

*A Set of Conventions, a Model: An Application of Stafford Beer's  
Viable Systems Model to the Strategic Planning Process*

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## 1. Introduction

This paper outlines a sequence of sixteen management diagrams that demonstrate both the rationale of the Action Research change methodology<sup>1</sup> and the underpinning structure of the strategic planning process that has emerged at Greyhound Racing Victoria (GRV), the body responsible for regulating the \$700 million p.a. industry. The management diagrams are devotedly and unashamedly based on Stafford Beer's (1972; 1979; 1985) original drawings. However, managers who follow the philosophy and method outlined here, do need to discover their own diagrams and the levels of understanding that they might need to transform their thinking into a strategic planning platform for their own businesses. The required levels of understanding of any theory-based method will vary according to organisational hierarchy. And so while this paper is aimed at the upper levels of management, it must be as clearly understood that according to the structure of this method, its fundamental principles should apply recursively, at all hierarchical levels of the organisation. It is for this reason that the diagrams start at an elementary standard and aggregate to differing levels of complexity.

The first eight diagrams trace how employees at GRV came to an understanding of the structures that lead to the formation of the PICCO formats. The terminology used here is simple and uncomplicated. With absolute respect to Beer, this level of simplicity is nonetheless required for three very important reasons. The first reason is that the fundamentals of the diagrams need to be comprehensible for a broad range of employee competency levels. The second reason is that the diagrams need to be both practical and useful at differing hierarchical levels of management. The third reason is that in keeping with the first two reasons, employees are able to focus on a single method. Thus in accord with Argyris and Schon (1974) employees can then make conscious<sup>2</sup> use of the diagrams and the PICCO formats to learn and manage their responses to organisational issues in practice.

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<sup>1</sup> We take Checkland's (2000: 36) a succinct account of method and methodology. A methodology is at a meta-level with respect to a method. Methodology is a body of methods used in a particular activity.

<sup>2</sup> Argyris and Schon (1974) say Organisational Learning is the logic that learning is a primary process affecting the way in which successful organisations consciously learn and manage their responses more successfully than those who do not.

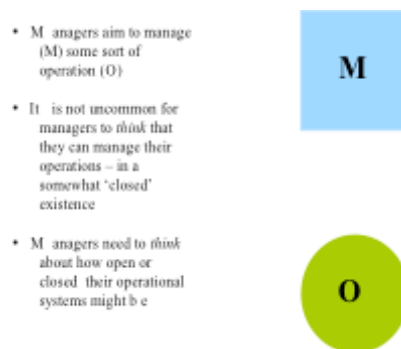
The next six diagrams become more specific to the GRV strategic planning process and are applicable to higher levels of management. Nonetheless, their structural recursiveness could apply in any organisation. The final two diagrams aggregate all of the issues, approaches and theory-bases that have contributed to the preceding diagrams and link the theory based method PICCO at many levels of recursion, with emergent action learning frameworks.

## 2. A sequence of sixteen management diagrams

### Management diagram 1: Thinking about Management Principles

*Nothing will come from doing nothing – with apologies to William Shakespeare*

A template was developed as a handy reference for employees who might be required to look at fundamental principles of management and the strategic planning process for the first time. The first of the management diagrams, Diagram 1 illustrates the fundamental principles of management.



*Diagram 1 – Thinking about Management Principles*

These fundamental principles apply at all hierarchical levels. Employees therefore need to think about how this depiction is relevant to their own operational systems which Beer (1959: 39) terms as purposive<sup>3</sup>. In the primary case, Beer's (1985: 20) purposive operational systems, the relevant operations that produce the (total) viable system-in-focus, are individual employees who are first encouraged to think about how they manage themselves in the workplace. The advantage of starting with

<sup>3</sup>A purposive system is one organized to achieve some end, its aim is to do what it does.

individual management is that the principle of recursion is quickly and easily established. Table 1 thus categorizes some words and phrases that can germinate thinking for employees about the management of operational systems at differing hierarchical levels.

Issue	Approach	Theory base
Thinking about management	Problems are part of everyday life	Cognition Socio-technical
Organizing effectively	A new approach	Cybernetics
Gap between textbook and practice	Juggling the best you can	Open and closed systems Systems Thinking
You need to start somewhere	Doing something is better than doing nothing	Organisational Knowledge Creation
A template is handy	Consensus of understandings	System Dynamics Soft Systems Methodology

Table 1 – Thinking about Management Principles

**Management diagram 2: Management of Operations involves recognition that the controller is part of the system that is under control**

*A model is neither true nor false: it is more or less useful - Beer (1985:2)*

Employees’ first view of their locus of operational control is from a somewhat cocooned or closed system perspective. Hence, Beer’s (1972: 25) axiom ‘the first principle of control is that the controller is part of the system under control’ and the thought of control emanating as operational feedback are not initially well understood. Diagram 2 illustrates this essential feedback loop.

