‘PLATO AND THE COCKTAIL PARTY’
Innovation and Knowledge Management with a Cybernetic Approach

By
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I ABSTRACT

The underlying idea of this paper is to demonstrate a paradigm shift in managerial thinking, from the mechanistic age to modernism and postmodernism, related to innovation and knowledge management from a cybernetic point of view.

An important part of this work is about demonstrating that the choice of topic is relevant for the author and his environment. The research is not concerned with symptoms but with underlying issues and causes. This is done by applying Soft Systems Methodologies and Qualitative Research, as well as drawing on the personal experiences of the author over the course of the two-year period of the Executive MBA at the Graduate School of Business in Cape Town as an important database. The emerging research question has as a result become a reflection of the author’s own situation, which has been influenced by the background of a mechanistic and hierarchical worldview.

The sense-making process (Part 2) presents and integrates multiple perspectives. It compares and contrasts the larger context of innovation and knowledge management with the literature, the view of practitioners and own experiences. The idea is to look critically at different philosophical ideas and new realisations in natural and social science reflected in cybernetics, as the expression of the dramatic changes of ages.

Semiotics and Cybernetics include most of the relevant subjects dealing with the increasing complexity of our world and promise to be valuable methodologies to understand the hidden potential of the most intangible asset of any organisation – knowledge.

Stafford Beer (author of ‘The Brain of the Firm’) has suggested a biological model called the Viable Systems Model (VSM) as a management model for complex systems. This thesis tries to answer the question whether or not cybernetics, and the VSM in particular, are valuable tools for the innovation and knowledge management process in organisations – as suggested by many followers of cybernetics.

The thesis provides an overview of how change away from hierarchic to heterarchic organisations has affected the management of knowledge and innovation, as we move toward postmodern systems without boundaries. The conclusion is that future
organisations will require a more multidisciplinary and networked approach to innovation and knowledge management, kept together by nothing more than ‘gravity’. The gravity is created by means of a creative culture and supporting environment, by taking the cybernetic approach to a more ‘molecular’, emotional and philosophical level. The basic feature of this work is the attempt to integrate scientific thinking with ethical, aesthetic and philosophical perspectives in both theory and practice.

II INTRODUCTION

The introduction describes the process of this work as well as the why and how of qualitative research. It also outlines the form of presentation.

The Process

“IF I HAVE SEEN FURTHER IT IS BY STANDING ON THE SHOULDERS OF GIANTS”

Isaac Newton

What I saw at the beginning of my managerial formation during the EMBA was a ‘gigantic mess’ and this required that I take a step back or stand on the shoulders of a giant and look from a distance. Ackoff’s definition of a ‘mess’ is ‘a system of problems’ that defies resolution simply by solving constituent problems’. Formulating the problem starts therefore with the collecting of information about the unstructured problem situation or ‘mess’. The deductive process of identifying important elements from it assists in formulating a relevant Question and Concern.

This work is about the management of innovation and the application of structures from a cybernetic point of view. It is also about the conflict between the people who innovate and the people who commercialise and administer innovation. It is, in a wider sense, about the management of knowledge and represents an attempt to conceptualise ideas of how the increasing amount of information and its complexity can be understood. The theme emerged from a personal situation as an individual and as a member of an organisation.

The thesis should certainly demonstrate the ability to collect and structure thoughts around a subject, but while it is written for others it is also a reflection and summary on the personal development level. My own experiences are an integral part of it, while further inputs are drawn from the literature and interviews with practitioners. Considerable emphasis is placed on the choice of literature and interviewees in order to reflect different views along with the managerial paradigm shift from the mechanicistic age to modernism and postmodernism.²

**Part A** summarises the personal experiences as an individual and in organisations resulting in a problem formulation which leads to a new question – the research question. **Part B** deals with the emerging research question and tries to answer how the innovative process can be managed within an organisation.

The style of presentation of the thesis makes it possible to skip over Part A and start directly with Part B. The two parts belong together and are linked through personal experience, but Part 2 can be read independently as a more general view of innovation and knowledge management.

The whole process should demonstrate the capability to deal with complexity and to create comprehensive and objective representations of analytical and synthetic skills. ‘The ability to spot the right problems and then formulate them correctly is the critical skill that all workers, managers, and top executives must have to compete successfully in the twenty-first century. Organisations that know how to think critically will dominate. Individuals who think critically will make better and wiser decisions in their lives.’³

The underlying research methodology has a qualitative character and is based on Soft Systems Methodology and Action Research. I will try to qualify this approach, as my focus is on interactions of people in organisations rather than their structures. This does not mean that structures are not important in organisations but rather that this thesis emphasises interactions, or, as Luc Hoebeke expressed in his book on work systems, “I prefer to work on issues worth exploration and intervention in a creative and thus profoundly human way. Why people work, how they deal with the tension of belonging to and working in different work systems, how they cope with the dilemmas of destruction

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² Modernism according to the Oxford Dictionary: Modern ideas or methods in contrast to traditional ones/Post-Modernism: Relating to a style of art, architecture, etc. that reacts against modern tendencies
³ Preface of ‘Smart Thinking in Crazy Times by Ian Mitroff (Handout EMBA 3, Module 6)
and creation, life and death at work, how they express their sexuality in work, these have much more impact on their life, on the tools they design and use and on the fruits of their endeavours than management and organizational aspects. Somewhere organization scholars got their priorities wrong when they started to focus primarily upon organizations, their structure and their management instead of upon meaningful work.”

Organisations are people and issues turning mainly around ‘soft issues’. But soft systems problems are often experienced as ‘fuzzy’ and are more difficult to grasp than empirical data. ‘This phenomenon of being muddled is a natural, and sometimes necessary, part of the overall process. The important part of being in a muddle is to recognize it and to work to tidy it up.’

**Action Research and Soft Systems Methodology**

As the theme of this thesis is related to interactions of human beings and society in a broader sense, it is action research that can achieve a “warranted assertion or ability to mount evidence to support the conviction, at least for the moment.” Action research, which originated in the work of Kurt Lewin in the late 1940s, has traditionally been used for research of complex social and psychological processes but became more important in organisations. As a type of qualitative research it can indeed create the required validity, and invites conscious learning from the experience. ‘Checkland and Holwell call action research that emphasises this aspect ‘interpretive action research.” Interpretive action research makes a clear virtue of the ability of the researcher, and the research process itself, to influence the situation being investigated.” It can be regarded as a process of several learning cycles. Most of the tools in the process of inquiry are taken from Soft System Methodology (SSM), which was developed by Peter Checkland and colleagues. SSM is a non-numerical systems approach to diagnosis and intervention. Checkland defined inquiry as a seven step-process, and this serves as a framework for this thesis:

1. The researcher is immersed in the problem situation.
2. The problem system and their immediate context are defined.

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3 John Devey, 1966
5 Peter Checkland, 1981/1992
3. Root definitions of the relevant systems, comprising the essence of the systems, are defined.

4. Conceptual models of systems, intended as improvements, are developed.

5. The conceptual models are compared with reality.

6. Feasible and desirable changes are identified.

7. Action is taken to improve the situation.

Action research is ‘about action to bring about change in some community or organisation or program and research to increase understanding on the part of the researcher or the client, or both (and often some wider community)’.\(^9\) Bob Dick, a promoter of action research, writes that a need for responsiveness is one of the most compelling reasons for choosing action research. Qualitative research – and this is not to disqualify quantitative research – can offer more options in a social context.

There should be self-interest in a thesis, and in mine it is about creating change to my approach to innovation. It is a fact, unfortunately, that the amount of work that goes into a thesis does not mean that it attracts many readers. It should, of course, also generate new insights for a potential audience.

**A SCQARE Review**

The thesis process is written as a SCQARE Analysis (outlined in Figure 1), a structured approach and description of the actual situation (S), the concern (C), the question (Q), the answer (A) and the rationale (R) behind it. An evaluation (E) is performed at the end of each process, looking at the relevance, utility, validity and ethical content of the findings as a sort of checklist.\(^10\)

The reader is ‘walked’ through the SCQARE loop twice, first in the problem formulation, which ends with a new concern and question, and then in the process of finding further explanations and solutions for the problem (concern).

**Part B** of the thesis deals with the concern and question resulting from the problem formulation, which emerged from the ‘mess’. A collection of literature, interviews with relevant people and own experiences forms the rationale for the answer. This ‘final’ answer does not claim completeness but should offer some insights into organisational

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cybernetics and its possible applications in innovation and knowledge management. It is intended to serve as a ‘road map’ for my own personal management development.

Figure 1: Process Road Map
PART A

PROBLEM FORMULATION

The problem formulation is a very personal aspect of the thesis and is an attempt to enhance the relevance of the work for the author himself. It is essentially an analysis of two years of private and organisational life, with the iterative process of extracting the problem of whatever has obstructed or helped in the development toward a desired state. This analysis reconstructs the author’s individual and organisational situation and problems down to their roots. This is a necessary process in order to explore possibilities for improvement.

As previously mentioned, innovation and knowledge management emerged as a central aspect of the thesis. Part 2 is comprehensive in itself, so the reader can choose to move directly to this more general view of innovation and knowledge management.

CHAPTER 1:

METHODOLOGY

The problem formulation had to be relevant for the individual and organisational situation. To extract the essential elements out of a two-year experience required a particular approach to the processing of mainly non-empirical data.

1.1 Pragmatism
The American philosopher Charles Saunders Peirce defined the term ‘pragmatism’. Pragmatism determines the modes of reasoning used in the construct of this paper. The doctrine states that:

‘No object or concept possesses inherent validity or importance. Its significance lies only in the practical effects resulting from its use or application. The “truth” of an idea or object, therefore, can be measured by empirical investigation of its usefulness. The test of the truth of a proposition (confirming or denying something) is its practical utility; the
The purpose of thought is to guide action; and the effect of an idea is more important than its origin'.

Peirce’s central contention is that knowledge is an activity. It is the mapping of an idea to relevance, which takes us further. Weick has expressed this idea in his own way: ‘The fact that maps animate managers, not the map itself, is what imposes order to the situation’.

The application of intelligence is primarily evaluative, and is aimed at achieving understanding. Knowledge consists of valid explanations. In his first important paper ‘How to Make Our Ideas Clear’ (1878), Peirce argued that to understand a term we should ask ourselves what difference its application would make to our evaluation of our problem-situation, or of a proposed solution to it. That difference constitutes the term’s meaning.

Peirce then defined three distinct elements that make up three modes of reasoning:

- A Rule: A belief about the way the world is structured, which in this dissertation, is the inductive process starting with the data from the Position Papers, Critical Incidents and Action Research Projects resulting in a problem theory (Causal Loop Diagram).

- A Case: An observed fact that exists in the world, or the hypothesis about how I act and behave in my organisational environment according to the problem theory.

- A Result: An expected occurrence, given the application of the Rule.

What we are actually trying to achieve is to notice an undesirable result. We are looking for its cause in our knowledge or the structure of the situation and testing whether we have found it. The process of doing this is called analytical problem solving and will take the proposition from the collected data (Critical Incidents, Position Papers, Action Research) through a sequence of abductive, deductive and inductive reasoning, called the ‘Pyramid

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12 Karl Weick, ‘Cartographic Myths’, from The Story of Philosophy by Bryan Magee, Dorling Kindersley, 1998
14 Three Modes of Reasoning, Hand out Module 4, System Thinking by Prof T Ryan
15 Theory formulation from 50 module lessons, the literature and the workplace
16 Comparison of espoused theory and theory in action from the inter-modular logs of 10 critical incidents in real life
17 Qualitative and quantitative action research in the work place
Principle’ (see below). This process is similar to Charles Handy’s ‘Wheel of Learning’\(^{18}\) (Figure 2): Question → Theory → Test → Reflection → New Question and so on…).

![The Wheel of Learning](image)

**Figure 2: The Wheel of Learning**

1.2 The Pyramid Principle

The ‘Pyramid Principle’\(^{19}\) provides a useful structure in terms of a ‘project planning’ tool for the problem formulation process (Figure 3).

**Abduction** (Figure 3) is the process whereby an explanation or hypothesis is generated around the questions of how, what and why problems in individual and organisational management issues have developed; a plausible explanation (answer) for a phenomenon.

**Deduction** (Figure 3) is the revision process of the hypothesis, by drawing information from the literature serving as theory to explain how, what and why happened in connection with the individual and organisational management problems.

**Induction** (Figure 3) is what drives learning and improvement by comparing the resulting divergence.

The prospect value of this exercise is to achieve a better understanding of an important issue of individual and organisational management.

I decided to make two main groups prior to the analysis of my data in order to make the amount of information more manageable. The problem formulation is therefore initially

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\(^{18}\) Charles Handy ‘Wheel of Learning’, *The Fifth Discipline Field book*, Ch. 8, 1999
separated into the **individual role in management** and the **organisational management**. The final problem formulation attempts to combine the two aspects into one research question.

The data from the Critical Incidents,\(^\text{20}\) Position Papers\(^\text{21}\) and Action Research Learning Projects\(^\text{22}\) form the mess (1) from which variables emerge through a deductive process of reasoning (2). The data selection represents the ‘**what**’ in the Theory Development Process. The results of the process of clustering the data into groups are the variables (categories) of a problem theory (2).

**Figure 3: Process of Theory Generation**

\(^{19}\) Barbara Minto, *The Pyramid Principle: Logic in Writing and Thinking*, Minto International Inc., 1982
\(^{20}\) Critical events and experiences that influenced us as EMBA students on a private or organisational level
\(^{21}\) Papers about building personal and organisational theories regarding issues discussed in the MBA modules
\(^{22}\) Research done in the organisations of the EMBA students
The Interrelation Digraph (ID) and the Causal Loop Diagram (CLD) determine and describe the causality between the variables. The ID describes the ‘how’ (3), the CLD the ‘why’ (4). The strength of the variable relating to cause and effect, as in the Interrelation Digraph (ID), define the starting point and end point of a Causal Loop Diagram,\(^\text{23}\) which focuses on the variables and their behaviour.

The next phase is about making use of multiple perspectives. This requires the input of supporting or conflicting views from multiple paradigms, archetypes and the literature (5), leading to a more critical reflection on the resulting CLD or Problem Theory (6).

**CHAPTER 2:**

**SITUATION**

This chapter highlights one of the main aspects of this work, namely the shift in thinking that has taken place in all disciplines from the mechanistic age to postmodernism. Later is just an expression for what is happening now and in the near future, and is not intended to describe a shift to esotericism.

**2.1 Change of Ages**

We find ourselves in a change of age – the transformation from the systems age to the age of social systems and communication age. Russell Ackoff explains ages: ‘Despite the role our worldview plays in our understanding of reality, few of us are conscious of the set of assumptions that forms this view. We absorb it by osmosis in the process of acculturation, of growing up. In fact, a shared worldview is the cement that holds a culture together, and it characterizes what historians call an age.’\(^\text{24}\)

Ackoff’s description reflects my own experience as a medical doctor in the transformation of a scholastic or mechanistic worldview to a more holistic understanding of medicine. The simple anatomical representation of the body has shifted to a more systemic understanding of the complex coherence of body and mind.

\(^{23}\) A variable influences another variable by an action:  \(A \rightarrow B\), i.e.  \(A\)  increases  \(B\)

\(^{24}\) Russell L. Ackoff, ‘From Mechanistic to Social Thinking’, video summary handout of the GSB/EMBA3
2.2 Personal Paradigm Shift
My background is medical – I am a qualified physician and specialist in emergency medicine. I studied the human body and trained for 12 years to think in terms of systems and to explain a variety of illnesses. Systems thinking in internal medicine is complex, and the predominant strategy is still one of ‘treating symptoms’ of malfunction. Internal medicine’s emphasis is on the analysis of the system and not on its cohesiveness. I think, retrospectively, that my professional development was to a certain degree a capitulation to the complexity, which I encountered in the field of internal medicine. I moved to a more interventional domain where a Napoleonic strategy of ‘hitting hard and quickly’ had more appeal to me. Working in intensive care medicine and on board an emergency helicopter gave me the confidence to act on an event level where strategies are based on a strong cause and effect relation. This mechanistic reasoning seemed to offer more contentment than the complexity of a cancer patient. One can immediately see the effect of a milligram of adrenaline.

My medical career took me through several hierarchical levels. I always saw myself as a practical person and decided not to get more involved in academic medicine and to leave the hospitals. I am surprised to find even more complexity out here, but of a completely different nature.

2.3 Organisational and Social Paradigm Shift (Figure 4)
This paradigm shift has been translated into a managerial or organisational/social context. Machine-age thinking has moved into systems-age thinking, with its modernistic view of organisations – as Stafford Beer proposed with his Viable Systems Model (a functionalist’s system approach).

We find ourselves at the dawn of the social systems or communication age, where even the boundaries of systems are questioned. Postmodern ideas are related to cohesive or gravitational forces, which keep our organisations together. Interpretive and emancipatory system approaches reflect these forces quite well. The explanations might well become more mystical in a time of uncertainty where we tend to realise that we are floaters in space and time.
This paradigm shift is also reflected in the management literature, where the focus has moved from ‘leading’ to an integrative learning process of organisations.

### 2.4 Philosophical Paradigm Shift

The belief in cause and effect, so central to mechanistic-age thinking, presumes that we have no freedom of choice. Yet, we do not believe this. This dilemma has occupied philosophy not only recently but for 300 years until 20th century philosophers like Jean-Paul Sartre placed the freedom of the individual first. We do have choices – but how can we make them holistically (systemically) and with a shared understanding?

The machine age has come to an end because its fundamental assumptions were undermined philosophically by existentialists such as Kierkegaard, Husserl and Heidegger, as well as by pragmatists such as Charles Sanders Peirce, and scientifically and mathematically by Albert Einstein.

What Existentialism and Pragmatism have in common is that they apply systematic analysis of conscious experience of the world and our integral part of it. Existentialism was one of the most influential forms of philosophy in the second half of the 20th century while the founder of existentialism is thought to be Kierkegaard (1813 – 1855). He believed that ideas are just crutches that we invent in order to be able to think and to connect with the world. If we want to understand the world we should first find ways to understand our unique individual entity. Hegel then put the individual in the context of society. ‘Hegel had seen the individual as fulfilling himself only when absorbed into the larger and more abstract entity of the organic state, whereas in fact, said Kierkegaard, it is the individual himself who is the supreme moral entity, and therefore it is the personal, subjective aspects of human life that are the most important to our consciousness.
Husserl chose a new way of looking at our ‘examination of consciousness and its objects’ called phenomenology25 – a systemic analysis of experience in which everything is a phenomenon and the sum of phenomena is our experience, or the reality in which we live. Phenomena are constructs of our own classifications and philosophy and should therefore contribute to a better understanding of how the mind develops these classifications.

Pragmatists did not accept any fundamental truths as a basis of reasoning. A process of learning can create new useful facts and laws, which will never be better than an approximation of the truth as an emerging outcome. ‘The ideal, truth, if approached as a high degree of purposefulness is achieved when each person becomes able to realize his or her desires.’26 Again, this train of thought is in line with Weick’s statement ‘The fact that maps animate managers, not the map itself, is what imposes order to the situation’.27

On the scientific side, Einstein contributed to this philosophical revolution by moving the world into a third dimension. Einstein proved that the Newtonian model was inaccurate and with it the way of linear thinking. We will never understand a system if we do not consider the complex gravitational forces of the universe, which, as Leibniz proposed, could be a model for our world system or microcosm.

It is important to note that Aristotle and Plato developed a sort of systemic philosophy by addressing the unity of the body and soul and between individuals and the state. However, it was Plato who first used the word ‘kybernetes’ – meaning ‘steersmanship’ through some form of regulation, control and communication.

We find their ideas again in Kant and Hegel. Emmanuel Kant promoted reason as the ultimate measure of things (i.e. categorical imperative). But he also realised the need for a holistic or systemic understanding of life, despite the limitations of the human mind created by categories of thinking. He knew that even categories of thinking are subject to change.

Friedrich Hegel’s approach to the ‘whole’ was more advanced through his explanation of change as a dialectical process of creating a thesis and then an anti-thesis in which

27 Karl Weick, ‘Cartographic Myths’
elements of both are contained in the synthesis. The synthesis itself has new conflicting elements, triggering a new thesis and anti-thesis etc., a process that will eventually take us closer to the ‘absolute’, or a more holistic understanding of life.

Because of a permanent change of our phenomenology, the transcending value of moral consideration, it is decision-making that is the most important human activity: ‘it is through the choices we make that we create our lives and become ourselves.’\textsuperscript{28}

So, if we want to understand life, it can only be understood backwards – but we have to live it forwards.

CHAPTER 3: CONCERN

An increasingly chaotic and global environment has created new challenges and requirements for managers and leaders. Managing change more rapidly has become a question of survival. But we often seem to deal with symptoms instead of looking for the underlying causes. The result is that we get stuck with conflicts and failures that become serious obstacles instead of being a source of solutions. Management theories are subject to change and they have to be reviewed in moments of uncertainty where spotting the right problem is one of the most relevant concerns.

CHAPTER 4: QUESTION

What kind of problem formulation about individual and organisational management issues can be extracted from my two-year Executive MBA Programme that is relevant for the concern (see above) and addresses the underlying causes and not the symptoms? Does the problem formulation then provide a new specific question and theme that is worthy of

\textsuperscript{28} from Brian Mage, ‘The Story of Philosophy’, Dorling Kindersley, 1998
further research and can bring a new angle to the individual and organisational management?

CHAPTER 5:
RATIONALE FOR THE PROBLEM FORMULATION ABOUT THE INDIVIDUAL ROLE IN MANAGEMENT

The rationale for the answer is the body of evidence from the personal experiences for the model, which should describe the problem as accurately as possible. Soft System tools are applied to structuring the raw data and to identifying the essential elements.

‘WE ARE OURSELVES THE ENTITIES TO BE ANALYSED’
Martin Heidegger

5.1 Methodology: The Critical Incidents as Data
The following section concerns the ‘what’ or ‘which factors (variables, constructs, concepts) that should logically be considered as part of the explanation of the social or individual phenomena of interest.’ The critical incidents of all inter-modular periods were screened for the key issues. This exercise is not free from subjectivity but surfaces important issues and problems in my daily management practice (see Appendix)

Dissection of every critical incident into sub-elements and the selection of several aspects, instead of taking a main theme from single incidents, provided a richer picture of the individual management problems. This process also allowed the elimination of a certain degree of subjectivity. Focusing on issues rather than overall interpretations is based on the assumption that out of chaos a new form of order will emerge through a process of deduction and induction. The implication is that a maximum of freedom and complexity has first to be allowed.

5.2 The Immersion Phase: Affinity Diagram
The affinity diagram (see Appendix) is about finding a pattern in the messy situation of personal issues, which can be clustered into some new coherent groups.
The critical incidents included problem situations and also situations where proper use of management behaviour had a favourable outcome. The headings consequently have become ambiguous in terms of the notion of a problem formulation. A possibility is to ‘square’ the positive notions into a problem formulation in order to avoid elimination or neutralisation of certain variables (mathematically i.e. \((+1) + (-1) = 0 \rightarrow (+1)^2 + (-1)^2 = 2\)).

Most issues that were exemplary in one situation were problematic in another – they do consequently often represent a problem. Nobody can claim that he/she is free of failure in all situations. The resulting model therefore points to a failure approach in order to visualise possible lever action.

The trigger question for the critical incidents was: ‘What were (and could have been) individual managerial problems in the critical incidents’?

The heading of each group serves as a variable in the further problem formulation process (Interrelationship Digraph and Causal Loop Diagram). These are summarised in Table 1.

Table 1: Headings of the Affinity Diagram

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pushing vs. Pulling</td>
</tr>
<tr>
<td>2. Espoused Theory vs. Theory in Action</td>
</tr>
<tr>
<td>3. Control vs. Cohesion</td>
</tr>
<tr>
<td>4. Lack of Philosophy in Management</td>
</tr>
<tr>
<td>5. Conflict</td>
</tr>
<tr>
<td>6. Dilemma of Two Worlds</td>
</tr>
<tr>
<td>7. Ethical Dilemma</td>
</tr>
<tr>
<td>8. Lack of Mindfulness and Dialogue</td>
</tr>
<tr>
<td>9. Haste vs. Slowness</td>
</tr>
</tbody>
</table>

5.3 The Structuring Phase: The Interrelationship Digraph (ID)

5.3.1 Methodology

This is about the ‘how’, or ‘how the relevant factors or variables are related to each other.’\(^{29}\) The interactions of the Interrelationship Digraph describes causality reflected by the direction of the arrow (Figure 5).

\(^{29}\) T. Sekiguchi, Theory Development, Handout EMBA 3, Module 6
Figure 5: Interrelationship Digraph

5.4 Sense Making Process: The Causal Loop Diagram (CLD)

5.4.1 Methodology
This is about the ‘why’, or ‘what are the underlying psychological or social dynamics that justify the selection of factors and the proposed causal relationship.’31

The variables with the most outgoing arrows are the driving forces, while the variables with the most incoming arrows represent the effect.

The CLD (Figure 7) is a rearrangement of the ID into a dynamic cause-and-effect framework. The design of the CLD should not violate the relationship defined in the ID. The links remain while the ID is rearranged between the variables with the most outgoing arrows (driving factors) and the effected (most ingoing arrows) variables by identifying main flow patterns, which often become obvious as a geometric pattern (Figure 6). This is more of a visual conceptualisation process – the sense making of the pattern comes later.

30 T. Sekiguchi, Theory Development, Handout EMBA 3, Module 6
when eliminating unnecessary (multiple) causality relations and looking for reinforcing loops. The result is the matrix of theory on individual management issues.

