application & modelling methodology
- Refined Performance Management Systems
- Enhanced Software Tools (VSSuite)
• ReDesign of a Global Care Organisation
• Development of a ‘Change’ Methodology
• Social Housing – IS Design
• Rail Vehicle Gearboxes – Market Analysis
• Design of Information Systems - SAP
• Deployment of Information Systems
• A model for Coaching/Mentoring
• Analysis of Infrastructure interactions between:
Summary

- A view of Managerial Cybernetics
- What about it?
  - Robust
  - Rigorous
  - Practical
  - Different!
- In application?
  - Fast
  - Effective
  - It works!