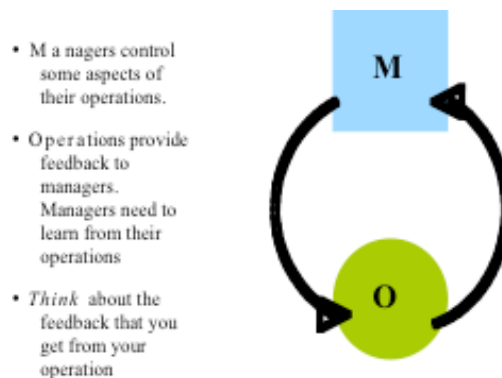


Diagram 2: Management of Operations

Nonetheless, Table 2 categorizes examples of some words and phrases that come to assist employee thinking at differing hierarchical levels.

Issue	Approach	Theory base
Closed system	Can the operational system be a separate identity independent of other existences?	Operational systems Cognition Organisational behaviour
Feedback	Action and reaction	Operational research Organisational behaviour
Control	Influence on the operation, response from the operation The controller is part of the system under control	Organisational structure Cybernetics Viable systems

Table 2 – Management of Operations

### Management diagram 3: The interaction of Management, Operations and the Environment (E)

*Homeostasis, the stability of a system's internal environment despite the system's having to cope with an unpredictable external environment – Beer (1985:17)*

When employees combine the concepts of feedback, their consciousness of their interaction with a wider environment becomes apparent, or is at least more readily acceptable.

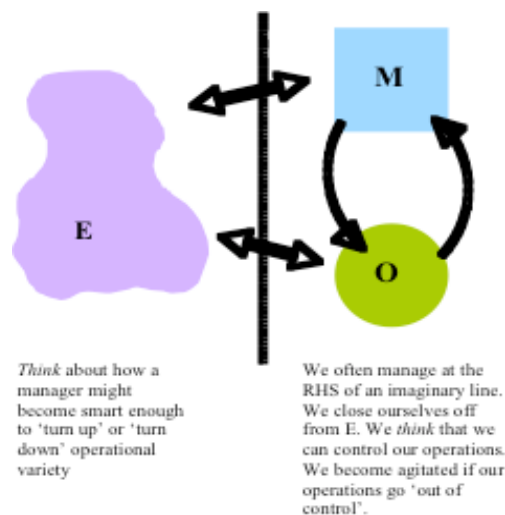


Diagram 3: The Environment, Management and Operations

With the inclusion of the environment, employee thinking tends to become ‘less closed’ and less focussed on their internal environment, an acceptance of a number and variety of systems emerges. The concept of a stacking of operational systems that embed in each other to form a recursive dimension also becomes evident.

A newer mindset that encompasses M, O and E as an unpredictable, tripartite interaction can then form part of the everyday organisational lexicon. Here variety<sup>4</sup> is often interpreted as a nuisance factor that raises its head only when employee operations tend to go out of control. Thus Table 3 categorizes some further words and phrases which eventually become common to employees.

<b>Issue</b>	<b>Approach</b>	<b>Theory base</b>
Environment	An internal environment having to cope with an unpredictable external environment	Ashby’s- Requisite Variety Conant/Ashby - Residual Variety
Homeostasis	Keeping the operation under control	General Systems
Open system	Operational systems cannot survive in a vacuum	Open systems
Recursion	Stacks of systems which each contain all the levels below	Set theory
Variety	Juggling the best you can	Cybernetics [VSD] Management science
Variety ‘dial’	How a manager might become smart enough to ‘turn up’ or ‘turn down’ operational variety	Ashby’s- Requisite Variety

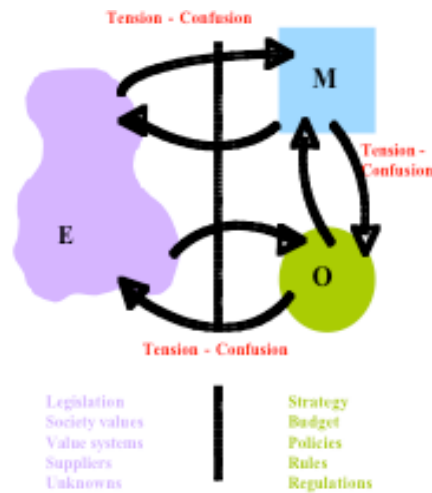
*Table 3 – The Environment, Management and Operations*

**Management diagram 4: All levels of ‘M’ have areas of both major and minor control**

*The big problem is this: you are not determining absolute facts: you are establishing a set of conventions - Beer (1985:2)*

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<sup>4</sup> Beer (1985:35). Variety is a measure of complexity: the number of possible states of a system



Think about how we like to be in control of our operations. We impose conditions such as strategies and budgets to take variety out of our operations. The environment provides us with intelligence that influences our behaviours

Diagram 4: Major and minor control

The fourth management diagram presents an important amalgam of the basic management principles and the rudimentary aspects of the strategic planning process. At this stage, employees must first grasp the concept of system variety as a measure of complexity, or the number of possible states that their organisational system might have.