Table 2: Driving Elements

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ARROWS OUT</th>
<th>ARROWS IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Philosophy in Management</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Lack of Mindfulness and Dialogue</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Dilemma of Two Worlds</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Ethical Dilemma</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Pushing vs. Pulling</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Espoused Theory vs. Theory in Action</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Control vs. Cohesion</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Haste vs. Slowness</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Conflict</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

5.4.2 The Story of the CLD (Step by Step)

Labelling the relationship of the variables in the CLD (Figure 8) tells an emerging ‘story’ about the individual managerial issues, which are important to me. It is a story of conflict – the dominant element of my critical incidents. The model, or theory, shows that conflict is...
not a starting point but a result. Two powerful reinforcing loops amplify managerial weaknesses to such an extent that conflict appears an almost logical consequence.

The building of a philosophical fundament seems to have become an important key for my further management development. Plato said, “Philosophy begins in wonder”, so, I ask, how can we be mindful if we ignore the miracle of space and time around us. Philosophy questions what we normally take for granted. Not striving for concepts about life, together with an inability to be mindful and to communicate with others in a form of dialogue, appears to be a recipe if not a guarantee for creating conflict.

Figure 8: Problem Theory of individual management

It also seems to invite situations where one gets drawn into a spiralling dilemma of different worlds of meanings, ethics and swamps full of espoused theories, which do not match anything related to action. Worst of all, this will most likely violate physical principles and create pressure – thus resistance instead of motivation – and pull people to
produce extraordinary results. Overly controlling and haste is the right chemistry for conflict in the second reinforcing loop and could eventually result is an almost 'cosmologic' (Weick 1993) event in which we would often find a breakdown of sense making.

5.5 The Reflection Phase
The involvement of multiple perspectives brings in supporting or conflicting views from multiple paradigms, archetypes and the literature. This leads to a more critical reflection of the resulting CLD or Problem Theory and of the accuracy of the assumptions made.

5.5.1 The Use of Archetypes
Jennifer Kemeny, Michael Goodman and Peter Senge have developed eight archetypes, or commonly seen behavioural patterns. ‘They should help us to fill in gaps in our thinking, and to tell fuller, more complete stories. Archetypes are accessible tools with which managers can quickly construct credible and consistent hypotheses about the governing forces of their system.’32

Three of the eight archetypes matched with the model in certain regards. They provided more insight into the problem model but did not change it significantly. This can be considered as an indication of the robustness of the model.

The ‘Reinforcing Loop’ fits with conflict as a result of several precursors. Almost any factor in the reinforcing loops can lead to an exponential growth of a situation towards conflict. The source of conflict can therefore be anywhere in the problem theory CLD and does not necessarily take a ‘classic route’ through the whole model from the bottom to the top (Figure 9).

32 Peter Senge, The Fifth Discipline Fieldbook, Nicholas Brealey Publishing, 1999
‘Limits to Growth’ (Figure 10) is like running into a brick wall. Growth suddenly levels off and increasing the pressure seems to create more resistance from the system, thus preventing improvement. This archetype is concerned with organisational issues, but can also be used as a situational or individual metaphor. It highlights an almost universal principle of life and is probably the dominant reinforcing loop of the model in my personal management development. Pushing hard will increase the resistance. Ohm’s Law describes this relation in physical terms by stating that ‘the electric current flowing through a metallic conductor is directly proportional to the potential difference between its ends’ as $R = \frac{V}{I}$, where $R$ is the resistance, $I$ the current and $V$ is the potential difference (or pressure).

‘Shifting the Burden’ is an archetype where three patterns exist side by side. ‘The reliance on the short–term fix grows stronger, while efforts to fundamentally correct the real problem grow weaker, and the problem symptom alternately improves and

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33 “Ohm’s Law,” Microsoft® Encarta® 98 Encyclopedia. © 1993-1997 Microsoft Corporation. All rights reserved.
deteriorates…’. This is exactly what happens in the CLD, where quick-fix measurements drag the wagon deeper into the mud (i.e. acting with more haste or pushing harder).

5.5.2 Multiparadigm Perspectives
Gioia & Pitre (1990) realised that the single use of research is inaccurate in complex situations and so proposed multiparadigm perspectives. ‘A paradigm is a general perspective or way of thinking that reflects fundamental beliefs and assumptions about the nature of organisational phenomena (epistemology), and the nature of ways of studying those phenomena (methodology).’ The ‘interpretative paradigm’ seems applicable for the situation, which results in conflict. It is based on the view that people socially and symbolically construct and sustain their own organisational realities – similar to existentialism. ‘The goal is then to generate descriptions, insight, and explanations of events that a system of interpretations and meaning, and the structuring and organizing processes, are revealed. This way of theory building is inductive in nature and the process is iterative, cyclical, and non-linear.’ Looking at the CLD from this angle has been confirmative and reassuring of the way of looking at my individual problem formulation.

5.5.3 Going Deeper Approach
The Going Deeper process is a four-step model for taking a deeper and critically reflective look at underlying issues in order to eventually create an intervention strategy. Later will not be part of the problem formulation process.

Purpose of the System:
The problem theory, as expressed in the CLD, reflects on the traps for individual managerial improvement. It defines the tension between vision and current reality and thus can serve as an instrument for interventions.

Mental Models (Figure 8):
A way of surfacing mental models is to inquire about assumptions regarding the reasonable action in the proposed CLD. What are the beliefs and assumptions and the rationale and thinking lets the system persist as it is? The preliminary model emphasises a failure approach. Not all of my critical managerial experiences ended in conflict. However,

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34 Peter Senge, The Fifth Discipline Fieldbook, p 123, Nicholas Brealey Publishing, 1999
35 T Sekiguchi, Theory Development, Handout EMBA 3, Module 6
36 T Sekiguchi, Theory Development, Handout EMBA 3, Module 6
destructive or ‘cosmological’ conflicts do distract from the purpose of a business and are real-time problems for any business.

_Larger System:_

It is important to be aware of the situation of a problem in a larger system in terms of a historical context in order to avoid just looking at a situation like a snapshot in time.

I did look at the critical incidents again and selected issues related to conflict situations with a negative effect and other situations with a more positive outcome over the period of two years or five inter-modular periods. The behaviour was put into a ‘Behaviour Over Time Graph’ (Figure 11) or BOT graph. Obviously still subjectively selective, I registered fewer conflict situations towards the end of the course. This is possibly a result of new competencies learned during this period.

![Figure 11: Conflict BOT](image)

\[\text{Figure 11: Conflict BOT}\]

_Acknowledgment of Personal Responsibility:_

It is fairly easy to make other people responsible for all the troubles. The model does provide an important insight into the mechanisms of conflict. It shows that I allow conflict situations to happen even if I refuse to accept responsibility for them.

### 5.5.4 Input from the Literature

The main categories of the previous CLD serve as headings for a literature search, which had to be limited somehow and therefore includes articles and books used during the EMBA. These inputs were screened for complementary elements to the problem theory.
Mindfulness and Dialogue:
‘When people discuss confusing events they sometimes think they have to sell or convince others of the validity of their own perspective and fail to listen respectfully and attentively to what others say. When this happens, advocacy replaces analysis; and both richness and the capability to discriminate important details that help restore and resolve problems are lost.’ (K.M. Sutcliffe, *Leading with Resilience in the Face of the Unexpected*, Handout Module 5, EMBA 3).

The impact of jumping up the ladder of inference: ‘The own conclusions seem right to us. People can and do reach different conclusions. When they each view their own conclusions as obvious, they don’t see a need to say how they reached them. People see the different conclusions of others as obviously wrong, and invent reasons to explain why others say things that are obviously wrong. When people disagree, they often hurl conclusions at each other from the top of their respective ladders, making it hard to resolve differences and to learn from one another.’ (*The Ladder of Inference*, Pegasus Communications, Handout from Dave Bond, EMBA 3, Module 4)

Jumping the ladder has not been a part of my critical incidents expressively but seems to be a problem in my way of coming to conclusions. I have realised this myself by the outcome of situations, which turned out to be completely different to my anticipation and because I was told by others. Jumping the ladder of inference should be a part of my model and has been integrated in Figure 10.

Espoused Theory vs. Theory in Action and Mental Models:
Our interpretation and reaction in a given situation are often programmed. ‘Few people are aware of it and even fewer people of the maps they use. A lie is the gap between espoused theory and theory in action, which we consciously know of.’ (C. Argyris, *Overcoming Organizational Defences*, 1980)

We cannot see how another person experiences a certain situation. ‘Our attention is that, although our own actions generate much of the knowledge we receive from others and from the environment, we are rarely aware how our actions skew what we know. The simple fact is that we are rarely aware of our own behaviour and the reactions of others as we act. Our attention to what is occurring at any given moment in our lives is that the data
we have about the outside world is ordinary about the past, not the present, drastically unsystematic and incomplete and rarely tested for validity on the spot’ (D. Fisher, W. Torbert, *Personal and Organisation Transformations*, McGraw-Hill, 1995).

Not only lack of mindfulness but strong mental models can let us jump to conclusions. Mental models should be part of my model and have been added in Figure 10.

**Control vs. Cohesion:**

‘Control is often equated with submission, dictatorship, rules, and punishment. Such an approach restricts the degree of freedom’ (K H Spencer Picket, ‘The Manager’s Guide to Internal Control: Diary of a Control Freak’, Vol. 37 No.2, 1999)

**Unproductive Conflict:**

Conflict that eats away will turn the focus of an organisation inward and will lead the organisation to neglect its engagement with the environment. Disputes become personal, and the creative process breaks down. Generally, managers have two responses to this phenomenon. On the one hand, managers who dislike conflict – or value only their own approach – actively avoid the clash of ideas. They hire and reward people of a particular stripe, usually people like themselves. Their organizations fall victim to what we call the comfortable clone syndrome: co-workers share similar interests and training, everyone thinks alike.’ (‘Putting Your Company’s Whole Brain to Work’ by Dorothy Leonard and Susaan Straus, *Harvard Business Review*, July – August 1997)

**Chaos Theory and Complexity:**

An outcome in every model with a complex causality is unpredictable but not necessarily one of utter confusion but rather one with a pattern. ‘Nevertheless, coherence emerges in the vast complexity of communicative interactions across enormous numbers of local situations because of the intrinsic capacity of self-organizing interaction to pattern itself coherently. That this is possible is demonstrated by the work of some complexity scientists. However, the patter of this concern is not predictable in advance and it involves both destruction and creation, both stability and instability.’ (Ralph D. Stacey on conflict in *Complex Responsive Processes in Organizations– Learning and Knowledge Creation*, Routledge, 2001)
CHAPTER 6:
THEORY ABOUT THE INDIVIDUAL MANAGEMENT PROBLEM

The theory is an answer according to the SCQARE Framework. The Answer, in this case, is the formulation of the individual management problem and includes the new insights from the reflection phase.

The Model or Theory (Figure 12) about the genesis of conflict appears robust but requires the integration of ‘jumping the ladder of inference’.

Figure 12: Problem Theory about Individual Management

The problem formulation, as it stands, opens unexpected ways of changing my individual management approach. It shows a way of avoiding ‘cosmological’ events instead of becoming an expert in dealing with them and in managing them. It is important to differentiate ‘cosmological’ events from healthy dissent. The latter is an important element
of change and the ability to learn and must be craft-fully [sic] stimulated. Figure 10 is my final CLD and theory about problems in individual management.

Triangulation, which is the circular process of using different sets of data, helps to describe the phenomenon (i.e. through knowledge from the field, literature, and personal experience). The answer should be ideally designed as an intervention plan.

CHAPTER 7:
RATIONALE FOR THE PROBLEM FORMULATION ABOUT ORGANISATIONAL MANAGEMENT

Again, this is the body of evidence for the answer related to the organisational management issues, which has been structured by applying Soft System tools. Looking at organisational issues raises more concerns related to objectivity. An excursion into phenomenology attempts to address this at the beginning of the chapter, before the structuring process is documented.

“I EXIST, AND ALL THAT IS NOT I – IS MERE PHENOMENON DISSOLVING INTO PHENOMENAL CONNECTIONS”
Edmund Husserl

7.1 About Phenomenology
Looking at organisational problems does raise the question about the objectivity of our observation or what we describe as phenomena, which form the basis for our theories about life. The following short discourse will throw more light on the important issue of how theories are constructed. According to Kerlinger, ‘A theory is a set of interrelated constructs (concepts), definitions, and propositions that present a systematic view of phenomena by specifying relations between variables, with the purpose of explaining and predicting the phenomena’.37

One thing is certain in our existence, and that is our own conscious awareness. But we are normally more aware of an object than we are of ourselves. Thinking about it, we realise that it is difficult to prove the existence of objects outside our awareness. The philosopher

37 Kerlinger, 1973: 9
Edmund Husserl was not bothered by this and accepted material things as objects of awareness or as a systematic analysis of experience – also known as phenomenology. Phenomenology has been used as a description or analysis of the conscious experience involved. The systemic analysis of experience is treated as phenomena. There is a phenomenology for basically everything – not only the material world, but also abstract thoughts about art, religion, science and even of our internal world of thoughts, feelings etc. ‘The sum total of things actually experienced by us is the sum total of what we are indubitably certain of, though only as phenomena, experience. Nevertheless, this is our world, the one we do in fact experience, the one we actually live in.’

7.2 The Immersion Phase: Affinity Diagram

7.2.1 Methodology
Again, as in the collection of data for the individual management problem, information from the past two years of the EMBA was used. The abductive and inductive process follows the same pattern as in the individual problem formulation. I reviewed all projects (Position Papers and ARLs) looking for organisational phenomena. From this pool of data, 160 issues emerged and were rearranged into Groups as an Affinity Diagram (see Appendix) with the categories or variables summarised in Table 3.

Table 3: Headings of the Affinity Diagram

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
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<tbody>
<tr>
<td>1. No Cybernetics: Organisations as Interaction</td>
</tr>
<tr>
<td>2. Not Dealing with Uncertainty</td>
</tr>
<tr>
<td>3. Control vs. Trust, Cohesion and Gravity</td>
</tr>
<tr>
<td>4. Not Challenging Mental Models</td>
</tr>
<tr>
<td>5. No Vision and Planning (Game Theory)</td>
</tr>
<tr>
<td>6. Not Dealing with Complexity and Dialectics of Change</td>
</tr>
<tr>
<td>7. Few Emotions and Social Entanglement</td>
</tr>
<tr>
<td>8. No Ethics of Common Good</td>
</tr>
<tr>
<td>9. No Flow and Compliance for Value</td>
</tr>
<tr>
<td>10. Not Learning from Diversity, Failures and Threats</td>
</tr>
<tr>
<td>11. Not Building Value and Customer Related Innovation Networking</td>
</tr>
<tr>
<td>12. Not Learning and Managing Intellectual Capital</td>
</tr>
</tbody>
</table>

38 from *The Story of Philosophy*, Bryan Magee, Dorling Kindersley, 1998
7.3 The Structuring Phase: The Interrelationship Digraph (ID)

7.3.1 Methodology
The interactions of the Interrelationship Digraph describe causality reflected by the direction of the arrow (Figure 13). This is about the ‘how’ or ‘how the relevant factors or variables are related with each other.’

Figure 13: Interrelation Digraph of Organisational Management Issues

7.4 Sense Making Process: The Causal Loop Diagram (CLD)

7.4.1 Methodology
This is about the ‘why’, or ‘the underlying psychological or social dynamics that justify the selection of factors and the proposed causal relationship.’

The variables with the most outgoing arrows are the driving forces, while the variables with the most incoming arrows represent the effect (see Table 4). The CLD (see Figure 12)

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39 T. Sekiguchi, Theory Development, Handout EMBA 3, Module 6
is a rearrangement of the ID into a dynamic cause and effect framework. The design of the CLD should not violate the relationship defined in the Interrelation Digraph. The ID is rearranged in the same way as the Sense Making process of the individual problem formulation, whereby variables are rearranged between the driving and effected variables. Figure 14 shows how this rearrangement process takes place. The result is the matrix of theory about organisational management issues.

Table 4

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ARROWS OUT</th>
<th>ARROWS IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Ethics of Common Good</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Few Emotions and Social Entanglement</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>No Cybernetics: Organisations as Interaction</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Not Challenging Mental Models</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>No Learning and Managing of Intellectual Capital</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>No Learning from Diversity, Failures and Threats</td>
<td>6</td>
<td>4</td>
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<td>Poor Vision and Planning (Game Theory)</td>
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<td>No Control vs. Trust, Cohesion and Gravity</td>
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<td>No Flow and Compliance for Value</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Not Building Value and Customer Related Innovation Networking</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Not Dealing with Uncertainty</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

Figure 14: CLD Formation

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7.4.2 The Story of the CLD (Step by Step)

Labelling the relationships between the variables results in the story of the CLD (Figure 15).

This process has produced a problem formulation, which does not deal with just the symptoms but is able to show the root of the problem. A business attitude that does not address the common good and lacks ethics would likely fail because some of the results would be a poor emotional engagement and not an authentic social entanglement. The latter is the condition for a functioning cybernetic model, which is based on interaction and flow of communication.

Organisations are in fact nothing less than interactions of people with feelings and emotions. Simply connecting neurons would not result in the same learning through the experiences of diversity, failure, and threats. Intellectual capital cannot proliferate without these elements, which are essential for improvement.

Figure 15: CLD – Theory of Organisational Problem Formulation

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41 A biological model of organisations, which will be discussed later.
A core problem is the inability to learn, which makes it difficult to challenge mental models. Seeing and experiencing the world through the same lens with the same mental models and ideas will limit the possibilities for building different scenarios and for planning. This all has to take place in a world of increasing complexity, full of paradox and rapid change. Not being able to anticipate the demands in the innovative domain makes it difficult to create any value for an organisation. Organisations cannot merely achieve maximal flow and operate in a compliant range without these elements. Lack of creative ideas will make it hard to live with the increasing uncertainty in our world. The result will most likely be increasing pressure and control.

7.5 The Reflection Phase
The involvement of multiple perspectives brings in supporting or conflicting views from multiple paradigms, archetypes and the literature. This leads to a more critical reflection on the resulting CLD or Problem Theory and should improve the accuracy of what is produced from assumptions.

7.5.1 The Use of Archetypes
As mentioned earlier, Jennifer Kemeny, Michael Goodman and Peter Senge have developed eight archetypes, or commonly seen behavioural patterns, which help to fill gaps in our thinking.

‘Tragedy of the Commons’: The world has changed radically over the past 100 years, more radically than ever before. What we share in an increasingly global competition are the resources of this planet. More and more problems will arise for organisations if they do not act as global citizens and if they are unable to adapt to the increasing complexity and uncertainty of this world. ‘The Tragedy of the Commons always opens with people benefiting individually by sharing a common resource. But at some point, the amount of activity grows too large for the commons to support. In many cases, the commons seems immeasurably large and bountiful at first, but it is either non-renewable or takes a great deal of time and effort to replenish. The commons might be natural resources, open space, human effort, financial capital, production capacity, or market size – anything which

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42 Compliance Model: see Appendix – basic biological relation defining optimal effect of volume change as a result of pressure.
groups of individuals depend upon in common. When you have a ‘Tragedy of Commons’ issue, the system is sending you a signal that you cannot solve the problem on your own.\textsuperscript{43}

The archetype does support the first itineration of organisational problem formulation and emphasises the potential problems regarding the exploitation of resources with involvement of a social system on a private or organisational level. The model does, however, look more at the subtle changes of lacking interaction on the ability of changing mental models and the vision and planning capacity to move a business or organisation forward. The other archetypes did not seem to provide further insight into the problem formulation.

7.5.2 Multiparadigm Perspectives

As discussed earlier, ‘a paradigm is a general perspective or way of thinking that reflects fundamental beliefs and assumptions about the nature of organizational phenomena (ontology), the nature of knowledge about these phenomena (epistemology), and the nature of ways of studying those phenomena (methodology).’\textsuperscript{44}

What is applied here is the ‘interpretative paradigm’, based on the view that people socially and symbolically construct and sustain their own organisational realities. Therefore, the goal is to generate descriptions, insights and explanations of events so that systems of interpretation and meaning, and the structuring and organizing processes, are revealed. This way of theory building is inductive in nature and the process is iterative, cyclical and non-linear.

The ‘radical humanist paradigm’ is used to a lesser degree but also shares the goal of freeing the members of an organisation from sources of domination, alienation, exploitation and repression by critiquing existing social structures with the intent of changing them. What was noted as a problem in the organisational issues was the lack of authentic democratic participation and integration of the social and intellectual capacity of organisations and the consequent inability of survival beyond viability. The reason for the shortfall in this respect lies very much in the issues highlighted in the individual problem formulation, i.e. the lack of mindfulness.

\textsuperscript{43} Peter Senge, \textit{The Fifth Discipline Fieldbook}, p 140, Nicholas Brealey Publishing, 1999

\textsuperscript{44} Tomoki Sekiguchi, \textit{Theory Development}, Handout EMBA 3, Module 6
The ‘radical structuralist paradigm’ represents an important aspect of the theory building process regarding the organisational issues. It seeks to explain the situation with historical, dialectical and critical modes of inquiry. ‘The goal is to understand, explain, criticize, and act on the structural mechanisms that exist in the organizational world.’ I am mainly concerned with the kind of organisational model that would allow the integration of social and emotional issues. Ignoring cybernetics seemed to be frequent reason for shortfalls regarding organisational structures and responsible for conflicts and failures.

The ‘functionalist paradigm’ is about the examination of regularities and relationships that lead to generalisations and universal principles. This was initially one of my major interests but lost attraction in a more complex, driven and post-modern world where explanation cannot be gained through extra polarisation of historical events.

7.5.3 Going Deeper Approach
Again, the Going Deeper process is a four-step model for taking a deeper and critically reflective look at underlying issues.

Purpose of the system:
The theory about organisational problems serves as an explanation for the inability of organisations to cope with uncertainty. The purpose of the system is also to describe a plausible relation of the relevant variables as a base for a further intervention.

Mental Models:
I do believe that the present CLD will probably also reflect elements, which have not been a product of my own mental models but a result of many discussions along the EMBA over a period of two years. The arrangement and iterative deductive process has been as unbiased as possible and provides new angles and explanations to me. Nevertheless, nobody can guarantee an entirely objective view – it doesn’t exist!

Larger System:
The organisational issues have to be put into a normative management framework. The underlying problem formulation reflects social responsibility with a utilitarian viewpoint. We cannot act without impunity toward the world.
7.5.4 Input from the Literature

The main categories of the previous CLD serve as headings of a literature search which had to be limited somehow and includes articles and books used during the EMBA. These inputs were screened for new complementary elements for the problem theory.

**Work Systems:** Learning and management of intellectual capital has been an important issue over the past two years. One of the main reasons has been the interaction of different work systems: the relations between these in the innovation domain occur through exchanges in the various project groups and through people working in them to exchange ideas, concerns and hopes. There is a tendency of innovative people to remain with the successes of the past, to continue on the same theme.

“The result is often overspecialisation or the creation of a style, a school of thought, a dogmatic environment. What is normally understood as planning is incompatible with the concept of innovation. Innovation activities inherently tend to be uncertain and the development of an innovative ideal is full of pleasant and unpleasant surprises.”


**Espoused Theory vs. Theory in Action:** Human beings are anything but predictable in the way they behave and think. Each person’s worldview is made up of a complex set of attitudes, beliefs, values, opinions and perceptions. We reveal only a glimpse of our own world-view in our relationship with others – and this may lead to misunderstandings and conflicts. Argyris and Schon (1974) assert that people hold maps in their heads about how to plan, implement and review their actions. They further assert that few people are aware that the maps they use to take action are not the theories they explicitly espouse. Also, even fewer people are aware of the maps of theories they do use (Argyris, 1980). There is a theory consistent with what people say and a theory consistent with what they do. Therefore the distinction is not between ‘theory and action but between two different ‘theories of action’ (Argyris, Putnam & McLain Smith, 1985, p. 82).

**Control vs. Cohesion:** The task is to equip people with the necessary tools and ensure the competencies are energised towards the required goals via the defined stage posts. Dynamic change is important to organisational survival. This must be done in a controlled

environment without the controls leading the process, but rather being organic and following what the organisation requires.

Energy is about fun, discovery, fulfilment and challenge. The manager as a coach assisting in this journey is important – not as a deviation spotter, but as a guide and source of inspiration. If we know where to go, how to get there and what problems to look out for, then all it takes is a reason to journey, i.e. motivation. Energy directs the extent to which we throw ourselves into the task and this must come from within. It comes from an earnest desire to express our innermost feelings through the exercise of life’ (‘Diary of a Control Freak’, K.H. Spencer Pickett, Vol 37 No, 1999).

Value: ‘Successful planning requires sound analysis for both formulating business strategies as well as for valuing strategies’ (Alfred Rappaport, Creating Shareholder Value, Free Press, 1998). ‘Value potentials must be controlled separately from profit and solvency, on the basis of independent criteria’ (Raul Espejo, Markus Schwanninger, Organisational Fitness, Campus). ‘Just as profit largely determines solvency, “value potentials” pre-control profit. Value potentials are defined as the texture of all applicable business-specific, profit-relevant prerequisites that must be present if profits are to be realised’ (Gaelweiler, 1987; cf. Puempin, 1991).

Uncertainty: ‘Everything in this chaotic world looks the same, incomprehensible and difficult to map’. Abstracting and symbolising is the process, which enables us to map the world (the territory)’ (K. Weick, ‘Cartographic Myths in Organisations’)

Vision: ‘Significant organisational change is only possible if there is a vision – a clear idea or image of what has to be changed and if each organisational unit concerned formulates a specific concept or model of management and realises it in a stepwise fashion’ (EMBA 3 handout, May 2001).