Issue	Approach	Theory base
Variety – tension and confusion	Managing complexity Directional channels Handling high variety Enhancing low variety	VSD Attenuation Amelioration
Planning templates to lessen or increase required complexity (variety)	Budget, Strategic planning, Laws, Conventions, Value systems	Organisational theory Operational research Cybernetics
Controlling variety to maintain viability	Only variety can absorb variety Homeostasis Becoming smarter than the situation we are managing A variety dial <sup>5</sup> - being able to turn up, or turn down variety	Requisite variety (Ashby) Residual variety (Conant/Ashby) General systems (Homeostasis)

Table 4 – Major and lessor control

Beer's (1985: 45) second Principle of organisation involves a time base. It says that the four directional channels<sup>6</sup> which carry information between M, O and E must each

<sup>5</sup> This new view of Beer's work emerged from our assessment of *Diagnosing the System (1985)*

have a greater capacity to transmit a given amount of information relevant to variety selection in a given time than the originating subsystem has to generate it in that time. Beer's second Principle was simplified from two different perspectives. One perspective is that managers need to organise themselves so that they have sufficient time to consider all of the information, before committing to a strategic decision. The second perspective is that they need to possess competencies that enable them to make sensible decisions about that information. That is, they need to be smarter than the situation they are managing.

### Management diagram 5: Thinking about thinking is difficult

*A man's mind stretched by a new idea will never return to its original state - Oliver W Holmes*

The Four Stages of Competency model is attributed to Gregory Bateson (1973). The reasons for introducing this diagram at this stage are three fold. One reason is that it assists employees in thinking about their thinking processes and cognition in general. The second reason is to enable employees to gain a better understanding of the strategic planning process. The third reason is that Bateson's model assists employees in the linkage of the issues and approaches that have been employed so far, to the referenced theory-bases.

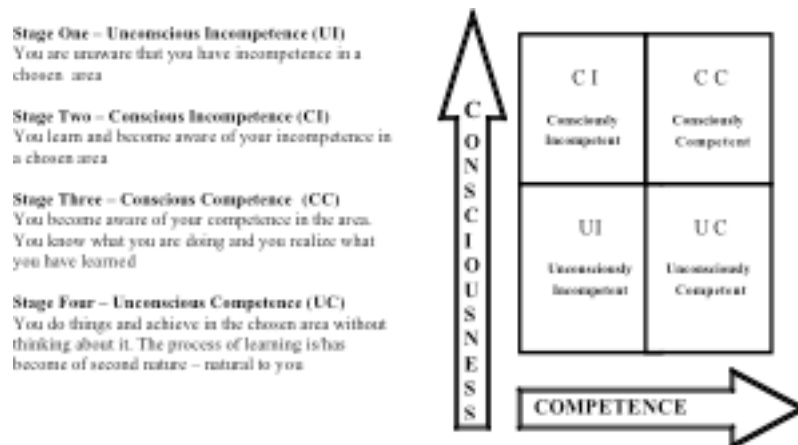


Diagram 5: Four Stages of Competency (Attributed to Bateson 1973)

<sup>6</sup> For clarity, this means attenuation and amelioration between E and O and also between O and M (via the regulatory centre)



## Management diagram 6: PICCO

*'A tentative road map, still indistinct and abstract, a target to which the organisation might aim to become generative. It is not a destination, but a never-ending journey. It is part fantasy, part psychology, and part struggle' - Watkins and Golembiewski (1995:99).*

The aim of the sixth management diagram was to introduce the GRV Senior Management Team (SMT)<sup>7</sup> to a quite distinctive road map (Watkins and Golembiewski 1995) that builds on the sort of thinking that underpins the first five diagrams.

- **SYSTEM 5:** The brains trust or senior brain functionality. The part of the organisation which ultimately determines the strategic **Policies** that the organisation will follow
- **SYSTEM 4:** The engine room of the Brain. The **Intelligence**, the gathering of information through the connection of the muscles and organs with the outside world. Intelligence looks at planning, forecasting and predictive strategy for the organisation
- **SYSTEM 3:** The floor or base of the Brain. A system that **Controls** the complexity of the muscles and organs in system one and maximizes the inner functionality of the organisation
- **SYSTEM 2:** A system that oversees and keeps an eye on the muscles and organs, a system that stabilizes their interaction. Identified as the sympathetic nervous system, it **Coordinates** or calms down any fluctuation or inconsistency in the operating system of the organisation
- **SYSTEM 1:** The muscles and organs. The bits of the organisation that actually do things. They provide for the fundamental activities of the system. They can be described as the **Operations** that make the organisation tick

*Diagram 6: The five systems that underpin PICCO*

By introducing the five interconnecting subsystems, Policy, Intelligence, Control, Coordination and Operations as PICCO, almost immediately three things happen. One is that that SMT and the Board focus on the template as one valid and straightforward approach to management. The second is that ownership of the PICCO approach takes place. The third is that the SMT and the Board start to think more

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<sup>7</sup> SMT comprises CEO and Clubs, Finance, IT, Marketing and Racing departmental managers

systemically about the interactions and iterations that occur within the GRV operations.

### Management diagram 7: PICCO and MODE at GRV

*You don't have to be a fantastic hero to do certain things to compete. You can be just an ordinary person, sufficiently motivated to reach challenging goals - Sir Edmund Hillary*

The aggregation of the diagrams provides GRV with an underlying structure to determine the strategies that make System One, the strategic operation of greyhound racing, viable. Thus the SMT<sup>8</sup> is given a snapshot of the GRV strategic planning operation MODE<sup>9</sup> at one point in time. Diagram 7 therefore considers how MODE is formulated as a holistic System One in focus, at one point in time. The diagram is two-dimensional and has two parts.