‘The management has to work towards an environment and condition under which everybody is able to do his work as efficiently as his capabilities allow’ (R.L. Ackoff, Creating the Corporate Future, John Wiley & Sons, 1981)
Cybernetics: ‘The supreme art of management lies in balancing constancy and change by orchestrating organisational preservation and transformation, thereby achieving viability and development’ (Handout ‘The cybernetics of management’)

‘Development is about a system’s growing ability and desire to fulfil its own and other’s needs – the quest of an organisation is in fact viability beyond survival’ (Ackoff, 1995).

CHAPTER 8: THEORY ABOUT THE ORGANISATIONAL MANAGEMENT PROBLEMS

This is a part of the Answer according to the SCOARE Framework. The Answer is in this case the Problem Formulation about the organisational management issues and includes all the newly gained ideas from the reflection phase.

The reflection phase added a normative dimension46 to the model. We cannot act without impunity without having the common good in mind. It will become more difficult to ignore our social responsibility. The problem model, as outlined in the CLD, is concerned with the organisational capabilities gained through learning and networking of intellectual and social nodes. The challenge of changing the underlying mental model is the main common denominator. The reality is that human beings are quite unpredictable and one has to keep the fact in mind that people hold maps in their heads and often act differently to what they say (espoused theory vs. theory in action).

Being mindful and flexible implies a certain structure, which has elements of control and communication (cybernetic system), allows emotion and an intelligent representation – the ability to respond to unexpected events. It is the scarcity of the emotional factors in the social entanglement of organisations that could contribute significantly to the problem. The rest is a rat’s tail – a symptom like in the following example. Control is more important if one cannot create cohesion. We generally work together on the premise that it should be fun and not painful. Rating individual satisfaction higher than the satisfaction as a team

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46 Normative management is putting organisations into the context with their environment – the social system around them – basically the society
cannot create the same value for an organisation. These concerns are particularly important for different work systems, which have to be linked with each other, as outlined by Luc Hoebeke in *Making Work Systems Better*.

**CHAPTER 9:**

**SYNTHESIS OF THE INDIVIDUAL AND ORGANISATIONAL MANAGEMENT PROBLEM THEORY**

Separating individual and organisational issues was intended to facilitate the deductive process. The following chapter is a synthesis of the main issues into one problem, theory which represents an answer to the initial Question (see above): *What kind of problem formulation about individual and organisational management issues can be extracted from my two-year Executive MBA Program that is relevant for the concern (see above) and addresses the underlying causes and not the symptoms? Does the problem formulation then provide a specific question and theme which brings a research angle related to the concern which has been explored in terms of the individual and organisational management?* The answer or problem theory should therefore also provide the insights for the formulation of a relevant research question.

It first appears, comparing the two models, that some elements are prevalent in both of them. An important one is the connotation of mental models. Individuals have mental models and organisations can have them, too. A dogmatic personality can transfer them to a whole entity, as one individual can be an example for an organisation in terms of ethics or culture. 47 There are several ways of combining the two models. Figure 16 shows a version that builds on the individual model, appearing to be the logical sequence. Problems of organisations are eventually rooted on the level of each individual protagonist. The resulting model represents a problem theory and a road map of how organisations develop the inability to deal with uncertainty. The problem at this stage was that a fairly broad problem formulation did not provide a narrow enough focus for a particular research question. This required a selection from one of the issues in the model or a further process of conceptualisation – without being guilty of applying reductionism. Brooding over the model made me see an analogy to diagnosis in medicine.
Both the individual and the organisational part of the model (Figure 16) are divided into two parts. One explains the cause of the problem (blue), while the 2nd part is about symptoms (red), or simply a description how things get worse and eventually culminate in conflict or the inability to deal with uncertainty.

The focus was consequently rather on the causes than the symptoms. The following were filtered from the pool of causes in the problem formulation in order to find a relevant focus for the theme of the thesis (see next chapter):

‘Lack of Philosophy in Management’, ‘Lack of Mindfulness and Dialogue’ and ‘Espoused Theory vs. Theory in Action’ from the individual loop were summarised as ‘No Bigger Picture Management and Mindful Action’. The organisational loop is focused on ‘Poor Ethics’ as a result of the lack of a bigger picture management and lack of mindful action. This triggers ‘Poor Cybernetic Interaction’ with ‘Unfavourable Intellectual Capital Management’ and a ‘Poor Emotional and Social Entanglement’ with an inefficient Learning Process which were categorised as ‘Poor Cybernetic Interaction and Intellectual Capital Management’

The combined model provides important information about symptoms and causes of the problem formulation on an individual and organisational level.

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47 S.E. Bromberg, The Evolution of Ethics – An Introduction to Cybernetic Ethcis (Evolutionaryethics.com)
CHAPTER 10:
FORMULATION PROCESS TOWARDS A SUBJECT OF RESEARCH

The formulation of a research question is an inductive and deductive process with an iterative character as described earlier as ‘Pyramid Principle’. The chapter illustrates what and why the emerging subject is relevant for my individual and organisational management situation and how the two remaining categories (‘No Bigger Picture Management and Mindful Action’ and ‘Poor Cybernetic Interaction and Intellectual Capital Management’) fit in.

10.1 The Dilemmas
Managing the proliferation of knowledge and innovation is one of my most vital interests. How to avoid destructive conflicts and to make abrasion creative is important both on an individual and on an organisational level. But there are several dilemmas and paradoxes to deal with in organisations. Luc Hoebeke’s ideas about work systems highlight the basic strategic dilemma in the added-value and the innovation domain and between them (see below 14.9, p 76). I could identify very well with his description because the linking between the two domains seems to be inherently difficult. One reason is the hurdle innovators have to take to separate themselves from the ownership of innovation. The transferability of innovation is perceived as a threat to the power base of innovators. It also creates a demand that once one is involved in innovations, one must continue to innovate, as described by Hoebeke in process level 4 of the innovation domain: ‘Attachment to or detachment from what already exists is the dilemma confronted by innovators active on recursion level 4’.

The issue is about linking individuals in the innovation domain and the added value domain in a meaningful way. ‘No Bigger Picture Management and Mindful Action’ is about the importance of integrating emotions and awareness of mental models into the process of innovation. I imagined that the creation of the right interactions for a better intellectual capital management could be facilitated with cybernetics.

10.2 Semiotics/Cybernetics and Biological Metaphors for Innovation
A medical professional will be attracted by semiotics, a broader term for cybernetics. Semiotics is an emerging class of science – a form of new ‘alchemy’ – which is integrating disciplines as diverse as logic, linguistics, philosophy, biology, psychoanalysis, sociology and others. As
cybernetics is closely related to semiotics it appears to be a good option for dealing with the problem of innovation management. Medical doctors are trained to be system thinkers. They are normally familiar with different disciplines, of which some include the basis of semiotics. What cybernetic thinking does is to use biological metaphors that can break radically from current conceptual worldviews and offer challenging new angles to our thinking.

Stafford Beer’s Viable Systems Model seemed a fascinating biological metaphor for my organisational understanding related to innovation, but it has been criticised for some possible shortfalls regarding the unpredictability of human beings and the emotional factors – particularly in situations of conflicts related to power. Again, the category ‘No Bigger Picture Management and Mindful Action’ addresses these emotional factors.

While I was still trying to figure out what the research question would be, I was possibly inspired by the award of the Nobel Prize of Medicine to the South African-born Sidney Brenner and his colleagues, John Sulston and Robert Horowitz. Upon hearing that he had been awarded the Nobel Prize with Brenner and Horvitz, Sir John Sulston is quoted as saying, ‘The worm [C. elegans] worked so well because the community held an ethos of sharing – just as the public genome projects have – from the beginning. We gave all our results to others as soon as we had them. From sharing, discovery is accelerated in the community. Research is hastened when people share results freely.’

I was further motivated by the fact that cybernetics is now also applied in diagnostic and therapeutic decision-making in medicine. It has established itself, for example, as a new subject at the Medical Faculty of the University of Munich in Germany.48

The theme for the thesis started emerging: Cybernetics as a possibly useful approach to knowledge and innovation management.

10.3 Innovation, Knowledge, Learning, Creativity and Intelligence of Organisations
Dealing with the management of intellectual capital required explanation for some of the related words – learning, knowledge, innovation, creativity and intelligence.

48 S.E. Bromberg, The Evolution of Ethics – An Introduction to Cybernetic Ethics (Evolutionaryethics.com
We can assume that **innovation** arises when ideas and other innovations come together and create new ensembles and approaches – what Peter Senge calls ‘component innovations’.

Innovation means ‘bringing in new methods, ideas’ or ‘making changes’ according to the Oxford Dictionary, based on the Latin word ‘novus’ for ‘new’ and ‘innovare’ for ‘making new, alter’. Innovation must not be confused with invention, however. Marketing people know that most of the things that are innovated have been invented long ago but have been changed in some way in order to satisfy the demands of the customers. Innovation is seldom the result of the efforts of a single person but of several people who interacted, had an idea, refined it, redefined it and then found others to produce, market and sell it. This process has been inverted and is now often driven by demand. Marketing people pick up the demand and find others to innovate or change existing material into something new. This process mostly uses tacit **knowledge** of people from within an organisation or elsewhere. This knowledge can be stimulated, but the exchange of it increases the chance for a ‘good innovation’. Innovation can therefore be defined as ‘the use of knowledge (new or existing) in a new application (product or process)’.

Knowledge can be managed, but because it is an intangible resource it is difficult to operationalise it.

What then is **creativity**? Salvio Vicari and Gabriele Trollo argue that there is a difference between individual creativity and organisational creativity. Michelangelo’s creativity is different from that of Microsoft, and organisational knowledge is more than just the sum of the knowledge of individuals working in the organisation. Vicari and Trollo see knowledge creation coinciding with creativity: ‘knowledge creation and creativity are two ways of describing the capacity of the system to evolve in a dynamic environment’.

So what is **intelligence**? Gardener defined eight intelligences on an individual level; being smart for self, words, logic, pictures, body, music, nature and people. There is nothing to

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49 Peter Senge et al., Schools That Learn, Nicholas Brealey Publishing, 2000
worry about organisations because in organisations people with different strengths make it possible for each other to achieve things. Organisational intelligence can be managed too! Intellectual capital networking and the learning organisation are inseparable. Reflective practice and organisational learning, as described by Don Schoen, are a part of second-order cybernetics and are part of new, purposeful learning systems. ‘The dialectics between the process and the product of learning, between the individual and the groups as a community of learners is leading to ‘ecological thinking’ – our new keystone educational concept.’

10.4 Cybernetics and Knowledge Management

The fact is that scientific endeavour in the postmodern age has become increasingly complex and requires synthesis in order to be able to focus on the relevant questions. One of the leading journals of cybernetics and semiotics describes the function of its discipline as: ‘Researchers and practitioners in the arts and the natural, medical and social sciences realize that the sharing of knowledge is both desirable, necessary and possible. For people working i.e. in the IT-sector, second-order cybernetics can be translated to the understanding of his/hers cognitive relation to the artificial system “user”. In this, Cybernetics & Human Knowing is a valuable complementary to technologically oriented fields as we provide a rich epistemological solid for the emergence of future metaphors. Our focus is on the need for change in the basic concepts of culture, our worldviews, values, views of ourselves and what “genuine” knowledge is, and on the call for a new exchange between theoreticians and practitioners’.55

10.5 Semiotics/Cybernetics and Philosophy

A compelling issue related to cybernetics is philosophy, which is the starting point of the combined Causal Loop Diagram of the problem formulation and certainly a part of the category ‘Bigger Picture Management’. I had experienced philosophy as a more and more important aspect of my own management approach. Philosophy is also one of the most consistent companions to the paradigm changes mentioned earlier.

Semiotics, which is a broader term for cybernetics and an emerging class of science, also includes philosophy. Philosophy, logic and biology form the matrix, while psychoanalysis and sociology determine the rules within this matrix. Semiotics is not a completely new science. We find its precursors as far back as classic Greek philosophy and 17th-century philosophers

54 Shoshana Keiny, Learning as Knowledge Construction Within a Community of Lerners. An Attribution to Don Schoen. Cybernetics & Human Knowing, Vol. 7, no. 2-3, 2000, pp. 31-45
such as René Descartes, Gottfried Wilhelm Leibniz, Thomas Hobbes, John Locke and George Berkley. In the 18\textsuperscript{th} century, there was Immanuel Kant and Herder; in the 19\textsuperscript{th} century Friedrich Hegel, Marx, Humboldt and Bolzano; and in the 20\textsuperscript{th} century exponents such as Husserl, Foucault, Lévi-Strauss and, last but not least, Charles Sanders Peirce. It is important to note that economy and science were and are closely linked to philosophy.

10.6 A Tribute to Stafford Beer

Lastly, a very good reason to look into cybernetics is the recent death of Stafford Beer at the end of August 2002. He is considered one of the fathers of cybernetics in management and developed the Viable System Model (VSM) as an underpinning structure of any sustainable organisation, which will form the matrix for the research.

The research idea is to look at the applicability of semiotics and particularly cybernetics in the context of intellectual capital management and innovation.

CHAPTER 11:
EVALUATION OF THE PROBLEM-FORMULATION

The evaluation should be a critical reflection on the first part of this paper in order to decide if it is relevant to the concern in my individual and organisational situation. It should also indicate whether the rationale given is valid for the answer (the problem theory).

The separate look at individual and organisational management problems helped to keep the amount of information manageable and allowed the conceptualisation of a variety of issues that have accumulated over a period of two years. It was difficult to integrate the individual situation and not to focus entirely on the organisational issues.

To ‘be examined ourselves’, as Heidegger expressed it, is a relevant issue in real life. The problem formulation and the resulting question had to address both components. The hope of finding a particular research question from the combined model was initially disappointing and

\footnote{Cybernetics & Human Knowing, Volume 9 No. 2, 2002, Imprint}
required further itineration. Too many questions remained, and it was necessary to choose a particular issue relevant to my individual and organisational situation.

Looking back at the concern, it seems to me that the answer so far deals with the concern. A postmodernistic view puts the relations of systems and subsystems in the foreground and not the structures. Management will move more towards social sciences and the understanding of the interaction of people. The approach in this paper is therefore not empirical. The rationale is the body of two years of work and cannot be entirely free of a subjective coloration. But that is good. Improvement starts with ourselves and our own phenomena or mindfulness towards the world in which we live.

My research question addresses the core of the new organisation – the human network – where ethics have become a cornerstone. The emphasis on the social context of management gives ethics a different role, and not just because it is in vogue. Ethics can be linked to altruism as an integrative term that joins the evolutionary theory of ethics and biology – an aspect explored later as ‘Cybernetic Ethics’.

The review of two years of work and engagement with the process of the EMBA offered by the Graduate School of Business at the University of Cape Town was like an extensive debriefing. The attempt to remodel issues that were relevant for me resulted in a clear distinction of causes and symptoms. The benefit should be a proper focus on the basic underlying problems. The problem formulation should now open the path for a new discussion, and eventually an intervention, and therefore serves as a toolkit for the future.
PART B
DEALING WITH THE PROBLEM

The first part of the thesis dissected the ‘mess’ and filtered the essential problems reflected in
the past two years during the EMBA, on an individual and an organisational level. The result is
a problem theory from which a particular theme for the thesis emerged:
Cybernetics in the context of intellectual capital management and innovation

CHAPTER 12: SITUATION

This chapter reformulates and transforms the important aspects of the individual and
organisational situation described in the first part of the thesis into the context of the subject of
research. It describes why it is a problem, issue or concern for me, what the contextual or
situational elements are which make this a concern that needs to be dealt with, and why
something has to be done about it.

12.1 Change of Ages – A Definition of Postmodernism

Most of what we know is based on the tradition of the 18th-century Enlightenment, which had
its origins in the Renaissance, when myths began to be replaced with reason and science.
Modernism, as we know it from the 20th century, built on the achievements of Enlightenment.
Science and logic seemed to provide the basis for explaining and describing the world in a
language that had a universal meaning. But, taking things apart in order to create objectivity did
not answer questions about the whole. The result of the dissection is that we struggle to create
meaningful links in this puzzle.

We have to realise that we live in the postmodern age of communication, in a world of
increasing complexity and conflict. But postmodernism must not be confused with esotericism.
For me, it is Jackson who characterises postmodernism most appropriately: ‘Postmodernism
offers little security. Rather, it thrives on instability, disruption, disorder, contingency, paradox,
and indeterminacy. The image is more significant than “reality”, and so postmodernism
emphasizes superficiality and play instead of seriousness and depth. Post-modern science, therefore, rejects performativity and asks questions about purposes. It sees systems not as stable but as subject to discontinuity and catastrophe. They are temporary islands of determinism within a sea of indeterminacy.56

Together with globalisation, postmodernism has fallen down where confrontation with diversity and intensified competition have created more insecurity than ever for organisations. It is not only in the aftermath 11 September 2001 that we appear to be move into a new age in which things don’t seem to be the same anymore. Jackson again: ‘Postmodernism seeks to puncture the certainties of modernism, particularly the belief in rationality, truth and progress. It denies that science has access to objective truth, and rejects the notion of history as the progressive realization and emancipation of the human subject or as an increase in the complexity and steering capacity of societies. Language is not transparent, and it certainly does not offer the possibility of universal consensus. There are many different “language games”, obeying different rules, in which speakers take part in order to defeat opponents or for the sheer pleasure of playing.’57

12.2 The Analytical Debacle

The exposure to hierarchical and autocratic structures turned out to be problematic when I ventured outside the walls of the hospital. Only then did it become obvious to me that a new kind of management concept and different tools are required in order to manage the innovation of organisations in a rapidly changing environment.

Experience with the inadequacies of academic institutions also enhanced my desire to get the spinning wheels to work together, or, as Fredmund Malik puts it for organisations: ‘Management is the transformation of knowledge into value for people or customers.’58 I now see how preoccupied the academic institutions were with analysis. Russel L. Ackoff describes this as the analytical debacle: “During and after the Renaissance, analysis became synonymous with thinking in the Western World. Everything was taken apart with the expectation that once the parts were understood, this understanding could be assembled into an understanding of the whole. It was for this reason that science became a crusade for which the element, the

indivisible part, was the Holy Grail. Life itself was analysed and disaggregated into parts: work, play, learning, and inspiration. As a result, institutions and organizations were developed to promote each of these aspects of life separately, independently of the others... In the post World War II period, the separation of work, play, and learning, if not inspiration, has become a major obstruction to increasing productivity and improving the quality of life, especially work life. The continuously increasing technological content of work requires continuously increasing knowledge, hence continuous learning by those in the work force. Despite this our educational systems deteriorate and become less relevant. Within them students do not learn how to learn, nor are they inspired to continuously do so.\textsuperscript{59}

12.3 Conflicts between Subsystems

I also noted how conflict burdened the relation of the protagonists in this system, i.e. between medical academics and the administration, amplified by the rising cost pressure. I discovered over the past few years that similar conflicts existed between the subsystems of private companies. There seemed to be a very specific problem situation between the work system of innovation (innovation domain) and the system where it should put into gear (the value-added domain)\textsuperscript{60} as schematised in Figure 17.

Figure 17: Conflicts between Different Work Systems (Domains)

\begin{figure} 
\centering
\includegraphics[width=\textwidth]{figure17.png}
\caption{Conflicts between Different Work Systems (Domains)}
\end{figure}

\begin{table} 
\centering
\begin{tabular}{|c|c|}
\hline
\textbf{System} & \textbf{Area} \\
\hline
Innovation Domain & Innovation \\
\hline
Value-Added Domain & Value-Added \\
\hline
\end{tabular}
\caption{Comparison of Work Systems}
\end{table}

\textsuperscript{58} Fredmund Malik, Peter, Stadelmann, ‘Management Knowledge and Knowledge Management’, \textit{To be and not to be, that is the system, A tribute to Stafford Beer}, CD Carl Auer - Autobahn Universitaet, 1996

\textsuperscript{59} Russel K. Ackoff in \textit{To be and not to be, that is the system, A tribute to Stafford Beer}, Editors Raul Espejo and Markus Schwaninger, CD Autobahn Universitaet, 1996

\textsuperscript{60} More about the innovation domain and value-added domain below under ‘work-systems’
The model is adapted from Luc Hoebeke’s blueprint about the relation of the three domains – value-system domain, innovation domain and added-value domain. Hoebeke’s model includes a spiritual domain which I chose to leave out in order to allow readers to decide on its role for themselves.

Realisation of our heritage and background forms the basis towards an awareness and better understanding of our mental models. My education as a medical doctor in the late 20th century was still an expression of the mechanistic age, which I experienced as a conflict with a new, more postmodern environment. Innovation management is subject to changing rules and is in need of a new meaning of language, particularly between different subsystems.

CHAPTER 13: THE CONCERN OF THE THESIS

The chapter summarises the concerns, expressed in the problem formulation, that are relevant in the context of the research question.

13.1 The Concern on an Organisational Level
The concern on an organisational level is that the failure to manage knowledge, intelligence, creativity and innovation in a meaningful way will result in poor competitiveness in the new network economy. Failing to link work systems of organisations across different ‘domains’ will put companies at risk. The innovative process is subject to an inherited conflict between the innovative domain and the added-value domain, as outlined by Hoebeke in his book, *Making Work Systems Better*. Hierarchical structuring of organisations does not satisfy the need for a language, which attends the interactive character of organisations. Organisations, after all, are nothing else than people and their way of interaction.

13.2 The Concern on an Individual Level
The concern on an individual level is more related to the reality of power and conflicts. A conservative education has left me with residuals of hierarchical and autocratic beliefs which are outdated. But participative democracy in organisations, as promoted by Jürgen Habermas,
cannot be achieved so easily. Conflict within and between subsystems will shift the focus from innovation, which, if made creative, is essential to innovation.

We can no longer separate the individual situation from the organisational one. The concerns related to innovation management have changed with time. To deal with the ‘right’ concern is crucial. This requires the ability to keep symptoms and causes apart. Failing to adapt the management style to a changing innovative environment will make any company short-lived.

CHAPTER 14: 
THE QUESTION

This short chapter is about formulating the concern as a question so that if the question were appropriately answered, the answer would propose a way of satisfactorily dealing with the Concern. Now integrated in the question is the aspect from a cybernetic view, as outlined in the ‘Formulation Process towards a Subject of Research’ (Chapter 9, p 43).

Is the creation of structures supporting creative problem-solving skills in the innovation domain and through connection to other work systems and can cybernetics, and the VSM particularly, provide the means to accelerate innovation through more effective intellectual capital management?

CHAPTER 15: 
RATIONALE

The chapter on the rationale explains how the concern is dealt with, if the approach proposed in the answer below was implemented and how the events/matters unfold leading to the resolution of the concern. The chapter creates the body of evidence for the answer (the claim).

The assumption that innovation management is subject to permanent change is the red thread and road map for the collection of evidence. The evidence is provided by the literature, interviews and personal experience. A lot of emphasis is put on looking at the research question
through different lenses. The selection of different views cannot be left to chance because they have to reflect different angles.

At the end of Part A, I started with the hypothesis that cybernetics would represent a useful way to manage innovation. This chapter summarises the important aspects of cybernetics and argues why and how semiotics and cybernetics can deal with the innovation environment.

15.1 Road Map
The road map is an overview of how multiple perspectives are collected and how they document the paradigm shifts taking place between the machine age, modernism and postmodernism, as related to innovation and knowledge management. We start with Ashby and the early beginnings of cybernetics and move on to Beer’s Viable Systems Model and the development of second-order cybernetics, as represented by Espejo, Schwaninger and others. A further step on the road map is an evaluation of Luc Hobeke’s work systems model. This is related to Beer’s VSM, but deals with the social context and social interaction in a unique way. Stacey and Habermas throw light on the qualities of people in organisations from a more postmodernist viewpoint.

The question of whether cybernetics can be a useful approach to innovation and intellectual capital management cannot be answered unless other ideas about innovation and knowledge management are included. Three personalities, whose common attribute is that they are systems thinkers, were carefully selected and interviewed. Their input created valuable new angles to the research question (I). Another look at the literature helped to refine the emerging picture.
15.2 Definition of Cybernetics

Cybernetics is the science of effective organisations. It helps managers to design and control organisations; it also helps them to implement change when necessary (adding to Wiener’s classical concept [1948] of cybernetics as ‘the science of communication and control in the animal and the machine’). It goes deeper than the general concept of system theory – the theory that concerns wholes as constituted by their interrelated parts – by focusing on the structural invariance of systems.

15.3 History of Cybernetics

Cybernetics is a science in itself but has gained more significance through its application in organisations over the past 40 years. Cybernetics can be seen as a form of response to an increasing trend to specialisation in most disciplines of science. In the second half of the 20th century, modernism’s limitations regarding a systems approach became more obvious. But there is, of course, a desire in people to understand the world in all its richness.
The German writer Goethe\(^{61}\) portrayed the legendary alchemist Faust as a rationalist philosopher who risks everything – even his soul – to advance human knowledge, and is pardoned by God because of his noble intentions.\(^{62}\) Getting into trouble with heaven and hell was a common experience for alchemists in pre-Enlightenment times. A holistic approach to life was considered to be a sin. Goethe’s desire for a more holistic view of an unknown world was expressed through the character of Faust. Goethe was, like many other writers and philosophers, not by accident also a man of science. Over the centuries, many philosophers were also mathematicians, physicists, astronomers or economists, but this combination gradually became more rare – probably as a result of the modern knowledge explosion. Microscopic analysis and specialisation now seem to be the best responses to the increasing complexity of the world, even though there has never been a greater need to understand the world as a system.