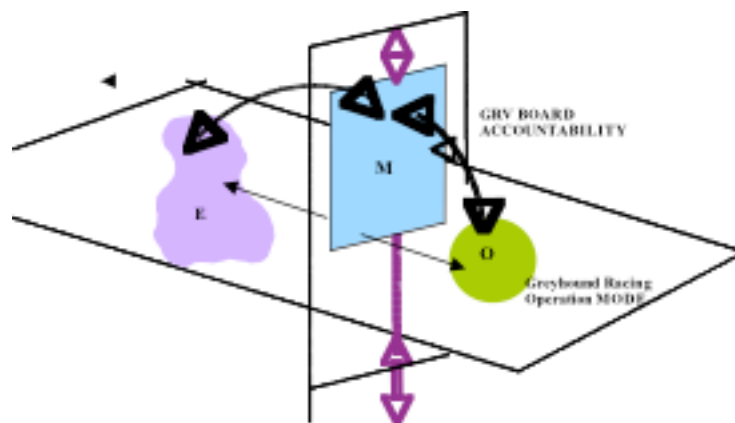


Diagram 7a: Part 1 of MODE

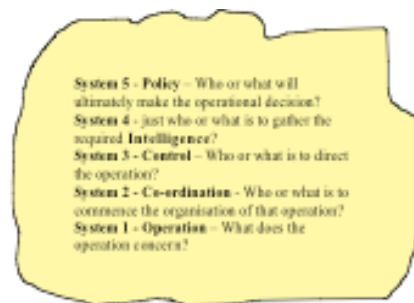
For the first part of the diagram, on the horizontal plane, the purple blob symbolises all information that comes to MODE in the form of intelligence from the ‘external’ environment and the green circular disc symbolises the compilation of information that comes from all of the ‘internal’ subsidiary parts of the GRV operation. On the vertical plane, the blue square symbolises the GRV Board accountability for the management of MODE at the particular point in time.

<sup>8</sup> Senior Management Team (SMT) comprises CEO and Clubs, Finance, IT, Marketing and Racing departmental managers

<sup>9</sup> Strategic planning at GRV is termed operation MODE (Managing Our Dynamic Environment).

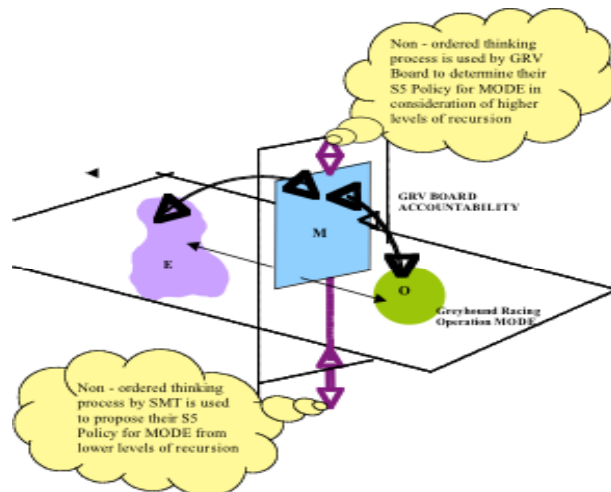
A reason for the two dimensional depiction in the first part of Diagram 7 is to get the SMT to think imaginatively, but quite seriously about the structure of the decision making processes that provide information as the MODE strategies are progressed. When this thinking occurs, questions such as ‘How do we arrive at decisions which influence strategy?’ ‘Who decides ultimate policy?’ and ‘Can our decision making processes be improved?’ arise and the need for a second, decision-making process part of Diagram 7 surfaces.

The second part of Diagram 7 is shown below as a nebulous version of Diagram 6. Here PICCO symbolises a non-ordered thinking process that might apply for any operation, at any hierarchical level of decision-making. In the most straightforward of cases, PICCO could be used to determine S5 Policy at lower levels of recursion on something like the purchase of stationary supplies, but this would not be an organisational strategic policy.



*Diagram 7b: Part 2 of MODE*

In relation to this lower SMT subsidiary level of recursion, the accountability of proposed SMT S5 Policy is then able to be assessed by the Board considering questions such as ‘Does this proposed SMT S5 Policy (received as Board S4 Intelligence) provide for the appropriate operational requisite variety?’ or ‘Has the SMT member been smarter than the situation they are managing?’ If the answer is in the affirmative, then this Board S4 Intelligence becomes Organisational or Board S5 Policy. If the answer is in the negative, then the intelligence is sent back for PICCO reconsideration, so that requisite variety for the operation may be ameliorated.



The whole of Diagram 6.7

*Holistic Diagram 7: Integration of the two parts, MODE and PICCO at GRV*

The yellow ‘call out’ notations are symbolic of the PICCO non-ordered thinking processes that occur at GRV. Presumably, some similar processes occur at the higher (Government) level of recursion.