Cybernetics is a method of systems thinking that was developed in the middle of the last century. A kind of a modern alchemy, it involves disciplines such as biology, social sciences, mathematics, anatomy and physiology, but also anthropology, psychology and even philosophy. Its integrative approach addresses the need to understand the world as a system.

15.4 First-Order Cybernetics – Wiener and Ashby
Norbert Wiener and W. Ross Ashby are considered to be the fathers of cybernetics. Wiener defined it as ‘the science of control and communication, in the animal and the machine’ – or, in a word, as the art of ‘steersmanship’, which is also the meaning of the Greek word \textit{kybernetes} – as Ashby would call it. Wiener felt strongly about a general systems theory that would address problems common to many disciplines. This new science was given the name Kybernetik or Cybernetics. The central aspects of Wiener’s work was concerned with the management of complexity. He wondered what machines, biological systems and organisations had in common in terms of communication and control that would enable them to respond adequately to unexpected events in the environment.

\(^{61}\) Johann Wolfgang von Goethe (1749-1832), German poet, dramatist, novelist, and scientist. Goethe's poetry expresses a modern view of humanity's relationship to nature, history, and society

\(^{62}\)“Faust,” Microsoft® Encarta® 98 Encyclopedia. © 1993-1997 Microsoft Corporation. All rights reserved.
Wiener’s main focus was the application of cybernetics in societal systems. The revolutionary aspect of his theory was a first step away from autocratic systems. Cybernetics later became quasi the science of design and system-oriented control of dynamic societal systems. The dynamics of systems have to include the interaction with the environment being the main purpose of organisations. Cybernetics developed concepts of control, the processing of information and communication and ways to create purposeful representations and designs of systems.

Ross Ashby’s *Introduction to Cybernetics* is a more empirical definition of cybernetics. One of his achievements was the development of the fundamental laws of cybernetics. He emphasised that ‘the truths of cybernetics are not conditional on their being derived from some other branch of science’ and that ‘Cybernetics has its own foundations and does not ask “what is this thing?” but “what does it do?” It is thus essentially functional and behaviouristic.’

Cybernetics is a child of modernism and an expression of a desire for a more holistic view of life. It seeks understanding about what dynamic social systems do by means of communication and control.

### 15.5 Ashby and Innovation

The following section considers extracts from Ashby’s *s Introduction to Cybernetics*. Included are the passages touching in some form on the management of innovation.

#### 15.5.1 Growth

Ashby claims that cybernetics offers concepts that can help different branches of sciences to relate to each other ‘It has been found repeatedly in science that the discovery that two branches are related leads to each branch helping in the development of the other. The result is often a markedly accelerated growth of both. The infinitesimal calculus and astronomy, the virus and the protein molecule, the chromosomes and heredity, are examples that come to mind.’

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63 University of St. Gallen, Systemorientiertes Management – Das Werk von Hans Ulrich, Studienausgabe, Haupt2001
15.5.2 Common Language
Ashby also found a suggestive parallelism between machine and brain and society, and that ‘cybernetics can provide a common language by which discoveries in one branch can readily be made use of in the others.’ 66

15.5.3 Control and Stability
Ashby highlighted the idea that cybernetics offers effective ways of dealing with the control of systems that are very complex. But this does not necessarily mean stability. Stability can well be undesirable, particularly if a system tends to return to a state that is undesirable. He cites as an example a situation where the more intelligent members of the community are not reproducing as freely as the less intelligent – the Intelligence Quotient (I.Q.) of the community will fall. ‘Clearly’, he writes ‘it cannot fall very low, because the feebleminded can reproduce better than the idiot. So if these were the only factors in the situation, the I.Q. would be stable at about 90. Stability at this figure would be regarded by most people as undesirable.’67

15.5.4 Change
Ashby is concerned with change as a universal principle of life – there would be no life without change. Change drives innovation; innovation drives change.

15.5.5 Variety
The second part of his book deals with variety. This is the number of possible states of a system and the complexity of its capacity to adopt a large number of states. The more interaction possible, the more information can be exchanged and contributed to the variety of the system. This is the basis of variety engineering, which will be discussed later under system dynamics or second-order cybernetics.

15.5.6 Regulation
Regulation in biological systems is, according to Ashby, the central theme of cybernetics. Two thousand million years of the history of the earth allow some deduction in what exists now. Studying the brain is therefore a means of survival. What corresponds to the living organism is a state where essential variables are kept within assigned (physiological) limits. But how

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15.5.7 Requisite Variety
An important aspect of regulation is what Ashby describes as ‘requisite variety’. The law of requisite variety states that variety can destroy variety. So, according to Ashby, variety can and should be exposed to a certain degree of selection regarding possible interactions of the elements of a system. It is regulation and control that are intimately related to each other and will influence variety. Their function can be seen as dialectic – regulation by error, for example, is an important means to innovation. Perfection of error-controlled regulation therefore becomes a contradiction.

15.5.8 Amplification
A whole chapter of Ashby’s book is dedicated to amplification, which is considered to be another important principle of life, which can be adapted for organisations. Examples of amplification are a music speaker, the brain or even intelligence. Our gene pattern, as a store or channel for variety, has limited capacity. ‘Survival goes especially to those species that use the capacity efficiently’, Ashby writes. ‘We can now understand quantitatively why this indirect method (amplification) has proved superior – why it is the method used by those organisms that have the most powerful resources for regulation – it allows amplification, precisely amplification of selection.’ But is problem-solving not largely a matter of appropriate selection? It seems to be clear that many of the tests used for measuring ‘intelligence’ are scored essentially according to the candidate’s power of appropriate selection. This would mean that intellectual power might be therefore equivalent to power of appropriate selection. Ashby concludes, ‘if this is so, and as we know that power of selection can be amplified, it seems to follow that intellectual power, like physical power, can be amplified. Let no one say that it cannot be done, for the gene-patterns do it every time they form a brain that grows up to

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be something better than the gene-pattern could have specified in detail. What is new is that we can now do it synthetically, consciously, deliberately."\(^{69}\)

Ashby defined the fundamental laws of cybernetics, or how to deal with complexity, which is important for the innovative process. Cybernetic designs can stimulate the growth of social systems, provide a common language, control and stability but also facilitate change – an intended paradox. One of the fundamental qualities of cybernetics is its ability to increase the variety of systems in order to cope with internal and external events by active engineering and selection (requisite variety) and by synthetic, conscious and deliberate amplification of the existing possibilities of a system.

15.6 Cybernetics as Management Theory – Stafford Beer

Stafford Beer created the Viable System Model (VSM) by comparing organisations with the human nervous system. The VSM is often used by practitioners for designing and structuring organisations. The following paragraphs describe the VSM, focusing on its applicability for innovation management.

Beer spent almost his entire life making cybernetics more accessible to organisations. He died in August 2002, and this thesis is also a tribute to the man who was most influential in developing organisational cybernetics over the past three decades.

Jackson stresses the difference between management cybernetics and organisational cybernetics. The latter is represented by Beer’s VSM, which uses a biological system – the nervous system of the human body – as an analogy. Management cybernetics takes its pattern from the analogy of a machine and is therefore mechanistic in nature and offers little advance from hard-system thinking.

15.6.1 A New Way of Organising the World

Stafford Beer’s biological starting point has made a fundamental difference to cybernetics in management. Fredmund Malik\(^{70}\) comments about the significance of Stafford Beer’s ideas: ‘If I


had to summarize Stafford Beer’s thinking in one short statement, I would say that he has given us a radically new way of organizing our knowledge about the world and – as a consequence – a new way of organizing the world itself.  

15.6.2 Management as Cohesive Complex Molecules

Beer was a classical systemic thinker. As for Ashby, it was absolutely crucial for him that knowledge experienced in one field be used to generate insights in another field. If we imagine knowledge management as cohesive complex molecules, then we could use this structure of multiple non-hierarchical parts to design interactions among people in complex problem situations. The cohesion of the group is provided by a communications protocol that ensures that all participants have the chance to influence all others even if they do not interact directly with each other. The reverberation of ideas throughout the system is achieved by creating direct and indirect communication channels that offer an effective means for everyone to contribute to the best of their abilities and to the outcomes of the conversations.

Such a model has profound implications for the management of social and business organizations. It explains how to design structures for effective policy processes in which different viewpoints provide checks and balances on each other’s views. Such an approach tackles a common shortcoming in almost all organisations, where policy processes are dominated by particular viewpoints which do not benefit from the influence of relevant alternatives. Beer’s achievement is in fact an important contribution to the design of a ‘mechanism’ to support the generation of robust policies in which there is a balanced contribution to the debate by all those who have something to offer.

15.6.3 Images of Organisations

Let us explore some ideas about what is called images of organisation or the representation of the world around us, the phenomena (see 6.1 p 30, Husserl), by using analogies such as the nervous system in Beer’s VSM.

Charles Sanders Peirce spent a lot of time analysing the dependence of ‘icons’. Qualities need references! We immediately connect the smoke of a fire with the object that is burning. The portrait of a person depends on the representation of his or her age, gender, clothing etc. We

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71 Prof Fredmund Malik, University of St. Gallen, Switzerland
struggle to isolate the quality of an object from its environment. Jürgen Habermas said that ‘independence can only be achieved by abstraction’ and Karl Weick dealt with this fundamental aspect of life by using the metaphor of maps. ‘Everything in this chaotic world looks the same, incomprehensible and difficult to map. Abstracting and symbolising is the process, which enables people to map the world, so that we experience the world as patterned and coherent. This process is necessary but inherently inaccurate. The awareness of the abstracting process in mapping the territory is often blurred and the distinction difficult but the world becomes stable only as people ignore differences and attend to similarities.’\(^7^2\)

The phenomena which we observe as material objects or feelings are subject to a different interpretation by every human being. As Bertrand Russell said, ‘There is absolutely nothing that is seen by two minds simultaneously.’ So what is important to our perception is not only the content but also the way of representation. Our brain works with ‘chemical pictures’ and that is why we understand images or metaphors, and consequently images, icons or metaphors of organisations. ‘Using multiple metaphors to understand organisation and management gives us capacity to tap different dimensions of a situation, showing how different qualities of organisation can co-exist, supporting, reinforcing, or contradicting one another.’\(^7^3\) But we will see that metaphors can also make it hard to re-look at entirely different models because they often match with the ‘chemical picture’ in our brains.

Stafford Beer chose a model or metaphor that has been exposed to the ‘fine-tuning’ of evolution over million of years – the nervous system and the brain. This legacy seems to give his VSM a kind of authority if its interpretation is applied correctly to organisations.

15.6.4 Brain of the Firm

Beer was completely unsatisfied with the company organisation charts as a representation and was looking for a model which could be used to diagnose problems in organisational systems and to design or redesign them. The analogy of the nervous system and the human body as a metaphor was published in his famous book, *Brain of the Firm*. One of Beer’s key concerns was that such a model should allow for the system’s viability – in other words, allow the system to respond to unexpected events at all times. The model should also integrate most of

\(^{71}\) Fredmund Malik, *To be and not to be, that is the system, A tribute to Stafford Beer*, 1996
\(^{72}\) Karl Weick, ‘Cartographic Myths’, GSB/UCT EMBA handout, 2001
the cybernetic laws as outlined by Ashby. Probably the central aspect, and particularly important for the innovation process, is the amplification of the organisational variety in order to cope with the variety offered by the environment. This requires variety engineering. The requisite variety confronts management with an enormous data load, which needs to be filtered in a meaningful way to a manageable level.

It is not important here to gain a deep understanding of the VSM but to realise its potential and possible downsides in terms of innovation management. The following section summarises the model.
15.6.5 The Viable Systems Model (VSM)

The main elements of the model (Figure 19) are five subsystems with the following headings:

*System 1: Implementation (i.e. production)*
*System 2: Coordination*
*System 3: Control*
*System 4: Development*
*System 5: Policy*

System 1s are to a high degree autonomous in order to deal with and absorb the variety of the environment. So each S1 should be viable and a model of the VSM in itself (recursion). Beer’s model presumes that the information exchange between the different subsidiaries (A, B, C, D) is important and that System 1 requires a degree of control and coordination. System 2 is therefore a coordination system seeking to help the flow in and between the system 1s. System 2 must have control centres in system 1s where signals are read and linked to a higher regulatory centre. System 2’s function is then also to prevent uncontrollable oscillations in the whole system. System 3 has a control function. It must therefore have direct access to audit (audit channel) all subsystems at all times.
This also involves the control of how policies and resources are implemented or used, respectively. Beer describes the vertical lines going through systems 1–3 as ‘command’ lines, an aspect which has been perceived as an autocratic or hierarchical by his critics.

However, the control information going via system 3 is channelled in both directions in order to allow essential information to pass quickly. Beer grouped the three lower systems (1, 2 and 3) together as a so-called autonomic management system, an adaptation to the physiology of the human body. The nervous system of the human body does indeed provide control of the vital organs without the contribution of the ‘higher’ centres, but the difference is that it cannot act purposefully in the environment without its involvement. This supports Beer’s model, which implies that a purposeful action and reaction to unexpected events in the environment requires the involvement of ‘higher’ systems. While system 1s can sustain viability in emergencies, they cannot act beyond viability, according to the physiological model. A human system cannot react to events in the environment if it suffers a blow to the head and is in a coma, while the heart and respiration would keep the whole organism alive independently. In real life, subsystems could well take over the entire system and ‘run’ it successfully in a variable environment (e.g. management buy-out and take-over).

System 4 is involved with variety engineering. The ‘intellectual centre’ (system 5) is in danger of becoming overloaded with information that is not relevant for its thought process and decision-making. System 4 acts in the form of a ‘switch’, as Beer calls it, filtering non-relevant information from important information. It is also the location where internal and external information are brought in line. It is in a sense the ‘command deck’, where a ship is steered and where senior management meets. The risk is, of course, that relevant information goes missing through the filtering process.

System 5 eventually moves the steering wheel in a particular direction. It has to monitor and influence the dialectic of internal stability and the ability to motivate change depending on the environment. Beer, who proposed that system 5 should be an ‘interactive node’ of managers, had always denied the hierarchical association with such a system. He argued that decision-making can be formalised without suffocating the flexibility and freedom of the system.

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74 Autonomous (or vegetative) nervous system: Regulation of the vital organs independent to will and consciousness – sympathetic system (energy de-charge or ergotrope) and parasympathetic system (energy building or trophotrope)
15.6.6 VSM and Innovation
How can the VSM be applied to the innovative process? Malik: ‘More and more production processes deal with the intangible goods “knowledge”. Knowledge nowadays is the key resource. Its characteristics are very different from those of the classic resources (land, labour, capital). Due to higher variety, these processes need more management than do material production processes. These processes take place in new and very different structures (look at the Internet!), in organisations which are becoming more and more fluid, which have new and quickly changing shapes. The VSM provides a way to understand and structure such knowledge-organisations.”\(^{75}\) If one is to make possible desirable changes, it is not enough to change the appreciations of people about a situation; it is also necessary to make the changes structurally (systematically) feasible.

15.7 Systems Dynamics – J. W. Forrester
Forrester, like Beer, had tremendous influence on the beginnings of management cybernetics with system dynamics. His modelling emphasised dynamic feedback processes, which he claimed would explain the behaviour of systems. The first part of this thesis applied the tools of systems dynamics quite extensively. Forrester focused more on the interaction of the elements of systems than on creating a model like Beer’s VSM. The focus of this thesis is on the VSM because it served as a fundamental model for second-order cybernetics (see below).

Beer’s VSM is a functionalist model which adapted the nervous system to organisational management. The visionary Beer is possibly still too much a product of modernism. His model is not explicit about the soft issues of human interaction, despite the fact that Beer was a vigorous defender of his model as a viable system if designed properly. It has often been interpreted as too mechanistic, opening it to criticism regarding its ability to adapt to change. The VSM provides a relatively simple image of organisations that is easy to conceptualise with regard to design control, communication, coordination and implementation. It seems to be suitable for companies concerned with innovation because it promises better variety engineering.
15.8 Second-Order Cybernetics

A more systemic cybernetic approach to management is based on the work of Maturana, Varela, von Foerster, Espejo, Schwaninger and others. They all represent what is referred to as second-order cybernetics, whereby deepening the understanding of the relationship between the individual and the organisation becomes a central aspect of effective problem-solving. To many authors, the assumptions of first-order cybernetics (see above) derived from the understanding of machines do not appear reasonable in the context of human activities. It would be unfair to classify Beer as entirely representative of first-order cybernetics. His model is not really in conflict with second-order cybernetics, but it may not be as explicit concerning the soft issues. Second-order cybernetics enhances problem-solving by making control and autonomy complementary rather than contradictory. Markus Schwaninger is one of the exponents of second-order cybernetics. The following section focuses mainly on his work and that of some of his colleagues.

15.8.1 The Dawn of the Black Box

Espejo and Schwaninger place a lot of emphasis on better relationships and communication requiring the sharing of a common representation of a situation. Schwaninger: ‘The “black box” thinking of first-order cybernetics is too analytical and does not include the phenomenology of the involved individuals. In this sense, cybernetics seemed to be too rigid for human interaction. This means that an effort has to be made to create a representational platform for every individual to contribute to the common understanding!’ ‘The statement “everything that is known is known by an observer”, changed the emphasis from a naïve realism into a more phenomenological framework. It cannot be assumed that everyone sees the same “black box”, nor that there is a “black box” out there to be seen about the defined goals or the mechanisms to regulate the “black box”. In this new framework communication processes are the outcome of epistemological mechanisms. In other words, communication processes are based on creating knowledge and depend on language and media to take place. The key problem of situational participants is to “ground epistemology in ontology”, or in other words, to transform their knowledge of their realities into shared knowledge of a common domain of

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75 Fredmund Malik, Peter Stadelmann, ‘Management Knowledge and Knowledge Management’, *To and not to be, that is the system, A tribute to Stafford Beer*, CD Carl Auer - Autobahn Universitäet, 1996
76 Maturana, 1987 and Von Foester 1979
77 Raul Espejo, Markus Schwaninger, *Organisational Fitness*, Campus Verlag, 1993
action in which the participants can operate as a community. This transformation depends on the communication processes creating this shared reality, or operational domain.'

This view does not deny the existence of a world outside the observer; however, it denies that the world is independent of the observer, which makes it necessary to accept multiple realities. Models may help to create a common language among the participants by making apparent distinctions so far not shared or recognized by them. However, it is only in the context of a shared operational domain that modes can be used as if they were a representation of an external reality; it is only then that Weick’s dictum, ‘the map is not the territory’, makes sense. ‘For as long as the process is focused on creating a common operational domain the “map is the territory” of the interactions.’

Hence, more and more ‘accurate’ models of the situations of concern do not necessarily help problem-solving. It is not about being precise, but about making managers think. Precision would be more accurate if the participants were in a shared operational domain. ‘In fact, however, particularly when we are talking about unstructured, fluid situations, the main use of models is making distinctions through which the participants create a common domain, rather than a shared view of reality. The quality of these creative processes depends upon the quality of the communication mechanisms supporting the interactions of the participants. In other words it depends upon the organizations and related structures in which the concerned individuals operate.’

15.8.2 Viability beyond Survival
Espejo and Schwaninger both built their models on Stafford Beer’s Viable System Model but both focus more on dynamics. Their interest is ‘viability beyond survival’ or how organisations are able to ‘change themselves, influence their environment and if necessary, find a new environment’. I think one can postulate that this is particularly important to innovation. Schwaninger postulates the following capabilities of organisations to be able to fulfill a systemic purpose:

- structures that support autonomy and problem-solution capabilities;

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78 Harnden 1989
79 Raul Espejo in Organisational Fitness: Corporate Effectiveness through Management Cybernetics, Chapter ‘Management of Complexity in Problem Solving’, Campus Verlag, 1993
80 Markus Schwaninger, Die Intelligente Organisation als lebensfähige Herterarchie, Discussions Beitraege, Insitut fuer Betriebswirtschaft St. Gallen, Nr. 14, Sep 1994
• transformation of the company culture to one of greater openness, participation and self-organisation
• exchange of Taylor’s paradigm for a systemic paradigm;
• creation of conditions for the employees to allow their development and to find and create new options;
• implementation of mechanisms that guide but allow autonomy and cohesion;
• realisation of structures that support reflection.

15.8.3 Heterarchies vs. Hierarchies
This paragraph makes a general comparison of autocratic and what are often called ‘flat’ structures in organisations, including the domains concerned with innovation management. Schwaninger emphasises that heter-archies (from the Greek ‘heteros’ = different) imply a highly participative culture of dialogue and that any unit of an organisation can take a leadership role for the entire organisation in certain aspects but at the same time subordinate functions. The emphasis of heterarchic organisations is on temporary structures, multiplication and recombination, while hierarchies are strong in using existing resources. The strength of heterarchies lies in innovation and flexibility while they struggle sometimes to sustain identity and cohesion.

Raul Espejo compiled the following comparison of heterarchic and hierarchic systems:

<table>
<thead>
<tr>
<th>Recursive (heterarchic)</th>
<th>Hierarchical</th>
</tr>
</thead>
<tbody>
<tr>
<td>self-regulation</td>
<td>regulation from above</td>
</tr>
<tr>
<td>shared realities</td>
<td>one reality</td>
</tr>
<tr>
<td>autonomy of parts</td>
<td>contained parts</td>
</tr>
<tr>
<td>distributed control</td>
<td>top-down control</td>
</tr>
<tr>
<td>empowerment</td>
<td>power over the other</td>
</tr>
<tr>
<td>decentralised</td>
<td>centralised</td>
</tr>
<tr>
<td>responsible</td>
<td>obedience</td>
</tr>
<tr>
<td>flexible</td>
<td>law of rules</td>
</tr>
<tr>
<td>pluralistic</td>
<td>hegemonic</td>
</tr>
<tr>
<td>individual centred</td>
<td>role-centred</td>
</tr>
<tr>
<td>coalitions</td>
<td>confrontational</td>
</tr>
<tr>
<td>composite units</td>
<td>simple unities</td>
</tr>
</tbody>
</table>
15.8.4 Heterarchic Networks

Networks are not necessarily heterarchies but all heterarchies are networks. Schwaninger states that networks can deal better with uncertainty because of their ability to absorb complexity and their flexibility and capability to adapt. They also allow better realisation of Ashby’s law or variety.\(^{81}\) Allowing networks to absorb complexity requires a maximum degree of freedom or a state that is close to equilibrium of maximal entropy.\(^{82}\) The freedom must allow a system to change and to identify options through a rapid sequence process of trial and error. Such a process is difficult if not impossible to regulate or control. It is possible that it cannot even be supported by adequate structures. A way of quantifying the output of networks has developed from sociometric tests. They measure the density of relations, dispersion, ability of interaction, social distance, influence etc. Shortfalls are that the dynamics of interactions, context and history are difficult to quantify.

In Figure 20, Type A is a hierarchic system and Type B a heterarchic network:

![Figure 20: Hierarchic (A) and Heterarchic System (B)](image)

15.8.5 Viability of Networks

Networks seem to be temporary and project-oriented formations. Their lifetime is somehow limited by the scope of task. Such a temporary system will go back into its state of potentiality when the goals are reached. Depending on the tasks and projects new intra-organisational groups will form (Figure 21)

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\(^{81}\) only variety can master variety

\(^{82}\) Entropy, a measure of the disorder in a physical system, and hence of how close it is to thermal equilibrium in terms of thermodynamics. More about organisational entropy under 14.10.4
This allows a high degree of variety and a customized adaptation to any task. The different tasks can, however, take different time frames and scopes, as represented by three different management levels as part of a management framework: normative, strategic and operational management. This serves as valuable model and is illustrated in the graph below (Figure 22, according to M. Schwaninger).
Schwaninger plays with the paradox of viable systems by asking if networks should actually be viable because they are defined by a task and are by definition only temporary systems.\(^3\) One of the characteristics of networks is therefore permanent metamorphosis, during which they can return to a state of potency from which they can evolve to a new form according to a given task or event. Boundaries are defined by the task-related interaction of people who form a ‘virtual organisation’.\(^4\) Such a concept addresses the increasing complexity of the economic, social, political and technological environment. It appears to be ideal for the innovative process, where essentially a high degree of variety is required according to Ashby’s law of variety (only variety can deal with variety).

Schwaninger states that there is sufficient proof for the compatibility of Beer’s theory with heterarchic networks and that they require the different management functions as defined in the VSM. Schwaninger proposes that the necessity of certain structures has to be balanced by the ability of systems towards spontaneous self-organisation, but, according to him, the VSM provides the necessary structures for the management of innovation.

15.8.6 Qualification of Beer’s Viable System Model (VSM) as Heterarchic Network
The VSM represents one of the most valuable organisational management theories for second-order cybernetics, as it is a powerful concept for the design and creation of heterarchic networks. Such design, in the context of innovation, should enhance organisational intelligence and fitness. Schwaninger emphasises that viability means more than being ‘autopoetic’ (self-producing). Intelligent organisations do not put survival as their highest goal but their dedication to development. Allowing self-destruction at certain instances is necessary when their identity no longer fulfills any purposeful function.\(^5\)

Second-order cybernetics considers the ‘black box’ as an insufficient model of management. Its emphasis is on the communication processes, which are based on creating knowledge, and depends on a common language and the ability of representation. The key problem for second-order cybernetics is the transformation of knowledge of different realities into shared

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\(^3\) Markus Schwaninger, Die intelligente Organisation als lebensfähige Heterarchie, Institut fuer Betriebswirtschaft St. Gallen, 1994
\(^4\) A term, which according to Schwaninger, has been created by Jan Hopland of Digital Equipment Corporation
\(^5\) Markus Schwaninger, Die intelligente Organisation als lebensfähige Heterarchie, Institut fuer Betriebswirtschaft St. Gallen, 1994
knowledge of a common domain of action in which the participants can operate as a community.

The effective exchange of information that can stimulate innovative thinking is easier with heterarchies. Heterarchies are characterised by greater variety and flexibility, while they often struggle to sustain identity and cohesion. Allowing networks to absorb complexity requires a maximum degree of freedom. The freedom must allow a system to change and to identify options through a rapid sequence of trial and error. Such a process is difficult to regulate or control and is not necessarily supported by structures. Schwaninger, however, qualifies Beer’s theory as a good model for heterarchic networks, as long as managers are able to balance the paradox of structures with the spontaneous capacity of systems to self-organisation.

15.9 Luc Hoebeke on the Innovation Domain

The following section is a closer look at Luc Hoebeke’s ideas about innovation, and draws on his book, *Making Work Systems Better*. Hoebeke’s views are reflected with only a few comments. I didn’t see the necessity to rephrase his ideas, and the relevant quotations are taken directly from the book in order not to distort his work. His model is related to Beer’s VSM but emphasises on the sociology of organisations, the people who form them and the dynamics of their interactions. He created a new name for groups of people who are concerned with a particular domain of each business – work systems.

15.9.1 Basic Description

Hoebeke defined work systems as ‘systems of more or less loosely coupled self-regulated semi-autonomous networks rather than static hierarchical pyramids’. A lot of his work is built on Peter Checkland’s Soft Systems thinking. He developed a view of Human Activity Systems as different systems in which people work and which have special outputs without formal organisational boundaries. Beer’s Viable System Model (see below) is an important step to the understanding of work systems. Says Hoebeke: ‘His *Decision and Control* and *Brain of the Firm* convinced me that logical rigour could still be valuable in human problems as long as it is related to one’s own sense of elegance or beauty.’ The conceptual framework of the work

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systems is to ‘relate human activities again with identifiable human beings’. Hoebeke defines the classic subdivision of companies as domains whereby innovation is a separate domain.

15.9.2 The Innovation Domain
Hoebeke on the innovation domain: ‘Changes in values in the environment in which the work system in the innovation domain is embedded are sensed and transformed into new products, services and processes. The work system is involved in the discovery and the creation of the added-value of the future. The innovation domain has its own characteristics and dynamics. A lot of what is created through innovation is pushing new markets. An innovation is called successful when it becomes integrated into the work systems of the added-value. A successful innovation can only be called post hoc. For this reason, it is not surprising that people who feel at ease working in the innovation domain are not inclined to use the words “success” and “failure”. The inquiry process in itself is what they value most. High-performing Research & Development divisions are exempt from the fear of failure. When innovative efforts fail, they are perceived as necessary learning elements. Statistically, only 15% of innovative projects, which are formally started, come to fruition.’

Clearing some of the semantic ambiguities regarding research, development and innovation: ‘Clearly, the creation of a new market through the introduction of a new service or product is an innovation. But in business terms, activities that lead to the introduction of new products or services are called development activities, in contrast to research activities, which result in discoveries or inventions.’

15.9.3 Desirability of Innovation
Hoebeke: ‘The future, which will be discovered, must essentially have an ethical and aesthetic attractiveness for the stakeholders who will have to be involved in its future realization and use. This is only possible if the innovators themselves have a passion to achieve what they desire. Desirability then becomes an attribute of a relation between innovators and stakeholders. It can be measured by the degree of positive effort that both make in that relation. Innovations are not to fulfil customer needs; they are the expression of a desire. People committed to them wish to express something new in a product or service.’ What Luc Hoebeke is stating is a truly fundamental desire to express our innermost feelings through the exercise of life.
15.9.4 Feasibility of Innovation

Innovation doesn’t come easily: ‘Innovation always has to pass through a Machiavellian struggle: those who have to defend the present know what they have to lose, while those in favour of the innovation are, at most, lukewarm champions. What they can appreciate is still pie in the sky. And they are very aware that there can never be any given guarantee that the new state of affairs will succeed.’ Hoebeke emphasises the dialectic tension between the ‘conservatives’ and the innovators’ that leads to a feasible (i.e. socially and culturally acceptable) expression of the innovation. Here again, same as the desirability, feasibility is an attribute of the relation between innovators and stakeholders. ‘It can be measured by the degree of defensive effort that both invest in the relation. In contrast to positivistic scientific ideology, which claims that scientific endeavours are value-free, one finds in scientific innovative environments much rhetoric, apologetics and debate.’ This is, as stated elsewhere, a healthy state of affairs. ‘It is a way by which works systems show a sound resistance to change. Not every brilliant or maverick idea can be assimilated.’

15.9.5 Transferability of Innovation

The best innovation cannot be transferred to the added-value domain if it is not understood. Hoebeke: ‘The balance between desirability and feasibility is the driving force for creating the conditions in which innovations can be assimilated by the work systems in the added-value domain. The degree to which an innovation can easily be spread in the added-value domain gives an indication of its transferability.’ Many innovations fail because too few efforts are made to achieve transferability. The simple but major hurdle is that innovators struggle to separate themselves from their ownership. This is the fate of many ‘entrepreneurial’ innovators. ‘Only if the innovation is left as an inheritance to the work-systems in the added-value domain will it become successful. Transferability is perceived as a threat to the power base of innovators. It also creates a demand that, once one is involved in innovations, one must continue to innovate.’ This pointed description gives a good insight into the very basic psychological conditions between work systems. The understanding of the dynamics seems to be crucial for a better innovation management.

15.9.6 Systemicity and Time Span

Luc Hoebeke involves a dimension that often seems naively neglected in the management literature, namely, time. He proposes a classification according to time-related process levels: ‘As innovations recreate a new conceptual order in their area, the classification schemes of the
old order are no longer valid. Hence it is essential to take into consideration the innovation area within its context. The degree in which an innovation has been conceived, taking into account the interfaces with other areas, is an indicator of its systemicity.

Hoebeke has defined several process levels for every work system. *Process level 3* is defined as the innovation period of 1 to 2 years, *process level 4* as a period of 2 to 5 years and *process level 5* from 5 to 10 years. *Process level 1 and 2* (1 day to 1 year) are normally not found in the innovation domain but in the added-value domain. Every process level has its own strategic dilemma, which he defines as follows (see also Figure 23):

**Process Level 3 (1 – 2 years):**

**Basic Strategic Dilemma:** Choices have to be made for alternative products and services in which known clients could be interested. Do we take the risk of reformulating the needs of those clients through these novel products or services? Thus in process level 3, because it is the link between the added-value and the innovation domain, an adaptation for existing clients and ‘markets’ is required. The way in which this dilemma is normally expressed is by what is known as ‘pilot projects’. The result of these trials is in fact the first check whether the proactive anticipation of the needs and wants of these clients are minimally met by the novel products and services, developed on a small scale. This is a well-known method of technical innovation.

**Process Level 4 (2 – 5 years):**

According to Hoebeke it is the transformation of the signals of change in the value system of the major stakeholders into new generic products and services, which, at the same time, make this change perceptible to them. They concretely reveal the future, which is already present, and shape it in that way. Innovations should not be confused with inventions. Successful innovations, after their first introduction to new clients, generate many followers in the added-value domain.

**Basic Strategic Dilemma:** Attachment to or detachment from what already exists is the dilemma confronted by innovators active on recursion level 4.
Many innovations do not score well regarding systemicity. This is due to confusing development in a specialised field or discipline with innovation, which takes into account the work systems in the added-value domain which already exist or have to be created to assimilate the innovation.

**Process Level 5 (5 to 10 years):**
According to Hoebeke it is important here to sense the changes in value systems, to recreate conceptually whole systems which reflect these changes and thus to create conditions for the introduction of innovative products and services relevant to these changes. On this level, the rules of the game for the next decade are consciously made. Innovations that belong to this process level always imply many work systems. The focus of the innovative activities is upon the redesign of the relations between these work systems. The rules of the game cannot be altered if they are not in tune with the changing values of the various stakeholders in the network.
Basic Strategic Dilemma: Although immediate results are not available to verify choices, the efforts deployed on this level create a point of no return – in technical terms, a bifurcation point. These choices can create many beneficiaries and victims among the stakeholders, and one is not sure who will be what. The tension between the attractiveness of the future which is designed, the aesthetic and ethical aspect and the amount of unavoidable harm which will be caused, requires most attention for those consciously involved in this kind of process.

15.9.7 Relations between Work Systems of the Added-Value and the Innovation Domain

Hoebeke describes the essential relationship between the two domains: ‘Here we have two kinds of relations. The first is a regular exchange of people working on processes on process level 3 (adapting and improving product, services and technologies) with those working on process level 4 (creating new products and technologies for a system of known stakeholders). This exchange greatly enhances the transferability and the systemicity of the innovations. At the same time, the added-value domain keeps in touch with what succeeds in the innovation domain. The second relation between the added-value and innovation domains lies in the fact that the costs incurred in the innovation domain have to be paid for by money generated in the added-value one.’ This often creates a conflict situation because innovators feel that they have to beg and plead in order to be able to do their work and that they are viewed with distrust by the value-added domain.

15.9.8 A Need for Innovations?

Luc Hoebeke takes a critical look at innovation: ‘One of the major errors is to state that innovations must be marketable. This is a contradiction in terms, once the revolutionary characteristics of real innovations are understood. The only attitude possible is of sharing the risk between the partners involved in them and paying for them. Part of this trust may reside in the fact that the parties feel able to stop an innovation effort if, during the course of its development, its incongruence becomes too evident.’

On dismantling a mental model: ‘Innovations are not needed; they are always the fruit of a want, of an enthusiasm on the part of the innovators. At the basis of any innovation is the vision of an innovator. Perhaps it is for this reason that economists have so much trouble in coming to terms with innovation. Economics belongs to the added-value domain and must be conservative by nature. Innovations are creating new economic ecologies. Metaphorically, a new species is invading the existing ecosystem and changing the prevailing rule of the game. A healthy
ecosystem is bound to resist this intrusion. This resistance creates the possibility for newcomers to insinuate themselves into the system. It is a guarantee of transferability and systemicity.’ What is critical for the success of innovations is that they are supported throughout the entire organisation. That means that innovators cannot act in isolation. ‘The reason many projects are continuing and are not transferred to the added-value domain is that the project team members, who have in any case to struggle with the process of ending the project and handing it over to others, have no future after the project.’ Can it be so simple?

15.9.9 Relations between the Work Systems in the Innovation Domain
Again, isolation of the innovation domain is not sustainable. ‘Here the only possible relations are through the exchange of persons in the various project groups and through meetings of people working in them to exchange ideas, concerns and hopes. The exchange of people between projects must take into account the right time frame. If it happens too often, contributions will suffer.’ Beer and others, such as Ackoff, appear to neglect the influence of power and the narcissism of people in organisations. Egoistic motives represent some of the biggest hurdles to the proliferation and transferability of innovation. Really problematic is that most of the people are not aware of their mental models. ‘There is a tendency for innovative people to stay with the successes of the past, to continue on the same theme. The result is overspecialisation or the creation of a style, a school of thought, a dogmatic environment.’

Beer, Schwaninger and Hoebeke agree that conditions have to be created to maintain an intellectual mobility. ‘Interdisciplinary teams’, says Hoebeke, ‘are excellent places to nurture this mobility’. Douglas B. Lenat, in his studies on heuristic, showed that the most productive inventive heuristics are still analogies and metaphors shared by different groups of people.

15.9.10 Planning versus Innovation
Hoebeke makes clear that ‘what is normally understood as planning is incompatible with the concept of innovation’. Innovation activities are indeed inherently uncertain and the development of an innovative idea is unfortunately and fortunately full of pleasant and unpleasant surprises. ‘Planning normally means dividing a system of activities into definable sub-activities and relating these sub-activities to each other by means of a time axis. Now innovative activities, which in fact create their maps and paths during the exploration of an unknown territory, are missing the relevant criteria for division, and stages or key events are unpredictable in time.’ Hoebeke gives the following example: ‘…DuPont has continually tried
to replicate the process of the invention of polymerisation, which led to synthetic fibres, by Carothers in its R&D division without success. No conditions, no planning and decisions procedures could guarantee similar discoveries.’ Furthermore, he writes, ‘It is clear that, as normal human beings, innovators try to cope in a particular way with the uncertainties which they know they have to face. And a very human way to cope with uncertainty is to create and anticipative a model of causes and effects of what we intend to do. Certainly, planning can fulfil that function. Things go awry when a non-relevant understanding of cause and effect inherently flaws the language used for this model. Positivistic science, which is still the most current ideology behind innovative efforts, has inherited the confusion of the Greek philosophers between causality as a logical and a chronological construct. It is clearer that if innovative activities imply a learning process, it must be full of feedback cycles, where the output of one experience is used as the input of the next set aiming at the same results. Chronologically, the terms “input” and “output” lose their meaning, while logically they can be part of meaningful maps for the various parties involved in innovative activities.’

Does that mean that any planning is detrimental of the innovative process? ‘The use of personalized planning, which omits time in project work, makes things much simpler because it does not aim at predicting an unpredictable future and at creating pseudo-certainty. The latter makes planning very complex and it is used as justification for explaining why things did not perform as planned.’

15.9.11 Relations between Work Systems in the Innovation and Value-Systems Domains
‘The relation between the innovation and the value systems domains’, writes Hoebeke, ‘occurs only through exchange of persons’. He implies that managers in the value-system (normative management level) have to be in close touch with the innovation domain. Interpersonal involvement will integrate the different system domains towards a more cooperative effort.

Hoebeke’s theory of work systems provides an important explanation for the dilemmas and conflicts within organisations. His model is another step away from a mechanistic view of the world, trying to grasp the soft issues regarding human interaction. Hoebeke is very particular in bringing the classic conflicts between the innovation domain and the value-added domain to the point. It becomes more and more apparent that cybernetics is in a sense an idealistic concept for a world constrained by power games and conflicts.
Hoebeke also brings in an element of time. Innovation has its own life-cycle dynamic, and it is unlikely that it can be accelerated. Proliferation of innovation through the interaction of different work systems, on the other hand, appears to be possible. Hence planning innovative projects now means for Hoebeke the joint elaboration by the actors in a project of the logic of the activities. This can be used to debate the status of complex systems of interrelated activities with an uncertain outcome and with unpredictable mutual feedback loops and non-linear mutual causalities.

15.10 Postmodernism - Systems without Boundaries

Ralph Stacey is one of the exponents of a postmodernist management philosophy where dealing with paradoxes is one of the key concerns. Organisational life is in a continuous state of order and disorder, stability and instability. The difference between these states is the motor of change and probably also of innovation. The following paragraphs support a non-linear approach to life and innovation and are compiled from the lecture notes taken during his visit to the GSB in September 2002.

15.10.1 Mainstream Thinking versus Interaction

Mainstream thinking eliminates the paradox. Stacey calls strategies an academic exercise that is poorly understood and therefore hijacked by managers who dictate and control their preferences. Strategies in a postmodernist view are redefined as an expression of the learning organisation, as described by Peter Senge. Charismatic leadership, in Stacey’s eyes, limits the variety and therefore the possibilities of an organisation to be innovative. Organisations are not what the leaders determine but the sum of the interactions among the people forming a system without boundaries. What keeps them together is the force of gravity. Such an organisation can be perfectly viable, as shown in nature by prions. These are the smallest infectious particles, consisting of nothing other than long-chained proteins without capsules or envelopes. It is the capsule that makes microbes more vulnerable to disinfectants. Prions are therefore hard to render inactive and are extremely adaptable.
15.10.2 Hegel’s Philosophy

Stacey often refers to Georg Friedrich Hegel, one of the greatest philosophers of all time. Marx, for example, built his entire philosophy on the ideas of Hegel. Hegel considered reality as an ongoing process of development and was one of the first philosophers who put self-awareness and knowledge at the forefront – the result, ‘geist’, is considered to be the essence between spirit and mind. More important, in the context of postmodernism, was his realisation of change as a result of the tension between thesis and an antithesis in the dialectical process. The pattern of change is dialectical and has often been referred to as the ‘law of change’. There would be no change without conflict. His social philosophy was heterarchic in its character. He believed that the individual would freely serve society. Paradoxically, he saw the rigid Prussian monarchy as an ideal state form, which resulted in the evolution of a left wing (Marxism) and a right wing (German nationalism) of his philosophy. Ironically, both sides misunderstood the character of dialectics and failed in trying to implement the extremes.

15.10.3 The Paradox of Control

The aspect of control has already been touched on in the discussion of cybernetics. Postmodernism has a very particular view of control. It starts with the questions whether we are in control of our learning and then whether we actually have to be in control of our learning. The fact is that the notion of control confronts us with the most classical paradox of organisational life. Stacey compares the two states of being in control and not being in control:

<table>
<thead>
<tr>
<th>In control:</th>
<th>Not in control:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended/selected.designed</td>
<td>evoked/provoked</td>
</tr>
<tr>
<td>forming</td>
<td>being formed</td>
</tr>
<tr>
<td>predictable/certain</td>
<td>unpredictable/uncertain</td>
</tr>
<tr>
<td>stable</td>
<td>unstable</td>
</tr>
<tr>
<td>regular</td>
<td>irregular</td>
</tr>
<tr>
<td>detecting deviation</td>
<td>amplifying deviation</td>
</tr>
<tr>
<td>correcting</td>
<td>letting go</td>
</tr>
<tr>
<td>conformity/consensus</td>
<td>diversity/conflict</td>
</tr>
<tr>
<td>habitual movement</td>
<td>spontaneous movement</td>
</tr>
</tbody>
</table>

‘What are we doing in an organisation if we don’t know what we are doing?’ asks Stacey, ‘we try to control!’ And yet, most of us probably feel more attracted by the right-hand column of

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the above table, most likely because we all know that most creative things occur out of situations of no control!

15.10.4 Epilepsy and Entropy

Why do we have so much difficulty in seeing the paradox of control? In this respect, the Russian novelist Fyodor Dostoyevsky, whose work I read some years ago, crossed my mind. Dostoyevsky’s *The Idiot* concerns the creative but tragic life of a man who suffers from epilepsy. The novel is also an autobiography of the writer himself, who had to live with the ‘illness of the gods’ – as the Romans called it – throughout his career as a writer. He described the aura prior to the uncontrolled electric cerebral discharge as moments of inspiration, a moment which was able to surface the most creative side of the literary genius. This is a postmodernist metaphor. Creativity results from a situation on the verge of becoming instable. It ends in a ‘grand mal’ attack (a medical term for an epileptic seizure, translated from French as ‘big bad’) followed by a collapse and a feeling of total emptiness. The metaphor tells us that maximal creativity could be born in the delicate balance between stability and instability, a state also described as ‘entropy’ in the Second Law of Thermodynamics.

Entropy is the process by which dynamic systems are continuously falling apart, causing increasing disorder and loss of energy. Our universe is an example of entropy, as are machines and organisations. But there is a fundamental difference between these three examples. Cars fall apart, but organisations and the universe have the potential for what physicists call negative entropy or ‘negentropy’. It means that organisations can reorganise themselves to a new level of complexity of a higher order. This process in a way violates the Second Law of Thermodynamics and represents a form of ‘perpetual mobile’. As a matter of fact, history shows that this rarely happens. The sustainability of organisations, nations or cultures remains a mystery.

The universe is in a state of entropy, and increasing dissemination of its energy will eventually result in maximal entropy or a balance followed by an implosion. What organisations and the universe have in common is that they have gravity and no boundaries. The challenge for organisations is that they must try not to fall apart or collapse nor should they be in a perfect

Brealey Publishing, 1994
balance between negative and positive entropy. They have to be in a permanent state of change. The same is applicable for innovation. Stability appears to be as fatal for it as complete instability.

15.10.5 Kant’s Philosophy – A Non-Linear World

The way we perceive the world is only an approximation or estimation of a moment in time – a calculus. We have to break a moment into a small piece to understand it. This is the scientific approach (Figure 24) commonly taken because linear equations can be solved more easily. Newton explained the relation of two bodies but how do you explain the behaviour of three?

Figure 24: ‘A Moment in Time and Space’

There is nothing wrong with the fact that we tend to look at a ‘snapshot’ in time, as long as we are aware of it. Emanuel Kant was one of the first philosophers who expressed the idea that the sceptics of a linear world were right and that we have a soul with the freedom of choices – a rather non-deterministic approach. He also took a dialectic stand by defending reason as a means of formulating hypotheses about the world through the capability to think in terms of categories – a rather deterministic approach.

15.10.6 Evolution

Darwin’s theory of evolution states that organisms survive if they have a high degree of adaptability. Stacey emphasises that evolution is not adaptability but exposure of living organisms to chance! Darwin might have missed the point. Cybernetics and General Systems Theory define self-regulating systems but not the influence of chance. They do therefore not explain evolution. Innovation as an expression of evolution is therefore not a function of the adaptability of an organisation but its potency, both internally in terms of variety and externally to its surface/interface to environmental variety, complexity and chance!

88 Dostoyevsky, Fyodor Mikhaylovich (1821-1881), Russian novelist, one of the greatest of all novelists, who penetrated the human mind and heart with exceptional insight and whose fiction has had profound influence on the modern intellectual climate.
15.10.7 Chaos and Complexity

Chaos theory is barely understood. The story of a butterfly causing a hurricane is just a metaphor for the cybernetic law of recursiveness. However, precise long-term weather predictions are simply impossible! In the case of organisations that are exposed to a number of unpredictable factors, one would assume that they should strive for viability beyond survival instead of getting stuck with their strategies. Here lies one of the fundamental strategic imperatives for innovative companies regarding their culture and ability to respond to the environment rather than spending too much time and resources and energy for planning. Or, in other words: planning processes and structures have to be put in place in an effective way, speedily and with a safe hand in order to free the capacity for the innovative process.

The brain is an excellent metaphor for complexity theory. It is a self-organising system consisting of 10 billion brain cells that are all somehow linked together and have developed a coherent pattern. Coherence is the central point of the complexity theory. Stacey often takes the flock of birds as an example. How can the birds fly together so closely without colliding? But coherence does not yet explain creativity and innovation. Innovative evolution is only possible with the presence of diversity and redundancy. The brain’s capacity for redundancy is indeed amazing. It allows replacement of (but not repair of) damaged areas and functions to a high level. That is why people with strokes can re-learn things like walking.

15.10.8 Self-Organisation of Systems and Organisations

Stacey provocatively states that it is a myth if we think that leaders know how to run a company. Leaders are just participants of interactions. We create leaders and leaders create us. Ideas that are evolving in the social process are in no way private nor is it the language we use. Language is a product of our social and historical experience. This was one of Hegel’s important points. He considered the individual as an expression of historical experience and the social environment, the state. German nationalists later abused this key idea. They overlooked an important aspect of it, which explains that social development is random and that the struggle for power and control are constraints to this development. Even our modern society is restricted, through its heavy interdependence, in the necessary variety to develop and innovate. Organisations have to make efforts to reduce, if not to eliminate, these constraining factors. Regarding leadership, it is notable that one leader is enough to block the entire creative flow in an organisation.
Chaos seems to be a necessary element in the innovative process. Trying to find a certain pattern in chaos can create some stability. The purpose of such is, according to Hegel’s social dialectics, to use the stability to re-pattern what has been found in order to find new elements which create some sort of instability, which then has to be re-patterned to create stability etc.

As leaders can block the flow of innovation, their task in organisations concerned with innovation has to change to a role as ‘therapist’ who draws people into a process of asking questions, noting and working on their mental models.

The kind of postmodernism represented by Stacey has little to do with esotericism. The advances organisations can make not only in the innovation domain, by taking the boundaries away, lie in an increased variety of factors that could contribute to a proliferation of knowledge. It is Stacey’s ‘day of reckoning’ with charismatic leaders and corporate strategies. Their influence on an organisation is at best a good snapshot in time. A sustainable drive to innovation is subject to permanent change and the willingness to engage with paradoxes, conflict and diversity – in the end, a healthy portion of chaos.
15.11 **INTERVIEWS**

The following interviews are not taken randomly but reflect different viewpoints. The choice of the interviewees was based on the following reasoning. I first wanted to discuss the applicability of cybernetics to innovation with a representative of second-order cybernetics. I then looked for someone who could critically reflect on the quality of Beer’s VSM from a biological point of view, and then a practitioner who works with the VSM but also other methodologies. What all three interviewees have in common is that they are dedicated to systems thinking. Professor Felix, who doesn’t apply systems thinking consciously, is considered to be a system thinker because he deals with systems every day as a medical doctor.

15.11.1 Schwaninger: Cybernetics and Innovation

Prof. Dr rer.soc.oec. Markus Schwaninger is Professor of Management at the University of St. Gallen, Switzerland – according to *Forbes* the No. 1 business school in the German-speaking countries. His studies were concerned with Economics, Sociology, Systems Theory and Management at universities in Austria, Switzerland and France. He has practical management experience in service organisations in Austria, Bermuda, Switzerland and Brazil. Schwaninger is also Management Consultant and Head of the Development St. Gallen Management Centre, the leading consulting and training institution based on a system framework in Switzerland.

15.11.1.1 The Significance of Cybernetics for the Management Model of the University of St. Gallen

Schwaninger: The Ashby Theorem says that the result of a process cannot be better than the underlying model if not by chance. It is the management model of sustainability that has influenced the economic training at the University of St. Gallen over the last three decades.
Schwaninger builds his teaching on two main pillars, one of which is Beer’s Management Cybernetics and the other Forrester’s Systems Dynamics. Professor Schwaninger’s concern is to build the bridges between these two theories.