### **Management diagram 8: PICCO recursion**

*Ecology is the branch of biology dealing with the relationships between organisms and their surroundings, including other organisms – Concise Oxford Dictionary*

Diagram 8 shows how information contributions to MODE can be interpreted to flow from both higher recursive levels (Government policy, relevant Acts etc.) and lower recursive levels (SMT, Clubs, participants etc.). And by employing PICCO as a non-ordered thinking process, GRV employees can gain a better understanding of how their management roles unfold in the MODE strategic planning process. Diagram 8 is designed to relate the use of PICCO for individual member of the SMT, the SMT as a collective and the Board from a hierarchical standpoint.

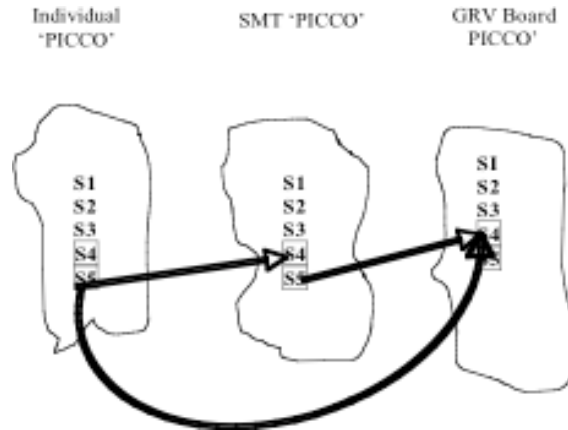


Diagram 8: PICCO Recursion

The bottom loop is shown to illustrate the possibility of highly specific information that might flow from perhaps an inquiry or consultancy, that is independent of the SMT, but this would be rare.

Issue	Approach	Theory base
Non ordered thinking process	PICCO	VSD Cognition Organisational behaviour
Stability of a system's internal environment despite the system's having to cope with an unpredictable external environment	Homeostasis	General Systems Theory
Language that you can make sense of	Transduction Encoding/decoding	Cognition
Hierarchical stacking of systems	Recursion	Set theory
Coping with variety	Being smarter than the situation being managed.	VSD/Cybernetics 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup> Principles of Organisation Ashby's- Requisite Variety Conant/Ashby - Residual Variety

Table 5 - words and phrases that have evolved from Diagram 8

### Management diagram 9: PICCO, subsidiary viable systems, recursion

*Different systems map onto the same model by sacrificing whatever variety is not needed for the purpose at hand – Beer (1974:49)*

The next six diagrams become more specific to the GRV strategic planning process and are applicable for higher levels of management. An upper (blue) and a lower (brown) level of recursion have now been added to the first part of Diagram 7 shown earlier.

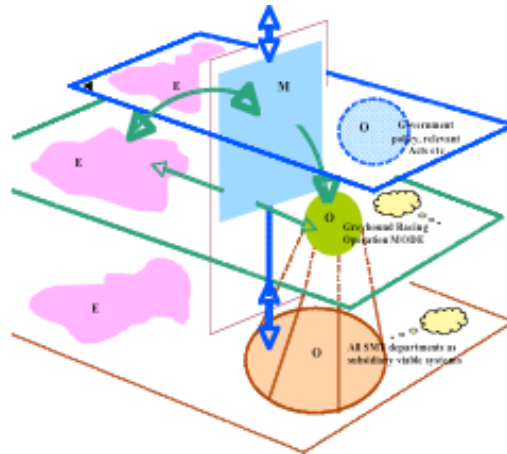


Diagram 9: PICCO, subsidiary viable systems, recursion

### Management diagram 10: Reduplication of a cybernetic system of regulation

*‘What we are doing is to reduplicate a cybernetic system of regulation recursively, that is over and over again, using the same components with appropriate variety adjustments – Beer (1974:42)*

Diagram 10, shows the contributions to MODE coming from the lower recursive levels (SMT, Clubs, participants etc.). This also occurs at higher recursive levels (Government policy, relevant Acts etc.).