15.11.1.2 Innovation and Cybernetics as a Common Language
The VSM is a very general heuristic of management. It implies that people in organisations speak a second language – the language of innovation. A trans-disciplinary common language is one of the central aspects of cybernetics and the VSM particularly. This involves different orientation parameters, which must be taught or shared for better understanding. But speaking two languages, ironically, can also result in a dilution of important expressions to an insignificant level with a low level of efficiency. Schwaninger emphasises that a common language is an important part of the VSM.

15.11.1.3 Applicability of the VSM
According to Schwaninger, Beer’s *Heart of the Enterprise* or *Brain of the Firm* demonstrate sufficiently that the VSM is by no means only a mechanistic model. But Stafford Beer always wanted to integrate mechanisms that influence the biological and physiological model of the brain, such as immunological or endocrinological factors, into his VSM. He was intrigued by Candace Pert’s book,89 *Molecules of Emotion*, which has a systems approach and is closely linked with cybernetics. Pert found the links between body and mind in the form of neuro-peptides, which form a dynamic information network. Beer might have seen Pert’s work about the emotional side of the human system as the missing link in his model.

15.11.1.4 Innovation and Time
Innovation should be concerned with time management. It is not about doing things faster but starting earlier and anticipating the relevant factors. One has to accept certain time horizons for the different management levels (see above: Normative Management – Strategic and Operative Management). Schwaninger, like Adabeck (MIT), emphasises that not everything can be anticipated on the normative level and that it cannot steer innovation without hampering it at the same time. A ‘bean counter’ approach to assessing innovation would be completely counterproductive. Schwaninger mentioned James Brian Quinn’s book, *Innovation Explosion*,

89 More about Candace Pert below in the literature chapter
as a valuable source in management literature, constructively supporting the innovation and knowledge management process.

**15.11.1.5 Team Syntegrity**

Team Syntegrity is a methodology described in Stafford Beer’s book, *Beyond Dispute*. It appears to be an optimal approach to innovative processes according to Schwaninger (a view that is critiqued by Jackson). Syntegrity has a regular icosahedron with 20 sides and 30 edges as model. The 30 edges represent people. An internal network of interactions is created by a set of protocols. A group organised like this is an ultimate statement of participatory democracy, since each role is indistinguishable from any other by not implying a hierarchy – no top, no bottom, no sideways. Beer demonstrates in *Beyond Dispute* how continued dynamic interaction between persons causes ideas and resolutions to hum around the sphere, which reverberates into a kind of group consciousness. Schwaninger claims that a sufficient amount of implementations of Team Syntegrity has created the body of evidence that the methodology really works.

**15.11.1.6 Postmodernism?**

Schwaninger warns that postmodernism, as it is presently understood (or not understood, respectively), is leading towards more confusion and into a swamp. The biggest obstacle, in his opinion, is that a postmodern language has yet to be invented.

Second order cybernetics can provide the right means for the design of innovation according to Schwaninger. Yet, systems must not be a result of a cybernetic model but reflect the particular character of teamwork and its conversations. Tools, like the Syntegrity model, might be more suitable for the required networking process, collection and patterning of information.
15.11.2 Felix: The Physiology of Learning

Dominique Felix, Prof. Dr. med.; Professor of Neuro-Anatomy and Physiology at the University of Berne, Switzerland (Emeritus 2002). Professor Felix was not only an academic but also the head of the institute of Neuro-physiology of the University of Berne and a high-ranking officer in the Swiss Army.

I had the chance to meet him in Zürich, where I presented to him Stafford Beer’s Viable System Model. Professor Felix had never been confronted with the VSM before. I wondered if it seemed complete to a neuroscientist who is most familiar with Beer’s underlying model – the nervous system. Other questions addressed the emotional factors of creativity and learning. Felix’s input can be seen as a semiotic approach to innovation management.

15.11.2.1 Invertebrates vs. Vertebrates

Felix’s first association with the VSM was related to the nervous system of invertebrates. Centipedes for example have to be segmented to survive; every segment is therefore highly independent. The human body’s reflex system is, in comparison, rudimentary and ‘degenerated’ so that it is only able to deal with the reflexes. The nervous system of the human body is in a sense autocratic, because most of the signals from the periphery go directly to the brain where they are processed.

15.11.2.2 Emotional Learning and Memory

Felix highlighted the fact that a lot of our learning is linked to emotions steered by the basal ganglia (Figure 25), also called hypothalamus, hippocampus and septum, in the brain. They are not, as one might think, generated in the cortex. The latter is responsible for processing the conscious realisation of our self and of our environment. The hippocampus, which is a part of the basal ganglia, is also linked to memory. Memory is in fact the storage of a form of electrical

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90 Any animal lacking a vertebral column, or backbone. Invertebrates constitute the majority of the animal kingdom, including all species except those that have vertebrae (vertebrate animals). The invertebrates range from the simple sponges to advanced animals such as insects
signal as long-term potentiation (LTP) in the hippocampus. Any input signals from outside will pass the hippocampus where they can be compared with what has been learnt whereby these incoming signals are changed and can also be amplified. This process can somehow also result in an increase of the threshold when the next piece of information enters, thereby creating certain autonomy from the conscious. That is why we start ignoring certain stimuli from the outside, such as noises, if they have no implications for us, while others can trigger some kind of reaction. The permanent scanning for differences in the hippocampus influence our action reflected as system 4 in Beer’s VSM (page 68). Figure 25 shows is visual comparison of the brain and the VSM.

Figure 25: Brain vs. VSM

Problematic can be that what is stored in the hippocampus or system 4 can trigger pathological reactions like neurotic behaviour, phobias etc. which are difficult to influence once they are established. Adapted for the VSM this would mean that system 4 requires a good level of objectivity by involving as many perspectives as possible. The outcome would be too predictable if only one person controls the variety engineering in system 4. The intelligent
reaction of the system depends entirely on the right selection of parameters on this level. This would most likely have a negative influence if applied to a work-system of innovation.

15.11.2.3 Thinking
Thinking is mechanistic and takes place in the cortex (System 5). The cortex needs the stored memory and emotional value from the basal ganglia (hippocampus) for an environmentally conscious realisation because it does not really store information! It is responsible for the conscious but needs the emotional content from its subsystems. The cortex has also a control function but again cannot react adequately without the emotional (memorised) context. It might in certain cases react inadequately as a result of an ambiguous emotional context. The amplification from the hippocampus can become highly pathological (i.e. Morbus Parkinson). The model of the brain can therefore be ambiguous for the emotional signals and does not necessarily provide an objective phenomenology. It is the interaction of different centres which creates the sense. We cannot identify or name any object without the involvement of the two relevant centres in the cortex (Wernicke: comprehensive speech area and Broca: motor speech area) and the phenomena we see needs the involvement of both hemispheres in order to make sense of a particular phenomenon. This could explain that the phenomenology of innovation in organisations requires the involvement of subsystems on all levels in order to increase the awareness of pathologies.

15.11.2.4 Mental Models
A lot of what we have learnt repetitively has left deep ‘scars’ in our brain. We can imagine these as canyons, with a stream of thoughts coming from the cortex but triggered by the memory stored in the hippocampus. This stream is called ‘mental models’, which is an expression for cohesive programs of memories. This is called ‘drill’ in military education. What drill does to organisations, if it is used intentionally, is trigger an emergency program by pushing a button. Mental models are therefore not compatible with the required flexibility and creativity of innovative systems.

15.11.2.5 Creativity
Creativity is a result of the division into a left (logic and mathematical) and a right (creative) hemisphere. The difference between the two hemispheres is certainly not reflected in the VSM, nor is the diversity of the sexes or the fact that thinking processes are different in males and
females. It can be assumed that the lack of diversity of a system will limit the creative and innovative potential.

15.11.2.6 The Anatomy of Anxiety and Risk Taking
There are several other mechanisms, such as neuro-humeral factors, that trigger moods (i.e. anxiety neuro-peptides), which are not reflected in the VSM. It was demonstrated early in the 20th century that stimulating the thalamus could also provoke anxiety, an experiment performed by the Nobel prizewinner Prof. Walter Hess from the University of Zürich. Certain effects on this level seem to have an influence on risk-taking. There might even be a hereditary predisposition to risk-taking. Risk-taking in terms of innovation might influence the right selection negatively but could also increase the variety in a system and thereby the chances of finding a solution.

15.11.2.7 Intelligence and Variety
We were talking about the flexibility of organisations when Professor Felix mentioned that flexibility takes place already on a cellular level. He gave the example of the retinal cells, which have the ability to increase our ability to see contrasts by selecting impulses by what is called ‘lateral inhibition’. This is demonstrated by the following figure (Figure 26), which is a sort of a ‘Hoffmann Frame’. Please look at the graph and try to count the black dots!

Figure 26: The ‘Hoffmann Frame’
The lateral inhibition does in this case result in an optical illusion as a result of a selective process by the retina cells. This is the basic process of intelligence and explains why artificial intelligence is constructible by making use of the binary system in computers. That is why artificial intelligence is constructible by means of binary systems in computers. Felix’s early research included the surgical separation of brain structures in monkeys and the observation of new emerging pathways while trying to replace the lost function – a kind of research which is not allowed anymore. What these experiments proved is that brain cells use the available network to find new ways to become functional again. The only way of doing this is selection in a binary mode by asking if a pathway is open or not. We have discussed intelligence elsewhere but one of the characteristics of intelligence is to make the right selections out of a immense variety of connections in the brain (Figure 27).

Figure 27: Network of Brain Cells

Consciousness in the cortex (VSM system 5) cannot learn and think creatively and innovatively without the emotional context stored and processed in the lower basal ganglia (VSM system 4). If adapted for organisations this would mean that emotions are stored in the more peripheral subsystems, from where the emotions have to be transported to the cortex in order for it to get the full picture. Unsolved is how the VSM creates an adequate phenomenology, because the brain is susceptible to ambiguous emotional signals with an extremely subjective interpretation. The amplification from lower levels can result in a pathological reaction. There is a variety of diffusely circulating factors, such as the neuro-humeral pathway or even hereditary factors, that influence the behaviour of the system. The VSM does seem mechanistic in the light of these factors. Gravitational or cultural aspects of organisational life and the emotional factors cannot be sufficiently explained by the VSM. The recursiveness, which in Beer’s eyes gave his VSM sufficient flexibility, cannot explain the neuro-humeral response in system 5.
The neuro-physiological pattern of mental models explains why their outcome is so unpredictable. Mental models reduce the capability of organisations to respond to unexpected events due to lack of variety! Innovations therefore appear completely incompatible with mental models or drill, which explains why certain companies just can’t achieve the same innovative level as others. We could say, in a postmodern fashion, that thinking is a social process with an enormous variety and complexity that cannot really be modelled.

One could adapt from the neuro-physiology that the right selection in organisations should be done autonomously on a system one, or even lower level, in order to increase the recursiveness of the intelligence in a system. The organisational postulate for a better innovative process would therefore be to create a network with a great variety of connections but with the ability to make the right selections.

Professor Felix became the semiotic highlight in the process of writing this thesis and I would have liked to explore this direction further.

15.11.3 Strümpfer: The VSM in the Practical Field

Dr Johan Strümpfer is director of Systems Practice and director of Strategy Partners, a firm specialising in investing and turning businesses around. He is also Visiting Professor at the Graduate School of Business at the University of Cape Town.

He was a Principal Researcher at the University of Cape Town and Director of the Programme for Systems Management from 1993 to 1999. He has been involved in technical and organisational problem-solving for 25 years.

The large number of projects have ranged from basic engineering design issues to organisational design. Stafford Beer’s VSM is frequently used by him.
His fields of interest are systems thinking and the systems approach, strategic planning and organisational renewal. He has taught at the University of Cape Town Business School (1990-present) and the Stellenbosch University Business School (1988-1992) MBA programmes.

Johan Strümpfer is an experienced practitioner. I asked him about his experiences with cybernetics and particularly Stafford Beer’s VSM as a model for managing innovation in organisations.

15.11.3.1 VSM for Gaining Control
Strümpfer uses the VSM in situations where gaining control is required, and for coordination around a common purpose. The VSM is relatively simple and is a structural model to predict and to organise a situation by integrating different functions into a coherent framework. Philosophically, it is not compatible with the innovation process in organisations. The VSM is, after all, a vast simplification of how the mind really works, and Strümpfer believes that it is influenced more by Stafford Beer’s military background than by his understanding of the brain.

15.11.3.2 VSM and Variety
A downside of the VSM is that it does not reflect relations of power. Systems should allow a variety of behaviour and must reflect factors from the environment. But being a part of a system automatically constrains the variety of behaviour. That is true for the planets of a solar system or electrons of atoms. It is also the structure of the VSM which, according to Strümpfer, consequently limits the variety of behaviour in organisations – even if Stafford Beer modelled it for a high degree of variety.

15.11.3.3 Randomness and Innovation
Innovating is trying to do something different and new. Innovation is a trial and error approach resulting in a lot of innovations never becoming marketable. Increasing the chance of a successful launch is a mathematical function of maximising the output from the available resources. One can only try to get as close as possible to the maximum of possibilities through a step-by-step approach whereby the character of this approach has to be random. The VSM reduces randomness by implying control for organisations.
15.11.3.4 Sustainability of Innovation
Strümpfer gave the following example: More than 1,000 US companies were compared with the Standard & Poor Index (an important indicator for the US economy). Not a single one of these companies was able to beat the index for a period longer than 12 years. Most organisations that started their operational bases on a new innovation, went into a phase of structuring and consolidating, consequently loosing their drive for innovation. Looking at an entire industry that outperformed the S & P Index over a longer period of time typically featured a lot of newcomers.

15.11.3.5 Creativity
Strümpfer emphasizes that innovation and creative processes should not have any constraints in terms of structures and control. Cybernetics is a different type of intervention, which has little to do with creativity because any structural approach is philosophically and empirically incompatible with innovation and creativity. He denied that cybernetics would help if it would facilitate the exchange of information within a designed network, i.e. the exchange of information among scientists. Innovation and creativity are about different assumptions and the key lies in the upholding of a tension as a driving factor.

Strümpfer’s message is clear. Structures implied by the VSM would rather hamper the innovation process, which is a mathematical function of random trial and error. The innovative process can therefore not be designed because it would limit the variety of behaviour in organisations. He also emphasised that the VSM does not really reflect the relations of power.

15.12 Own Experience: Group Work during the EMBA

The 35 people in the Executive MBA class, and the seven people of our syndicate group, had a lot of knowledge and experience to share. A lot of our work during the two years was related to innovation – we were in as sense innovating ourselves. The introduction to different ways of thinking should erode our mental models and allow a fresh new way of dealing with the phenomena. We were permanently challenged as a group or class to re-pattern our world
in a dialectic sense in order to innovate new ideas. The following paragraph describes how difficult it turned out to be to manage this process and to be truly creative.

15.12.1 Teamwork – No Problem!
A key aspect in doing an MBA or EMBA is to learn how to cope with teams. We were thrown together as groups of six or seven people. The members had all been exposed to some form of hierarchic system before they joined as a team. We were initially quite optimistic about being able to work with each other. We were adults, after all. But reality overtook and the honeymoon ended after just a few days. Time pressure, confusion, disagreements and personal clashes made us stagnant and at stages completely dysfunctional both as a group and as individuals.

15.12.2 Diversity – No Problem!
What had happened? There was no way that we would be able to act in unity in order to deal with the hectic schedule of the EMBA modules. We tried virtually everything we had known or heard off in order to get us going. Clock- and anticlockwise talking, time limitations, voting, ruling, shouting, endlessly debating or just giving up or hoping that somebody would collect the crumbs. The most dominant figures eventually took over, the more introverted kept quiet and we fluctuated between anarchy and dictatorship. It was a capitulation to the diversity of our group.

In this situation I somehow slipped into the role of the peacekeeper and tried to be neutral in good old Swiss tradition. I desperately wanted to repair the holes of the sinking ship. It took a long time to realise that compromise was no solution and wouldn’t prevent the ship from going down. I changed my role and became an ‘agent provocateur’ thereby trying to accelerate the process of drowning. Whatever I did, that didn’t work either.

15.12.3 Representational Crisis
One of the key findings during the course was the effect of poor representation. We had learned a lot about systems tools but didn’t use them enough in order to create a common platform for understanding each other. We just didn’t manage to use the same language.
15.12.4 Notion of Conflict and Power

When chaos struck our group some protagonists tried to take over by controlling the situation. This led occasionally to an eruption of interpersonal conflicts. We all felt that a flat structure without conflicts would be nicer.

What most academics seem to exclude is the notion of power. It appears that many exponents of cybernetics and systems thinking are somehow naïve concerning the disruptive factors of social systems. Beer, who had supported Salvador Allende\textsuperscript{91} in his effort to reorganise and to socialise Chile, experienced his biggest defeat when Allende was toppled by the military under Pinochet. He struggled for the rest of his life to recover from this experience.

With time, what we learnt as a group was the ability to avoid power struggles, to anticipate destructive conflict and to channel it towards creative abrasion, or, as Dorothy Leonard writes in \textit{Wellsprings of Knowledge}, “Conflict is essential to innovation. The key is to make abrasion creative.”\textsuperscript{92}

Management theories offered little help in a group of quarrelling executives who did not know how to deal with diversity due to a representational crisis. How we managed to work together in an innovative and creative way is described in the answer below.

\textsuperscript{91} Allende Gossens, Salvador (1908-1973), Chilean politician and President of Chile (1970-1973)
What follows is a summary of an individual selection of several books and articles dealing with innovation management which are of a more practical orientation. The choice, again, should reflect the paradigm shift in management related to innovation. We start with second-order cybernetics by Espejo and his colleagues, then move to some works and articles based on field research and conclude with *Molecules of Emotions* by Pert.

*Organizational Transformation and Learning* by Raul Espejo et al.

Espejo and his co-authors are representatives of second-order cybernetics. While a lot of their theory is built on first-order cybernetics, they are very much concerned with the paradigm shift in management and the adaptation of the cybernetic model to the changing requirements. The recipe puts an end to hierarchical structures and focuses on the interaction of the people in organisations, thereby increasing the variety of actions. What Espejo and his colleagues leave in the centre of interest is a form of a viable system as designed by Stafford Beer. Espejo calls this model cybernetic methodology (CM), which integrates individual and organisational learning. The authors stress that organisational learning will not be possible without personal improvement. Personal improvement, on the other hand, is not possible with an enabling structure on an organisational level. An important part of what is called structure is a common vision and language.

An intelligent organisation must be able to produce itself so as to remain well-adjusted to its medium, now and in the future. This requires its managers to develop a deep appreciation of the control–autonomy complementarity. Autonomy implies seeing organisations from within,
and this can only be done, recursively, by those within it. Control is concerned with the cohesion of the whole and this, in democratic organisations, can only be achieved by respecting the autonomy of the parts and the alignment of their interests.

Espejo and colleagues reinforce the manner in which systemic thinking, in particular cybernetics and systems theory, serves as a framework for the design of comprehensive organisational fitness. Their postulates are grouped in for domains: those related to performance of organisations, those related to their structural basis, those related to the relationships transforming structure into process and vice versa, and those related to the individuals embodying these relationships.

- Structure, according to them, is the embodiment of organisational relationships.
- Structure and process are two sides of the same coin; process orientation is natural in organisations.
- Structure and process are the outcome of interpersonal communications.
- A deeper awareness of the organisation as a whole requires an appreciation of the environment.
- A deeper understanding of the organisation’s relationships with its environment will make issues such as strategy and performance become meaningful.
- Change happens all the time. As they adjust to each other and to the wider environment, people and organisations need constantly to redefine and improve their performance; they depend for this on individual and organisational learning.
- As people and organisations learn, they transform themselves.

Second-order cybernetics, even if it deepens the scope for the interaction of people in organisations, sticks to a sort of viable organisation as outlined by the VSM. Espejo and his colleagues argue that structures and processes are an outcome of interpersonal communication and not the other way around. Without being expressed, this would imply that learning organisations or innovation in organisations cannot be designed – they are results of interpersonal communication.
**Lateral Thinking by Edward de Bono**

De Bono’s book is about creativity and how new ideas are generated. He describes two modes of thinking regarding creativity and innovation: backward and forward thinking. Both ways of thinking are what he calls ‘vertical’, probably best described as linear. Forward thinking is about creating improvement. Backward thinking is more concerned with explaining an effect, and forward thinking about bringing an effect. De Bono recommends shifting the balance between the two modes more towards forward thinking, thereby suspending judgement. He spends a great deal of time explaining that the purpose of thinking is not to be right but to be effective and that suspending judgement allows for the making of mistakes. We are trained in our education always to be right. Being wrong is often punished. This makes it difficult to take ‘unconventional’ ways to new solutions, which are hidden behind all the ‘whys?’ A ‘why not?’ attitude, or a trial-and-error approach, explained in cybernetic terms, will create greater variety! This whole concept is what he calls ‘lateral thinking’.

Motivate others to suspend judgement and to allow mistakes to be made. A trial-and-error approach opens new and unexpected ways to the solution of a problem or creative process.

**Wellsprings of Knowledge, Building and Sustaining the Sources of Innovation by Dorothy Leonard**

Leonard analysed the core capabilities of successful innovative organisations. She starts with the nature of core technological capabilities, which are systems partly comprising technical competencies in the form of: (1) people’s skills; (2) the knowledge embedded in physical systems; (3) managerial systems that support and reinforce the growth of knowledge through carefully designed education and incentives; and (4) values that serve to screen and encourage or discourage the accumulation of different kinds of knowledge. Capabilities grow through the actions of the members of the firm – through the behaviours of employees at all organisational levels. The critical task for managers is to identify, implant, nurture and enhance those activities that create the knowledge to be absorbed and retained by the organisation and its employees.

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But there is a flip side of a core capability, coexisting with it, called ‘core rigidity’. A critical managerial task is being aware of the flip side of capabilities as we grow and nurture the knowledge that will propel our institutions into success. Core rigidities are activated when companies fall prey to insularity or overshoot an optimal level of best practices. There are many explanations for these self-defeating tendencies, such as the dysfunctional behaviours of managers in fostering them. As Peter Drucker often points out, every failure is a failure of management. ‘It is a manager’s high responsibility to rethink business systems on a regular basis, to take them apart in their minds, to go through a disciplined mental process of decomposing them and restructuring them form scratch, for a zero-base foundation.’

Key innovation activities are, according to Leonard: (a) shared problem-solving; (b) implementing and integrating new technical processes and tools; (c) experimenting and prototyping; and (d) importing and absorbing technological knowledge from outside the firm and learning from the market. Leonard, like most of the other authors, emphasises the paradox of structures regarding the character of innovation. Sustainable innovation moves on a fine line between the temptation to control and to design on one side and to let go or even active destruction on the other side. To keep this tension requires that organisations have the ability of permanent creative abrasion.

Leonard defines key capabilities and rigidities of innovation in the real world where companies are permanently confronted with the paradox of stability and instability in a changing environment. Moving away from a mechanistic worldview does not prevent the need to identify certain capabilities and key activities to enable innovation. They might be used less for the implementation of structures but for the way we select the individuals in a process-oriented approach to innovation.

*Enabling Knowledge Creation* by Georg von Krogh, Kazuo Ichijo and Ikujiro Nonaka

The authors emphasise that knowledge cannot be managed, only enabled. Knowledge or innovation management implies control of processes that may be inherently uncontrollable or,

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96 Kenichi Ohmae, 1989
at least, stifled by heavy-handed direction. Managers need to support knowledge creation rather than control it.

They evolve three key ideas. Firstly, knowledge is justified true belief. An individual justifies the truthfulness of his or her beliefs based on observation of the world; these observations, in turn, depend on a unique viewpoint, personal sensibility and individual experience. Therefore, when somebody creates knowledge, he or she makes sense out of a new situation by holding justified beliefs and committing to them. Under this definition, knowledge is a construction of reality rather than something that is true in any abstract or universal way. The creation of knowledge is not simply a compilation of facts but a uniquely human process that cannot be reduced or easily replicated. It can involve feelings and belief systems of which one may not even be conscious

Secondly, knowledge is both explicit and tacit. Recognizing the value of tacit knowledge and figuring out how to use it is the key challenge in a knowledge-creating company, one that requires extended conversations and good personal relationships – that is knowledge-enabling. Tacit knowledge may seem too mysterious to be usefully or consistently applied in a business situation, but this shifting, context-specific quality is precisely what makes it a powerful tool for innovation. The challenge comes in enabling such a creative source, rather than ignoring or muzzling it.

Thirdly, effective knowledge creation depends on an enabling context. What is meant by enabling context is a shared space that fosters emerging relationships. Such an organisational context can be physical, virtual, mental or more likely all three. Knowledge is dynamic, relational and based on human action; it depends on the situation and people involved rather than on absolute truth or hard facts (see Karl Weick, ‘The map is not the territory’).

Knowledge enabling should be thought of in a circular manner; it is always aimed at enhancing the knowledge-creating potential of the company. There are five knowledge enablers: 1) Instil a knowledge vision; 2) Manage conversations. 3) Mobilise knowledge activists; 4) Create the right context; and 5) Globalise local knowledge. Krogh and his colleagues present several case studies. Some of the important aspects of successful innovation are the capability of such organisations to balance chaos and order, to create mutual trust, to offer access to help, to enable people to expect the unexpected (viability
beyond survival) and to have good conversations, to share knowledge and to support a participative democracy.

Knowledge and innovation cannot be managed, only supported through coaching and enabling people to follow a joint vision based on shared language and phenomenology of the context. To grasp the tacit and the intangible requires the ability to have conversations in a participative and democratic environment and not debates. Another quality seems to be typical for innovative companies and that is their ability to live and to adapt to an uncertain and rapidly changing world.