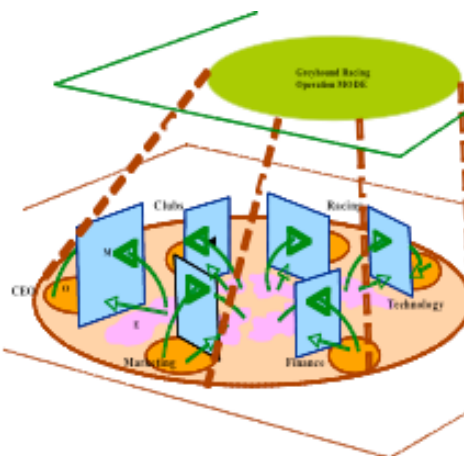


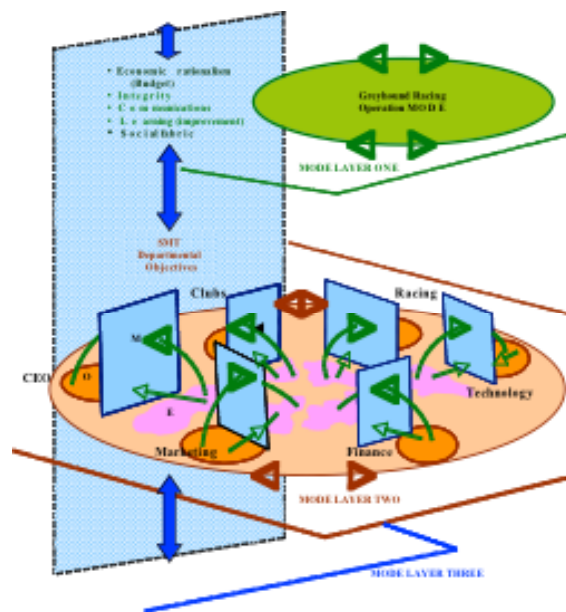
Diagram 10: Reduplication of a cybernetic system of regulation

## Management diagram 11: – An ever-spinning wheel

*Like a circle in a spiral, a wheel within a wheel, never-ending or beginning on an ever spinning wheel*

*– Bergman and Bergman*

As outlined in Diagrams 9 and 10, the SMT departments acting as subsidiary viable systems contribute significantly to MODE. At a layer of recursion one level down from MODE, the SMT operations sit side by side each other with their departmental objectives being regulated by the strategic requirements of MODE.



*Diagram 11: An ever-spinning wheel*

If the holistic industry strategy contained in MODE can be envisaged as being contained in the green disc in MODE layer one, that disc may ‘spin’ in either direction, and at varying speeds, depending on the need to attenuate or ameliorate variety arising from the whole operation of greyhound racing. It follows that when the green disc in MODE layer one spins, the recursive brown disc in layer two (and the six SMT departmental subsidiary viable systems) must also spin. Recursively, they use the same components, with appropriate variety adjustments at a MODE layer two, one level of recursion down.

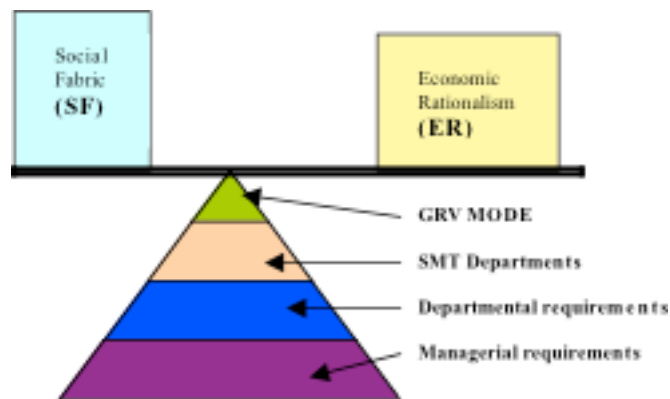
Information from MODE filters down and permeates each SMT department. PICCO formulated information from SMT departments also moves up to the MODE layer one as proposed strategic policies and down to lower management levels as defined

strategic policies. A ‘yo yo’ process is developed which leads to better MODE policy decisions emerging from contributions from each of the recursive layers.

### Management diagram 12: Strategic Balance

*Control is simply the process by which a system realises its vision and goals, in constant adaptation to the milieu into which it is embedded – Espejo (1996: 65)*

The twelfth management diagram is a simple depiction of how GRV sets out to control strategic balance in accordance with the cited Espejo, Schuhmann et al (1996) edict.



*Diagram 12 – Strategic balance*

At GRV, the principle aim of MODE is to maintain a delicate balance between Economic Rationalism and the Social Fabric required by the industry<sup>10</sup>. Integrity, appropriate communications and an organisational learning philosophy support that balance. These virtues are encapsulated in the first layer of MODE (designated by a green fulcrum). Using the same cybernetic components with appropriate variety adjustments, information then flows between the SMT departments (brown support) at layer two and MODE at layer one. Each SMT department then embeds the MODE virtues into a third support layer (Blue) as departmental requirements. Finally, each member of the SMT instils managerial requirements into their specific departments via a fourth (Maroon) support layer.

<sup>10</sup> As a legislated ‘semi-government’ authority, GRV has responsibility in upholding both the social fabric of the industry and accountability in a fiscal sense



### Management diagram 13: GRV hierarchy of systems

*The set of formal hierarchical roles in an organisation embodies a particular shared belief (paradigm) on how the opposing forces of integration and division are best arranged at a particular time – Ralph Stacey (1993:378).*

The various recursive layers within GRV that provide information to MODE via SMT department objectives, SMT departmental requirements and SMT managerial requirements can envisaged as a GRV hierarchy of viable systems.

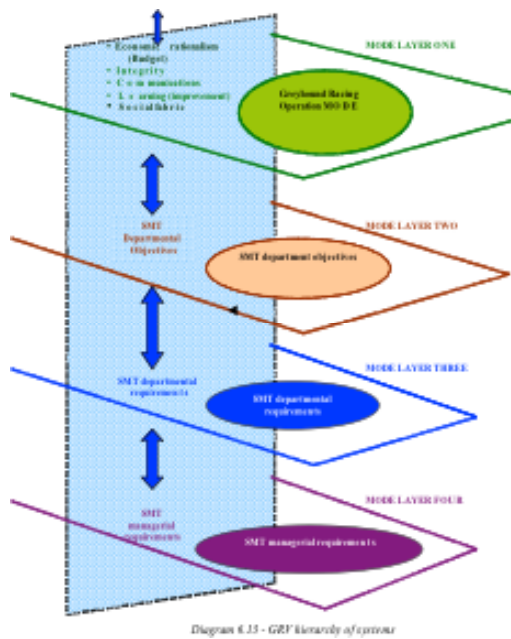


Diagram 13: GRV recursive levels

In line with Stacey (1993) the compilation of strategies within each SMT department then requires a formal documentation of processes with attention to appropriate variety adjustments.

### Management diagram 14: PICCO a theory-based emergent learning framework

*A play should give you something to think about. When I see a play and understand it the first time, then I know it can't be much good – T.S.Eliot*

The PICCO method came to be the glue that holds together the strategic planning process of this one organisation. However the learning which evolved in this instance does not entail a detailed elucidation of the theory-bases that underpin it, for all

employees. Thus for experienced AR practitioners, PICCO can be envisaged as an emergent action learning framework, that can be viewed as one and the same thing for all employees. Hence for the final three diagrams, the theory-based method PICCO is linked to emergent Action Learning frameworks.

The purpose of Diagram 14 is to refer the PICCO theory-based method back to an emergent Action Learning framework by way of a mirror image.

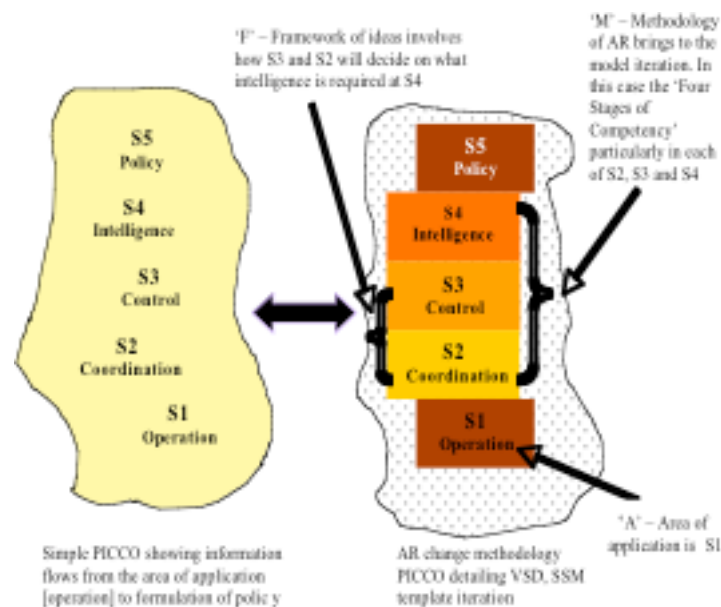


Diagram 14: Linking PICCO to Action Learning

On the left hand side of Diagram 14, PICCO is compressed down to what is its most rudimentary format, a simple non-ordered way to think while managing. Simultaneously, the right hand side of the diagram is a diagrammatical depiction of but one personal AR change method journey or emergent Action Learning framework. That framework emerged in the main through the consideration of work from Checkland (1991), Bateson (1973), Beer and Argyris (1982) But it has also included work and theory-bases attributed to others. A coming together of the PICCO method and the emergent learning framework is therefore shown as Diagram 15.

## **Management diagram 15: PICCO as a theory-based method in an emergent Action Learning framework.**

*We must not cease from exploration and at the end of all our exploring will be to arrive where we began and to know the place for the first time - T.S. Elliot*

Diagram 15 emerged from some reflective thoughts about how our work is inextricably linked to Beer's first principle of control; the controller is part of the system under control. The paper thus concludes with depictions that highlight how the entwined controlling roles contributed to the emergence of the PICCO AR change method. This reflection involves the consideration of the interwoven roles as the controller of GRV organisational process and also the controller of this AR change process. Further, an assessment of the role of the controller of this organization is best judged internally at GRV by reflecting on whether the organization is 'realising its vision and goals, in constant adaptation to the milieu into which it is embedded'. Espejo, Schuhmann et al.(1996: 65).

As the contextual systemic interaction of five components, PICCO generates order into the initial randomness of organizational behavior and flexibility into all five of the system components. PICCO thus uses a most basic format of VSD whereby the surfacing of local, sometimes tacit knowledge creates a sentient mechanism that is valuable in addressing complexity in the real world. PICCO simplifies the operative components of VSD by the articulation of questions that are animate and contextual. Finally PICCO, the distinctive way of thinking, adheres to the three fundamental tenets of management. The first tenet is becoming smarter than the situation being managed (Ashby). The second tenet is understanding that control is not only imposed onto an operation, it emerges from that operation (Beer). The third tenet is the principle of recursion where strategies and thinking are all contained within the next level. Diagram 15 is therefore a depiction of how the interconnected controlling roles contributed to the emergence of PICCO.