*How to Kill a Team’s Creativity* by Rajesh Sethi, Daniel C. Smith and C. Whan Park

Diversity, cohesiveness and autonomy might seem critical to group innovation. But don’t take them too far. Sethi and his colleagues surveyed 141 project managers who had led major new product initiatives in a diverse array of consumer products industries. What they found challenges some closely held notions about the roots of creative teamwork. Many managers, for instance, believe that cross-functional diversity provides the variety of perspectives and ideas essential to creative thinking. Sethi found that merely including people from a large number of functional areas on a team doesn’t improve its innovativeness. While more ideas may come to the table as diversity increases, team problem-solving gets harder. Information overload can bog down the process, cancelling out the benefit of having more perspectives and ideas to work with.

Another reason that high functional diversity doesn’t translate into increased innovativeness is that team members often hold deep-rooted functional allegiances that can compromise their ability to identify with a new team. Having a strong ‘super-ordinate identity’ – a sense of belonging to the team and having a stake in its success – encourages team members to find novel connections among their diverse perspectives. And this is the grist of innovation. Increasing interpersonal ties among team members can suppress the forthright exchange of opinions. Candid debate is critical to the process of innovation. Conventional wisdom promotes hands-off management, presuming that a team under the magnifying glass will be inhibited, but Sethi and his team found the opposite. Within limits, close monitoring by senior
management signals to team members and the rest of the company that their project is important. This is a powerful motivator, enhancing the team’s creativity. It also makes organisational resources more available to the team because it’s hard not to cooperate with a team that is visibly on the management’s radar.

This is an important input from the practical field, which demonstrates that everything eventually comes down to relations of power, friendship etc. It highlights again that teams should only have a temporary role before the establishment of relations hamper the process of creative abrasion. This would mean that process teams should be subject to regular rotation and not that management should suppress good relations among employees.

_The Discipline of Innovation_ by Peter F. Drucker
Drucker describes a middle way between inspiration and hard work. But yes, innovation is real work and it should be managed like any other corporate function. He argues that most innovations come from seven areas of opportunity, some of which lie within particular companies or industries and some of which lie in broader social or demographic trends. But analysis will take you only so far. Once one has identified an attractive opportunity, one still needs a leap of imagination to arrive at the right response – something which could be called ‘functional inspiration’. Drucker writes that what all the successful innovators and entrepreneurs he met had in common was that they are committed to systematic practice of innovation. But at the heart of the activity of innovation is the effort to create purposeful, focused change in an enterprise’s economic or social potential.

_Research that Reinvents the Corporation_ by John Seely Brown
The place of corporate innovation has traditionally been product development. But in times of rapid and unpredictable change, the creation of individual products becomes less important than the creation of general organisational aptitude for innovation.

Rather than focusing narrowly on developing technologies and products, R & D needs to broaden its agenda, helping companies invent new practices and processes that enhance their overall ingenuity and flexibility. A company must design the new technological and organisational architectures that make a continuously innovating company possible. Yet,
Seely writes: ‘Unfortunately, it’s the rare company that understands the importance of informal improvisation, let alone respects it as a legitimate business activity.’

_Molecules of Emotion by Candace B. Pert_ 98

Candace Pert had been linked to systems and cybernetics by several appearances in conferences, talks and articles before she published the ground-breaking book _Molecules of Emotion_. Pert was well known as a neuro-scientist prior to the publication discussed here. Her career began with the spectacular discovery of opiate receptors in 1972, and since then her work has concentrated on the ways chemicals in our bodies form a dynamic information network, linking mind and body. As an acclaimed scientist she combines the empirical and the spiritual world but keeps a safe distance from esotericism. In a way, Pert filled a sensitive gap in Stafford Beer’s VSM, which he honoured by presenting her the Wiener Medal (Wiener is of the fathers of cybernetics) on behalf of the Society of Cybernetics. Her work is a brilliant example of cybernetics.

_Molecules of Emotion_ is not only a book about chemistry but also about Pert’s approach and endeavour to research. It is almost an instruction to innovation because Pert’s research is more linked to the practical field than most other scientists’ work. Pert places a lot of trust in her instincts, and queries what the scientific literature says. She emphasises that one has to allow oneself wide latitude of speculations and that it is often necessary just to do the experiment. Again, as in Karl Weick’s map of the territory, it is not about precision but about the process which makes us think or as Maturana and others expressed ‘that a satisfying experience of understanding does not result from invoking objectivity, the truth, or a compelling argument, to achieve agreement by the force of reason, nor from a process of information exchange, but from some other qualities of the biological interaction itself.’

Pert found that proteins called neuro-peptides are carriers of emotions and are trapped in the physical body, but can be released physically, through loud, emotive expressions. The result is a freer, more abundantly flowing sense of energy. This could be a metaphor for organisations, where the means to process ‘circulating emotions’ in order to create a better flow of energy have yet to be identified. This is more feasible in a network vs. a hierarchical structure. In a

network, theoretically, one can enter any nodal point and quickly get to any other point; all locations are equal as far as the potential to rule or direct the flow of information.

Another wonderful metaphor for organisations from modern medical science is the fact that the immune system, like the central nervous system, has memory and the capacity to learn. Pert: ‘Thus, it could be said that intelligence is located not only in the brain but in cells that are distributed throughout the body, and that the traditional separation of mental processes, including emotions, from the body is no longer valid.’

As early as the 1970s, Pert found that opiate receptors, while densely concentrated in the brain, also occur in every other part of the body. These receptor-bearing cells reside in the organs, muscles, tissue and bones. The brain transfers the information from all these receptors to the cortex, where we become conscious of it. Only at this point do we begin to form ideas about what we are feeling. The experience itself occurs at a preconscious, physiological level. ‘The cellular level, where emotions are instigated, is also where unexpressed emotions are stored. The catharsis of illness expresses the sudden, overwhelming release of information that has been trapped in our bodies. What Freud termed the “subconscious” mind is actually a measurable physical process. In other words, there is no “mind-body problem”. Your body is your subconscious mind.’ If this physiological model would be transferred to Beer’s VSM, we could say that it is an oversimplification of the human nervous system and that it lacks elements of emotions and, on an innovative level, emotional intelligence. Seeing the subsystems as subconscious of management would have quite dramatic implications for the way companies are run.

The concept of a molecular level of emotions is in line with a postmodern approach to organisations. Information to and from subsystems floats at all times rather than being channelled in a specific way and direction, representing a form of unconscious state of the system or organisation. To pick up the signals on the management side reflects a completely different task of forming an idea, and involves both receiving and sending signals in a system where there are no clear boundaries. Pert: ‘The mind, as we experience it, is immaterial, yet it has a physical substrate that is both body and the brain.’
CHAPTER 16:
THE ANSWER

‘PHILOSOPHY BEGINS IN WONDER’
Plato

The subject of innovation management has attracted a lot of interest in the last few years. A variety of heuristics offer to deal with the new task of managing the intangible assets of companies – knowledge. What I tried to answer was whether the creation of structures support creative problem-solving skills in the innovation domain within, and through connection to other work systems, and whether cybernetics, and the VSM particularly, could provide means to accelerate innovation through more effective intellectual capital management. I found help from philosophy after I initially found myself completely lost with my self-inflicted research question. An essential part of what is presented as an answer is the realisation that we need a good concept about the world around us, and awareness of the dramatic paradigm shifts in the phenomenology of a world of such rich diversity. Philosophy created a matrix of time and space in which paradigm shifts in management could be explained. More than that, it filled a gap between the rational and spiritual world and made me wonder.

The answer starts with a review of the rationale by looking for a pattern, which has been modelled as a theory about innovation management. This part is followed by my personal experience and a comparison with the combined individual and organisational problem formulation.

16.1 Model of Innovation Management

The rationale had to be reviewed for a pattern. A simplified process similar to the pyramid principle used in the problem formulation resulted in an affinity diagram (see Appendix) from which the relevant categories of innovation management emerged.

Close to 100 elements promised to be relevant for the theory of innovation management. Central to the review were aspects adding some context to the cybernetic approach. The patterning process resulted in the nine categories below (Table 5). This was done with the

99 from a review about Candace Pert, Your Body Is Your Subconscious Mind, “Your brain is not in charge.” www.suchnessspa.com/Articles/candace_pert.htm
help of an affinity diagram, which can be found in the Appendix. There is, of course, a subjective meaning for every category (Kant) but the process can be re-itinerated by studying the affinity diagram. An effort was made not to create too many categories in order to avoid a complicated and not necessarily more comprehensive theory of innovation management.

Table 5: Categories of Innovation Management

<table>
<thead>
<tr>
<th>Categories</th>
</tr>
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<tbody>
<tr>
<td>• Creative Abrasion and Conversations</td>
</tr>
<tr>
<td>• Vision of Knowledge Transfer</td>
</tr>
<tr>
<td>• Variety, Diversity and Emotions</td>
</tr>
<tr>
<td>• Intelligent Selection</td>
</tr>
<tr>
<td>• Self-Organisation, Change and Development</td>
</tr>
<tr>
<td>• Transient Structure and Time</td>
</tr>
<tr>
<td>• Management as Interactive Node</td>
</tr>
<tr>
<td>• Common Language and Map (Representation)</td>
</tr>
<tr>
<td>• Heterarchic System as Participatory Democracy</td>
</tr>
</tbody>
</table>

The categories were arranged in an Interrelation Digraph (Appendix) from which the Causal Loop Diagram emerged. Following the rules and structuring the CLD between the most outgoing (driving) and ingoing (affected) variables first resulted in a quite linear arrangement (Figure 28). I had the idea of a circular model where innovation is sustained. I found that the starting point of the CLD and the endpoint simply had to be connected in order to reflect a real-life situation, shown below (Figure 28).
The model’s main characteristic is change but every variable will be discussed separately in a step-by-step approach.

16.1.1 Vision of Knowledge Transfer

The time is past where innovation was kept secret and was protected like a bank account (a Swiss metaphor!). Innovation requires a view of the world as a system. Transfer of information must take place on all levels. This requires that the innovation domain be in close contact with the added-value domain and with management. It will include exchange of information with competitors in order to increase own competitiveness. This is particularly important in markets that have disadvantages in terms of accessibility and size, like South Africa. Another valuable knowledge transfer is that between different disciplines and work systems and thereby increasing the variety of a system and opening the possibility for fresh angles on a problem situation. Sidney Brenner is a good example of how the free exchange of information led to a
proliferation of his own knowledge, which resulted in the Nobel Prize for Medicine. Can cybernetics or the VSM help? Yes, because it invites the collaboration of different disciplines and an intense exchange with the environment, including customers. The VSM seems to be useful in designing and conceptualising all these relations. To be able to use it properly, however, requires a long-term vision for the world, including an ethical level. We can no longer think of innovation without considering the effect on the environment.

16.1.2 Management as Interactive Node
What has been said above will have consequences on a managerial level. Charismatic personalities can be a risk to the process of innovation. Individual intelligence, creativity and innovation cannot be compared with organisational intelligence which is entirely a result of the right use of the variety of possible interactions. Organisational intelligence, well used, is far superior to the individual simply in terms of mathematical complexity.
Managers should therefore take a different role, which can be best described as ‘interactive node’. This presumes that organisational variety requires heterarchic structures. Managers then become ‘sensors’ and ‘therapists’, roles that call for different qualifications and abilities, i.e. psychological and sociological knowledge. Most of all, it requires the suspension of judgment, a good level of self-awareness and the ability to act mindfully. Such qualities help to identify pathological processes in organisations or innovative teams. The creation of knowledge and Innovation is a uniquely human process that involves feelings. Do cybernetics and the VSM reflect such a role? While second order cybernetics supports the role of an interactive node, it is the VSM that might not be entirely compatible. System 5 is not in direct contact with the subsystems and allows for important information to be filtered on a lower level. While this is in the interest of a better variety engineering (amplification vs. attenuation), it might allow relevant input or output to be distorted and admit pathological information.

16.1.3 Representation
A ‘Common Language and Map’, ‘Heterarchic System as a Participatory Democracy’, ‘Creative Abrasion and Conversations’ and ‘Variety, Diversity and Emotions’, are summarised as what I grouped as ‘Representation’. They form their own reinforcing loop. Here lies a secret of the innovative process, which is later described as a ‘cocktail party’. Managers can influence good representation by creating the right conditions for a coherent creative process. These are:
• a shared language and frame for the innovative process;
• the possibility of interaction in a heterarchic and democratic network of sufficient variety of opinions, diversity of sources, and last but not least, a stimulating emotional environment, with creative abrasion.

Amplification of these conditions requires a positivist science as the most current ideology. It provides an environment where people are not afraid to fail and maximises resource capacity. As important as the courage to fail is an atmosphere in which conflicts are not abused as power games but a possibility of sharpening our minds with a creative purpose. This does not involve just conflict management but a culture of conversations and creative discourse where one does not seek to be surrounded by people who are same-minded.

16.1.4 Intelligent Selection

It is only as a result of a good representative process that intelligent selections can be made. Every individual, every organisation, every innovative project team has to make important decisions. It is the quality of the selection process in that decision that makes the difference. A trial and error approach can be very helpful at instances. This process is fundamentally different for individuals and organisations. An organisation can involve the rich variety and intellectual power of a whole group of people, which requires a democratic system. Dictatorship is not the first line requirement of innovation management. Intelligent selections can only be made if the representational process has been used to its full variety.

16.1.5 Self-Organisation, Change and Development

The purpose of organisations, similar to organisms, is not just survival. They have to re-invent (recombine) and re-innovate (multiply) themselves and be dedicated to their development. This requires a dynamic process in order to be able to cope with a rapidly changing environment. We live in a non-linear world, which demands a far more sophisticated model than the force of reason or a VSM. Other qualities are needed. They are related to the emotional sphere of organisations and the appreciation of conversations among the people or teams occupied with innovation. It requires a self-organising ability, or what Maturana calls an ‘autopoietic’ system that is, the ability of producing itself. This is a postulate for the recursiveness of a system in which decisions can be made on all levels. The capability to deal with paradox might mean the readiness to self-destruction.
16.1.6 Transient Structure and Time
What organisations often appear to ignore is the significance of time. It is necessary, of course, to create 'snapshots' of a situation at instances, but only if one is aware of their temporary character in a dynamic environment. Structures like the VSM are useful in terms of a crutch in order to conceptualise the moment, but have to be result of the interactive character of innovative teams and not its lever. Any construction must be submission to change or it will fall apart.

16.1.7 Implementation
Once comparing a company with the VSM has highlights a number of problems, it is no use simply telling people that their company has a wrong structure. 'It is rather a matter of reinforcing the aspect of necessary change by creating awareness for the mental models and inviting to try something new. The more people there have been involved in the process of discussing their system, the easier this is.'\textsuperscript{100} The process of innovation would therefore look like the following graph (Figure 29).

Figure 29: Process of Innovation

\textsuperscript{100} Fredmund Malik, 'Understanding a Knowledge Organisation as a Viable System' in R. Espejo, M. Schwaninger (Editors): \textit{Organisational Fitness: Corporate Effectiveness through Management Cybernetics}, Campus Verlag, 1993
16.2 Comparison of the Model of Innovation Management with the Problem Formulation

It is comparison, according to Karl Weick, where differences can be spotted that make of managers think. It is not about creating a 100% accurate map of the territory. Absolute precision is impossible.

Management requires a concept for the normative, strategic and operational character of organisations whereby the problem-formulation covers the process level and enhances the ability of individuals and organisations to deal with uncertainty. The problem theory is in a sense a blueprint for improvement. My most important but simple lesson from Part A is that pushing will just create resistance and limit the variety of options required to cope with a chaotic world. Managers have to be concerned with permanently building a boundary-less model of their own mind that can reach the roots of any given situation.

16.3 The Cocktail Party – Lessons from Hell

‘The reasonable man adapts himself to the world: the unreasonable one persists in trying to adapt the world himself. Therefore all progress depends on the unreasonable man.’

George Bernard Shaw

What keeps systems together are the interactions between the parts. The creation of effective social systems is based on mutual trust and respect. What we call ‘soft-hearted values’ represent the most important canal for allowing optimal requisite variety. The art is to balance the dialectic of ‘soft systems’ (relations among people) and ‘hard systems’ (empirical tools) for organisational effectiveness.

One of the key experiences in the EMBA was the emerging solution for our work group. The secret was hidden behind a paradox and the fact that innovating our group was not a linear but a circular process. The attempt to design and to bring our group work into line failed miserably until we came to realise that we have to celebrate our diversity. The result was an increase in the variety of our small system, which consisted of nothing more than our interactions. Boundaries were imaginary, at most, the walls of our narrow syndicate rooms.
What emerged was a process where we first collected unstructured information about a situation from whoever had anything to say, write or draw. We noted that it was important to enjoy this moment of diversity, like a cocktail party. The informal character of these sessions stimulated a variety of inputs. The death of every cocktail party is if everybody is in agreement. Consensus silenced the discussions immediately. If there was a rule, then it was that the players had to strive for creative abrasion.

The cocktail party did the trick and created enormous richness. Seely: “Unfortunately, it’s the rare company that understands the importance of informal improvisation, let alone respects it as a legitimate business activity.”101 Interestingly the group eventually became more intelligent in its approach to a task when we learnt to use representational platforms like drawings, sketches etc. and developed the capability to pattern the chaos and hypotheses into a new theory. We voted if we were left with a situation where we had to make a selection, trusting that a democratic majority would find the right mean. What I learn as manager is that such a process can be facilitated and coached. There is always resistance to change but the rewards for the group created a sense of accomplishment, which supported the process.

What really pulled us as through as a group was humour. Teams need motivation in order to get the energy to innovate. Pickett strikes a personal chord when he says ‘Energy is about fun, discovery, fulfilment and challenge. The manager as a coach assisting in this journey is important, not as a deviation spotter, but as a guide and source of inspiration. If we know where to go, how to get there and what problems to look out for, then all it takes is a reason to journey, i.e. motivation. Energy directs the extent to which we throw ourselves into the task and this must come from within. It comes from an earnest desire to express our innermost feelings through the exercise of life.’102

Most important for this coaching is the suspension of judgments and the celebration of chaos as an interactive process of information exchange in the form of a ‘cocktail party’ – loose and unpredictable. Intelligence is a good representation of a situation where information can be

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102 K.H. Spencer Pickett, ‘Diary of a Control Freak’ in Management Decision, Vol 37 No 2, 1999
patterned and where this process can stimulate new inputs to the situation through the right selection.

16.4 Conclusion

The discussion of cybernetics and innovation management focused on the question of whether innovation can be enabled by cybernetic structures such as the Viable Systems Model. I was troubled by the paradoxes that while organisations are unthinkable without structures, the latter might limit the variety and innovative spirit. I observed a shift in my own thinking to a more postmodern view but also learnt that some caution is required with the concept of absolute freedom and variety. It is Ashby’s law of requisite variety that states that it is only variety which can destroy variety and therefore needs a behavioural capacity on the part of management that is commensurate to the residual variety. Making the right selection regarding the variety is crucial.

I would change Ashby’s theorem, ‘Every good regulator of a system must be a model of that system’ to a second order cybernetics approach: structures and models should be a result of interaction in organisations and not their starting point. Variety engineering means having the right tools and skills to deal with the information load and rapid changes in our environment. The ‘cocktail party’ approach cannot harvest any results if a team is unable to structure the collective knowledge. Effective networking in organisations therefore requires structures. Sidney Brenner’s knowledge of the Nematodes would not have been possible without an intended and planned exchange of information. I did not find any evidence, however, that the innovative process can be accelerated. Hoebeke emphasises the factor of time, which influences on us much like gravity. This is hard to accept these days. Innovation can accordingly only proliferate and develops through an optimal variety. Intelligent organisations do not put survival as their highest goal but their dedication to development.

Hegel’s philosophical ‘law of change’ perfectly explains both the process of innovation and how to maintain its sustainability as a dialectic process. Every complex situation (thesis) contains within itself conflicting elements (antithesis) and can therefore not continue indefinitely. Management of innovation in organisations requires the coaching of the dialectical process whereby conflicts and destabilising elements are identified until a resolution (synthesis) is achieved, and this constitutes a new situation (thesis) with new conflicts (antithesis). This is
an ongoing process in which explicit and tacit structures are permanently changed. It explains in a different way what I described earlier as the ‘cocktail party’. The dialectical process should integrate not only change but also sometimes what Dorothy Leonard terms ‘creative winds of destruction’. ‘Managers are looking for some form of stability in times of uncertainty and thus the notion of certain core capabilities related to innovation are appealing. Yet even core capabilities must shift in a changing environment. Research following the history of industries over generations has shown that there are always sharp discontinuities, often occasioned by new technologies and often competence-destroying’. Innovative systems have to balance structures with the capacity for spontaneous self-organisation.

So, is there a place for cybernetics or Stafford Beer’s Viable Systems Model in innovation management? What I found is that a minimum of structure to manage innovation is required but that any structure must be modelled or remodelled according to the interaction of the people involved in the process. Structure, as second order cybernetics described it, is therefore the embodiment of organisational relationships. The law of change determines the nature of such a structure; it could be the VSM, could only have a temporary function and must be changed permanently, and sometimes destroyed and designed again from scratch. The paradox regarding the incompatibility of structures with the innovative process has to be balanced carefully. The VSM is only useful if it becomes a part of the representation and the patterning process, thereby creating some stability but only to provide the basis for a new re-patterning process, triggering instability and change.

The creation of knowledge is a uniquely human process that involves feelings, and it therefore requires motivation of the individual to a cohesive cooperation with a common goal that more than anything else drives innovation. At the beginning of an innovative process must be a shared idea, as Peter Drucker expressed it: ‘At the heart of the activity of innovation is the effort to create purposeful, focused change in an enterprise’s economic or social potential.’ A mysterious passage in the ‘Control Freak’ suddenly made sense to me and I knew suddenly that its author Spencer Picket must have read Hegel:

'Gravitational control pulls us together and promotes order – satellite controls seek new experiences and inspirations based on creativity and exception. We probe new opportunities, we look for disorder and new patterns that we can use to add to our existing patterns.'

What innovation needs, in a nutshell, is the ability to pattern and re-pattern data in a dialectic process. This is indeed a universal law of life around us - the ever-present pulsation of the universe between entropy and negentropy.

A further attempt to conceptualise the theory of innovation management resulted in a philosophical model of innovation (Figure 30 and 31) with an inductive process, which, not by chance, reflects Hegel’s ‘law of change’.

Figure 30: Philosophical Model of Innovation

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Dictatorship of the Innovation

We cannot leave this model without a bit of creative abrasion. We live in a time when newness and innovation have almost become an addiction, while we paradoxically have never been so convinced that nothing really new will happen and we therefore look for old and nostalgic things. The result is a situation in which we are torn between change and a deep desire for security and a stable and familiar environment in a world around us which seems to spiral into faster and faster change. The more we follow the dictatorship of the new as a necessary element of the economy, paradoxically the more frantic innovative creativity seems to become. Innovations are now often related to apocalyptic concerns (e.g. genetic manipulation) reflected in a deep mistrust of new technologies. The fact that we do not know what postmodernism will bring raises a big question. Do we want utopia? Do we want more innovation? What we need is an awareness of this delicate dialectic or paradox, and a realisation that innovation is to a degree just a reflection of this tension.
CHAPTER 18:
EVALUATION

I started this thesis with the assumption that innovation could be managed and that cybernetics could be a tool for it. The initial focus was therefore to explore how to do this. The thesis became a reflection of an emerging change in my own interpretation of how this should be done. The result is a different question: Not how, but if, the innovative process should be managed at all. We seem to head from a ‘yes’ in the mechanistic-age view to post-modern view in which the answer would be ‘no’. The emerging theory of knowledge management is not just a compromise between these view- points, but has its own characteristics and potential to achieve a desired state from now.

Soft issues like emotions, corporate culture and gravitational coherence cannot be designed. Some of the concepts and ideas discussed in this thesis became important companions on my odyssey of individual and organisational exploration. An attempt has been made to include views seen through many different lenses. I chose to create a bigger picture with the help of philosophy instead of creating an application of innovation in any particular organisation. The emerging matrix helps my own orientation and serves as a map that makes me, and hopefully any reader, think.
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### Critical Incident Report 1

Problem of being able to creating intimacy and touching difficult subjects – dialogue with the intention of exploration, discovery and insight by suspending assumptions and refraining from imposing views on others and avoiding suppressing or holding back what others think (Peter Senge). Stop defensive routines that insulate mindset from examination, stop skilled incompetence in protecting ourselves from pain and threat posed by learning. Self – observation enhances awareness and the awareness of our own mental models is necessary for change. I genuinely tend to believe people and take their word rather than observe how they actually act (espoused theory vs. theory in action) by data selection, meaning, assumption, conclusion, beliefs and action (ladder of inference). Advocacy vs. inquiry (the payoffs comes in the more creative and insightful realisations that occur when people combine multiple perspectives (Ross Roberts, 5th discipline)

At strategic moments it may demand not ‘being nice’, but rather, for example, bluntly confronting someone with an uncomfortable but consequently truth they’ve been avoiding. Emotional intelligence does not mean giving free rein to feelings – “letting it all hang out”.