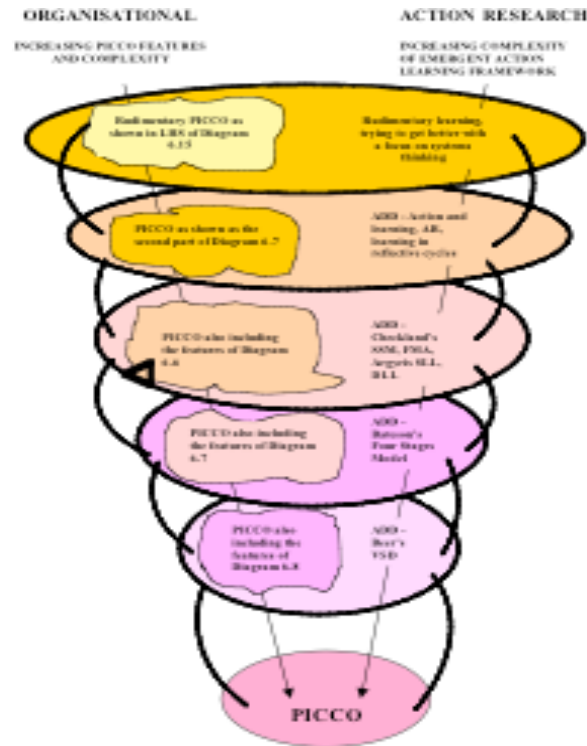


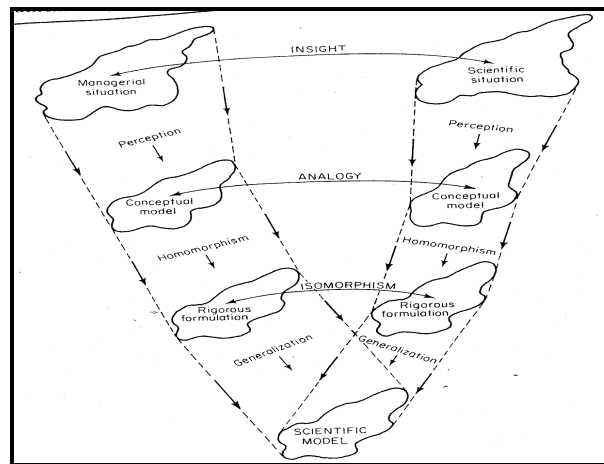
Diagram 15: PICCO theory in an emergent Action Learning framework.

### Management diagram 16: The linkage of VSD and emergent Action Learning frameworks.

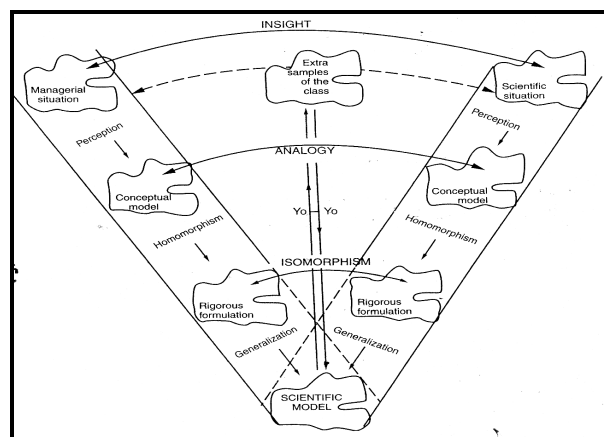
We do not under estimate the difficulties of linking scientific theory to social practice (Kast and Rosenzweig 1972; Emery 1981; Argyris, Putnam et al. 1985) however, our view is that the cybernetic foundations of Beer's work may be aligned with AR change processes and the pursuit of management learning and knowledge production. In AR, researchers are part of organisational 'learning-laboratories' [the controller is part of the system under control]. We thus accept that objective knowledge is impossible because researchers are always part of the context they study. However as an interpretive research methodology, AR may be further characterised by some common elements that appear in its methods, models and inquiry strategies.

Thus while Beer's account of 'scientific' modelling process does not prescribe the use of VSD, it does prescribe that the success of theory-based management methods is reliant on their application in action learning frameworks. We show this via the

development of Beer's (1966) original view on the nature of a scientific model, into Midgley's (2003) most recent depiction.



The nature of a scientific model. Beer (1966: 114)



Beer's account of scientific modeling (Midgley 2003: 272)

Hence in using Midgley's expression, a VSD (PICCO) has mapped a management method onto a firm. It is now up to others to test a second, third, and so on viable system against the scientific model – by the now classical criterion of falsifiability.

### 3. Conclusion

The paper set out to show how the development of the hybrid AR method PICCO, became the glue that holds together the strategic planning process of the organisation. The paper has demonstrated that the cybernetic foundations of Beer's work may

clearly be aligned with AR change processes and the pursuit of management learning and knowledge production. This 'distinctive way of thinking rather than a specific concrete subject' (Bateson 2000) has created a unique theory based AR change method for the organisation. To enable judgment on the success of this theory-based management method in an emergent action learning framework, will require an a further paper and as assessment of change in organisational equilibrium, the creation of knowledge in and of the organization and the designation of an AR process that is subsequently recoverable by anyone interested in critically scrutinising and hopefully repeating the research.

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