### Affinity Diagram for the Problem-Formulation of Individual Management

<table>
<thead>
<tr>
<th>Haste vs. Slowness</th>
<th>Lack of Mindfulness and Dialogue</th>
<th>Ethical Dilemma</th>
<th>Dilemma of Two Worlds</th>
<th>Conflict</th>
<th>Lack of Philosophy in Management</th>
<th>Control vs. Cohesion</th>
<th>‘Sein’ vs. ‘Schein’ Action vs. Espoused Theory</th>
<th>Pushing vs. Pulling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talking Less</td>
<td>Advocation and EI</td>
<td>Transparency</td>
<td>Heritage</td>
<td>5x Drama Triangle</td>
<td>Force Field Analysis</td>
<td>Control vs Cohesion</td>
<td>Procrastination</td>
<td>Mental Block</td>
</tr>
<tr>
<td>Listening</td>
<td>Charm</td>
<td>Ethics</td>
<td>Heritage</td>
<td>4x Conflict</td>
<td>Wisdom</td>
<td>Company Life Cycles</td>
<td>Scenario Learning</td>
<td>Espoused vs. Theory in Action</td>
</tr>
<tr>
<td>Speech Processes</td>
<td>Dialogue</td>
<td>Dealing with Liars</td>
<td>Cultural Background</td>
<td>4x Conflict Management</td>
<td>Wisdom</td>
<td>Bricollage</td>
<td>Game Theory</td>
<td>Mental Block</td>
</tr>
<tr>
<td>Patience</td>
<td>Dialogue</td>
<td>In Bed with the Devil</td>
<td>Different Worlds</td>
<td>Churn</td>
<td>Spirituality</td>
<td>Common Goals</td>
<td>Analysis of Intention (of others)</td>
<td>Mental Models</td>
</tr>
<tr>
<td>Speech Process</td>
<td>Representation</td>
<td>Transparency, Anxiety, Integrity</td>
<td>Bigger Picture</td>
<td>Reallive Values vs. Theories</td>
<td>Trust and Respect</td>
<td>The End of Courtship</td>
<td>Mental Models</td>
<td>Emotional Intelligence</td>
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<tr>
<td>Listening</td>
<td>Dialogue</td>
<td>Common Language</td>
<td>Transparency</td>
<td>Espoused Theory vs. Theory in Action</td>
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<tr>
<td>Silence is Gold</td>
<td>Dialogue vs. Debate</td>
<td>Living in Different Worlds</td>
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</tbody>
</table>

**Critical Incident Report 1:** Problem of being able to creating intimacy and touching difficult subjects – dialogue with the intention of exploration, discovery and insight by suspending assumptions and refraining from imposing views on others and avoiding suppressing or holding back what others think (Peter Senge). Stop defensive routines that insulate mindset from examination, stop skilled incompetence in protecting ourselves from pain and threat posed by learning. Self – observation enhances awareness and the awareness of our own mental models is necessary for change. I genuinely tend to believe people and take their word rather than observe how they actually act (espoused theory vs. theory in action) by data selection, meaning, assumption, conclusion, beliefs and action (ladder of inference). Advocacy vs. inquiry (the payoffs comes in the more creative and insightful realisations that occur when people combine multiple perspectives (Ross Roberts, 5th discipline)

At strategic moments it may demand not ‘being nice’, but rather, for example, bluntly confronting someone with an uncomfortable but consequently truth they’ve been avoiding. Emotional intelligence does not mean giving free rein to feelings – “letting it all hang out”.

### APPENDICES

**Affinity Diagram for the Problem-Formulation of Individual Management**
Rather, it means managing feelings so that they are expressed appropriately and effectively, enabling people to work together smoothly toward their common goal (Goleman, IE). Successful change managers need to recognise the importance of managing emotions by acknowledging individual defence mechanisms associated with change, as well as the nature of attachments to past practices which have occurred and through which individuals have structured their identities (Managing Change Reading EMBA 3).

Mastery of language is required for political (and social) competition and contestation, for the sharing of meaning and the appropriation of values (Ake, ‘What is the Problem of Ethnicity in Africa?’ Transformation 1993: 9) or a common language has to be found.

A mindful walk in life’s forest is a walk “with soft eyes” (Wheatley, 1992: 1999)

**Critical Incident Report 2**: Scenario planning important, not all problems can be solved diplomatically, brusqueness and overtaxing by abrupt confrontations is a problem, coaching instead of ordering, ‘ubuntu’ over individualism, leadership as collective process, listen, communication is different, linear thinking, rushing into things, patience, tolerance, empathy

**Critical Incident Report 3**: Change is good, managing it instead of slowing it down. Leadership as quality of feeling, analysing and guiding social systems. Leadership referst to effectively handling the changes that the competitiveness and volatility of the time have wrought (Kotter, Harvard Business Review, 1990). The fading type of ‘decisive, analytical, individualistic, powerful manager type who is willing to make hard decisions’ (Leadership, Cognitive Complexity and Gender, R.A. Preoehl and K. Taylor, Women in Leadership, 1997) and shifting to one that ‘expands people’s capacity to produce extraordinary results and help them to unearth their personal aspirations and goals, and link those to company goals (K. April hand out ‘coaching and mentoring’ 2001).

Espoused theory vs. theory in action: Few people are aware of it and even fewer people are aware of the maps of theories they do use (Argyris, 1980). A lie is the gap, which we consciously know of. Argyris suggests (1980) that effectiveness is resulting from developing congruence between theory-in-use and espoused theory.

No free rein of feelings: Managing feelings so that they are expressed appropriately and effectively, enabling people to work together smoothly toward their common goal (Daniel Goleman, Working with Emotional Intelligence, 2000)

Proper conflict management. Meaning of change and involvement of staff:

What we have to achieve in order to be successful is a system with requisite variety (VSM – cybernetics). Communication is the tool to build an organisation where ‘all staff has as detailed understanding of the strategic choices and dilemmas, why decisions are made and how their actions influenced the drivers of value creation in such situation’ (R. Bolton, 1998).
Control: Control is often equated with submission, dictatorship, rules, and punishment. Such an approach restricts the degrees of freedom of a system. The new view of management should increase the number of degree of freedom in our organisation. The basis of such an approach is communication, creativity and coaching.

Critical Incident Report 4:
Horses running wild and missionary like a steam train - control. Leadership is not only about expressing and talking but also listening. Leadership emerges from knowing yourself. Philosophical concept of change. ‘In the West, one can find indigenous cultural elements embedded in American culture if one knows where to look for them. The widespread fascination with antiquities, adventure travel, and tribal artefacts reveals a culture hungry to connect with indigenous roots. It is only through a massive investment in denial of indigenous spirituality that “modern” means that which has overcome primitivism, that which is superior to the indigenous” (The Healing Wisdom of Africa – Handout EMBA 3, Module 4).
“Talking differently rather than arguing well is the chief instrument of cultural change” (Richard Rorty).

Critical Incident Report 5:
Conversations: Communication became biggest task! Language and meaning! Dealing with mental models intellectually instead with the heart. Patience and time to bring the world of meaning of other people in line my understanding – through mindfulness. Problem is that unfamiliar context is often mislabelled as familiar old ones.
‘When people discuss confusing events they sometimes think they have to sell or convince others of the validity of their own perspective and fail to listen respectfully and attentively to what others say. When this happens, advocacy replaces analysis; and both richness and the capability to discriminate important details that help restore and resolve problems are lost.’ (K.M. Sutcliffe, Leading with Resilience in the Face of the Unexpected, Handout Module 5, EMBA 3).

Wittgenstein believed that there is a total reality, which is divided between a realm of which we could have no conceptual understanding, and about which we therefore say nothing, and the phenomenal world of our experience, which we could talk about and try to understand. It seemed important for him that we can explain how it is that the world is describable in language, and thus to explain the relationship between language and reality.
Wittgenstein used the analogy of a painting for his theory of meaning. ‘Although the canvas is a very different sort of object from that which is being painted, the artist can represent the scene by his use of colour so that the two share the same “logical form’. In the same way,
Wittgenstein believed, words can represent reality if, again, both share the same logical form.\textsuperscript{106}

But language can express a lot, like orders, which are not easily represented by pictures. Wittgenstein used the metaphor of a tool. The meaning of a word consists of the sum of all possible uses. There is nothing to talk about if one has described all meanings. To understand the intention of a word you have to know what is in the mind of a person! That is why the use of language is used differently in different worlds (i.e. business world vs. theatrical world).

‘Our attention is that, although our own actions generate much of the knowledge we receive from others and from the environment, we are rarely aware how our actions skew what we know. The simple fact is that we are rarely aware of our own behaviour and the reactions of others as we act. Our attention of what is occurring at any given moment in our lives is that the data we have about the outside world is ordinary about the past, not the present, drastically unsystematic and incomplete and rarely tested for validity on the spot’ (D. Fisher, W. Torbert, *Personal and Organisation Transformations*, Mc Graw-Hill, 1995).

“THERE IS ABSOLUTELY NOTHING THAT IS SEEN BY TWO MINDS SIMULTANEOUSLY” Bertrand Russell

Such a process can be facilitated by the Speech Processes (Framing – Advocating – Illustrating – Inquiring) but even more than that it requires self-awareness. ‘We have to feel in our bones that only actions based on truth are good for us, for others, and for our organisations. We have to think of other ways of stating the central issues, in a gently assertive and inquiring way rather than an accusatory, evaluative, self-righteous way.’ (D. Fisher, W. Torbert, *Personal and Organisation Transformations*, Mc Graw-Hill, 1995)

Conversational processes are linked to a form of logic or like Bertrand Russell said “the sense of reality is vital in logic”. ‘A statement that purports to be about reality but whose truth of falsehood makes no observable difference to anything has no content, no meaning – it is not saying anything. This belief has something fundamentally in common with the American Pragmatists.’ (From ‘B. Maggee, The Story of Philosophy, Dorling Kindersley, 1998). This is on of the central issues of the current EMBA – how to deal with propositions (S. Blackburn, *Oxford Dictionary of Philosophy*, Oxford University Press, 1996: *Proposition*: That which is proposed or stated; the content of a declarative sentence, capable of truth and falsity). To grasp a proposition is to understand what is said, supposed, suggested and so on.

General trend to become defensive when arguing with each other.

**Spirituality**: Searching for inner peace and spirituality – all the ladders of the world would not help in catastrophic critical incidents ‘without a mental orientation in which there is ongoing

\textsuperscript{106} From ‘B. Maggee, The Story of Philosophy, Dorling Kindersley, 1998
willingness and capability to invent new categories that care streaming events into more meaningful sequences, and a more nuanced appreciation of context and ways to deal with it’ (K. Weick, K. Sutcliffe, Managing the Unexepected, Jossey Bass, 2001). Spirituality – force for the perpetual mobile of life.

Leadership: For good of evil, authentic transfer of meaning makes a difference. Dissent is often seen as criticism. Setting realistic tasks for myself – than for others. Forcing – pushing. Pushing will create resistance (Force Field Analysis). Life is not about just a struggle but fulfilment -> treating people as if they are talented adults who are confused and scared but still capable of showing up with some common sense and goodwill – as most noble part of leadership.

Change: Everyone is a change agent. ‘Every complex situation contains within itself conflicting elements and these are destabilizing and initiating change. Therefore no such situation and of course a situation that contains new conflicts. There were no further conflict without further change. A conflict free situation will be reached when the Geist comes to know itself as the ultimate reality, and realizes that everything that it had hitherto regarded as alien to itself is in fact a part of itself, not in conflict with it. But until this situation is reached, Geist will continue to be alienated from it-self. The individual will still be enmeshed in conflict, will not know himself, and will not be free. This state of alienation will continue to proved the motive force for further dialectical change (Friedrich Hegel). A dialectical solution for change: Conflict with cohesion or search for a sustainable disequilibrium with some form of boundaries. Cohesion and boundaries might be set by inner peace, spirituality and belief.

Diversity: Mindfulness – culture and heritage. ‘I have gradually come to understand that one thing Western and indigenous peoples share is the fact that both have elected to live here on Earth, and are thus subject to the spirit of Earth. By this I simply mean that indigenous and Western peoples are actually children of the same Spirit, living in the same house they call Earth. No matter what they do to torture each other, the dysfunctional relationship of modern and indigenous peoples is symptomatic of a craving to share love for each other that is deeply buried in our psyches, a craving so alive that it is compelled to struggle through the rubble of division, power conflicts, and fear to express itself’ (from Living in Two Worlds – Handout Module 4, EMBA 3).
## Organisational Issues

### Affinity Diagram

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<tr>
<td>Enhancing Learning Process</td>
<td>Value Creation</td>
<td>Awareness of Weaknesses, Threats, Strength</td>
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<tr>
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<tr>
<td>Accessing Data for Learning</td>
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<td>Control not leading the Process</td>
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<tr>
<td>Competitor Analysis</td>
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<td>2 x Harms of Anything than Predictable</td>
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<td>Reinvention - Reorientation - Redesign</td>
<td>Unification of Team and Management</td>
<td></td>
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<tr>
<td>Particulars of the Innovation Domain</td>
<td>Minor Changes that Cause Chaos</td>
<td>2 x World of Meanings</td>
<td>Dynamic Change in Order to Maintain Integrity</td>
<td>Lack of Credos</td>
<td>Healthy Conflict</td>
<td>innovation from Geistalt or Facion</td>
<td>Unification of Team and Management</td>
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<tr>
<td>Growth</td>
<td>Work Organization around Processes</td>
<td>Misedunderstanding and Conflicts</td>
<td>Deafect of Stability and Change</td>
<td>Just Do It - Don't Ask</td>
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<td>Keep Things Simple</td>
<td>Recurrence Level of Workable Conditions</td>
<td>Everyone as Designer</td>
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<tr>
<td>Innovation as Result of Intellectual Capital Networking</td>
<td>Quality</td>
<td>Expoused Theories and Theories in Action</td>
<td>Churn and Chae</td>
<td>Parameters Intangible without Goals</td>
<td>Everyone as Designer</td>
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<tr>
<td>Profitability and Value</td>
<td>First Time Right</td>
<td>Destracting Internal Focus</td>
<td>Valuation of Strategy</td>
<td>Long Term Strategy Left to Chance</td>
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<tr>
<td>Customer Value</td>
<td>TCM</td>
<td>Dialectal Nature of Life</td>
<td>Long Term Strategy Left to Chance</td>
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<tr>
<td></td>
<td>Balancing Capacity and Demand</td>
<td>Arrogance and Autocracy</td>
<td>Everyone as Designer</td>
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<tr>
<td></td>
<td>Communication</td>
<td>Works Systems Clash</td>
<td>Everyone as Designer</td>
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</tbody>
</table>
PP1: Lessons from Hell
Creating awareness and dealing with mental models on an organisational level in order to cooperate as a team involving diversity of the people (boiled frog)
enhancing the learning process -> anticipating instead of even level decision making, creating awareness of weaknesses, treats and strengths. Good transparent business knowledge about the business with optimal flow. Strong emotions are a problem. Inertness and least resistance.

ARL 1: Scenario Learning

PP2: Normative Management
Freud, the Expressionists and Einstein prepared the century for more complex world of thinking. A world of chaos. Normative management for taking the viability of organisations beyond survival. Strategy and operational management can not contribute to a functional cell without cohesion to the whole. Ability to respond to unexpected events. Darwin’s theory states that organisms survive if they have a high degree of adaptability. The essence of life is the formation of complex structure from simple starting materials. A cell is the basic brick of life. Cells can become cancerous if social control fails – usually killing the organism. The interaction of the cell with the environment reflects the cybernetic model of Normative Management. Managers can stimulate their companies to interact with the world – its multifaceted social, political, cultural and ecological aspects. ‘Development is about a system’s growing ability and desire to fulfill its own and other’s needs – the quest of an organisation is in fact viability beyond survival’ (Ackoff, 1995). Normative management is about fulfilling the claims of all stakeholders. In order to survive the turbulent times of the future it has become necessary to permanently scan and analyse changes. We can only do this by increasing our social network especially in our companies. We have to balance change and stability in our organisations. Ethic values are contributing to stability. They should be surfaced, communicated and shared. The planetarium as model of ‘Societal Values & Living for a Common Good’ – ‘The Civil Society’ – ‘The Economic Environment’ all in a gravitational relation with ‘Change in Order to Maintain Integrity’. Team Play. Vision of common good in order to enhancing self-awareness and potential to coach and support virtuous behaviour. Amplification and attenuation. Teams must have autonomy to organise themselves on all recursive levels. Active interaction with the environment and increasing social network. Balance of change and stability. Permanent reorientation and redesign – dialectics – ‘The supreme art of management lies in balancing constancy and change by orchestrating organisational preservation and transformation, thereby achieving viability and development (Handout ‘The cybernetics of management’) Adam Smith proposed that people should be socially minded, rationally thinking and do things in an orderly fashion. He implied that having self-interest implies the self-interest of others and that they are then individually involve in finding their happiness.
The cell (p 7), linked to the neighbour cell as myosin and is able to a forceful action for the whole organism. Normative management as luxury? Meaning of control as dictatorial. Experience and wisdom. What lifecycle stage are we in? (I. Adizes, Corporate Lifecycles, 1988). Arguments in favour of event level decisions.

**ARL 2: Production Management**

Distinction

Compliance model

Efficiency – doing things right, effectiveness – doing the right things, parameters to measure the output.

Position within an organisation as being internally neutral or externally neutral. Dissatisfaction related to organisational weaknesses. Retirement into a relaxed apathy. Pre-production meetings – planning.

Problems related to frequent changes and interruptions. Production flow – waiting for work. Not being in the greater picture. Lack of integration into the strategy of the company. Cultural and religious diversity requires high level of tolerance. Helping in order to increase the flow – continuity. Avoid bottlenecks. Minor mistakes in the planning can cause major interruptions later (chaos theory). Squeeze in asap.

Changing threats into opportunities. Reinvention – reorientation – redesign. Production as part of the overall strategy. Lack of credo as matrix in a complex environment. Need for a stable and satisfying work atmosphere. Unification of work and management and organisation of the work around processes. Significant organisational change is only possible if there is a vision – a clear ideal of image of what has to be changed and if each organisational unit concerned formulates a specific concept or model of management and realises it in a stepwise fashion (EMBA 3 handout, May 2001).

‘The management has to work towards an environment and condition under which everybody is able to do his work as efficiently as his capabilities allow (R.L. Ackoff, Creating the Corporate Future, John Wiley & Sons, 1981)

Prioritisation of the operations performance objectives in a way, which links them to customer needs and competitor behaviour. Badly made products, slow delivery, broken promises, too little choice of products or an operation’s cost base, which is too high, will sink any company. Philosophy of improvement. ‘An effective system for integration the quality development, quality maintenance and quality improvement efforts of the various groups in an organisation so as to enable production and service at the most economical levels which allow for full customer satisfaction’ (A. Feigenbaum, MIT).
‘Quality and productivity increases as ‘process variability’ decreases’ (W.E. Deming, 1950)


Everyone is a designer of the system. Balance of capacity and demand. Production must become an integral and networked viable part within a truly democratic system to support development (effectiveness) and not only growth (efficiency). The difference lies in the possibility of the company to be learning and tough being able to respond to external influences beyond survival.

**PP 3: Shareholder Value**

*Lifecycle or Organisations (I Adizes, ‘How and Why Corporations Grow and Die and What to do about it’, 1990)*


Fun. Analytical thinking is somehow self-explaining while synthetic thinking results from our experiences in the world (E. Kant, *Critique of Pure Reason*).

Most of our knowledge is gained from judgement. To make an ‘empirical’ judgement we need objects in the world, which – according to Kant – can not be explained by reason. They serve us to have sensations and we have to put them into a matrix of time and space and four mental concepts (categories) of quality, quantity, relation (cause and effect) and modality in order to give them sense.

The forms of intuition and the categories are a part of the mind. They are applied by the mind to our raw perceptions in order to gain knowledge. Our conceptual knowledge can only be of the world as we see it with our eyes and how we experience it (‘Critique du Pure Raison’ by Emmanuel Kant’ from Hans J. Stoerig, *Weltgeschichte der Philosophie*, 1985).

The difference to my model is that my ‘Analytical Propositions’ includes synthetic elements (abstract calculations). The synthetic proposition reflects the social involvement i.e. governance and how boards see the world.

We can draw another analogy from Karl Weick ‘Cartographic Myths in Organisations’: ‘Everything in this chaotic world looks the same, incomprehensible and difficult to map’. Abstracting and symbolising is the process, which enables us to map the world (the territory). We need business ratios but they are inherently inaccurate. They can be very helpful as long as we are aware of the abstracting process and
see them in the context of organisational life by involving the cognitive process and our strong social entanglement. We need these maps that lead us to action. The fact that maps animate managers, not the map itself, is what imposes order to the situation.

Keep things simple. Parameters become intangible without goals. Raison d’etre for every company however are the intangible things or soft issues like ideals, ideas, which create framework for a successful team. Main purpose of the intangible parameters is to move the organisation into the same direction. Raison d’etre must come from inside and not rom the competitors.

Value is created by innovation and marketing. Everybody in the organisation to understand that we sell more than a product and that we add value beyond the product. Forward Goal. Data to support plan and decision are needed. Quality and Brand hand in hand. Actively building customer relationship. Value adding chain. Profitability vs. long term value.

Thinking about value as key to performance. Resistance to change. Perception of control as an intrusion.

‘The task is to equip people with the necessary tools and ensure the competencies are energised towards the required goals via the defined stage posts. Dynamic change is important to organisational survival. This must be done in a controlled environment, but controls must not lead the process, they must be organic and follow what the organisation requires (Diary of a Control Freak, K.H. Spencer Pickett, Vol 37 No 4, 1999).’

‘Successful planning requires sound analysis for both formulating business strategies as well as for valuing strategies (Creating Shareholder Value, Alfred Rappaport, Free Press, 1998).’

Value potentials must be controlled separately from profit and solvency, on the basis of independent criteria (Raul Espejo, Markus Schwanninger, Organisational Fitness, Campus). Just as profit largely determines solvency, “value potentials” pre-control profit. Value potentials are defined as the texture of all applicable business-specific, profit-relvant prerequisites that must be present if profits are to be realised (Gaelweiler, 1987; cf. Puempin, 1991).

‘Energy is about fun, discovery, fulfilment and challenge. The manager as a coach assisting in this journey is important, not as a deviation spotter, but as a guide and source of inspiration. If we know where to go, how to get there and what problems to look out for, then all it takes is a reason to journey i.e. motivation. Energy directs the extent to which we throw ourselves into the task and this must come from within. It comes from an earnest desire to express our innermost feelings through the exercise of life (Diary of a Control Freak, K.H. Spencer Pickett, Vol 37 No 2, 1999).’

ARL 3: Reusable Barrier Fabrics

Soft System Methodology…

Human beings are anything but predictable in the way they behave and think. Each person’s world-view is made up of a complex set of attitudes, beliefs, values, opinions and perceptions. We reveal only a
glimpse of our own world-view in our relationship with others – and this may lead to misunderstandings and conflicts. Argyris and Schon (1974) assert that people hold maps in their heads about how to plan, implement and review their actions. They further assert that few people are aware that the maps they use to take action are not the theories they explicitly espouse. Also, even fewer people are aware of the maps of theories they do use (Argyris, 1980). There is a theory consistent with what people say and a theory consistent with what they do. Therefore the distinction is not between ‘theory and action but between two different ‘theories of action’ (Argyris, Putnam & McLain Smith, 1985, p. 82). Espoused theory is the world-view and values people believe their behaviour is based on. Theory-in-use is the world view and values implied by their behaviour, or the maps they use to take action.

**PP 4: Creating Customer Value**


**ARL 4: Development of Medical Barrier Fabrics**

“Science is perhaps the only human activity in which errors are systematically criticized and … in time corrected” Karl Popper

The primary characteristic of the actors working in the innovation domain is that they are involved in the process of consciously creating the future. The term ‘innovation’ is used because of the creative process, which defines the domain.

Human beings are anything but predictable in the way they behave and think. Each person’s world-view is made up of a complex set of attitudes, beliefs, values, opinions and perceptions. We reveal only a glimpse of our own world-view in our relationship with others – and this may lead to misunderstandings and conflicts. Argyris and Schon (1974) assert that people hold maps in their heads about how to plan, implement and review their actions. They further assert that few people are aware that the maps they use to take action are not the theories they explicitly espouse. Also, even fewer people are aware of the maps of theories they do use (Argyris, 1980). There is a theory consistent with what people say and a theory consistent with what they do. Therefore the distinction is not between ‘theory and action but between two different ‘theories of action’ (Argyris, Putnam & McLain Smith, 1985, p. 82). Espoused
theory is the world-view and values people believe their behaviour is based on. Theory-in-use is the world view and values implied by their behaviour, or the maps they use to take action.

Systems which involve human beings working together are much more complex and less easy to understand than groups of physical components. Individuals may be seen as participants in the activities of sub-systems of which they are not members. Systems concerned with people undertaking linked sets of activities are termed human activity systems.

A system is made up from different components, which are elements or subsystems. Elements can’t be sub-divided any further.

The formal system model of paradigm is essential to any system failure study of a situation in which human activity forms a part.

The control mechanism between PrionTex and BreatheTex is mainly linked to people.

This is important, as human-activity systems are much less reliable or predictable. They often experience time delays between control decision, control action and control effect.

Again, that is where most of the problems in the relation between the development partners PrionTex and BreatheTex lie.

The main problems in communication are related to language difficulties and system noise. Clashes do not only exist between different mother tongues but also different levels of scientific language both represented in the graph below (Figure 10).

The people who are involved in the R & D co-operation come from different backgrounds (i.e. accounting, mechanics, textile engineering, polymer science, medicine) opening many opportunities for all kind of misunderstanding, which are enhanced by a complex terminology and the involvement of different mother tongues.

The infinitive variety of possibilities in human behaviour makes them particularly difficult to predict.

<table>
<thead>
<tr>
<th>Failure category</th>
<th>Suggested paradigm</th>
<th>Justification</th>
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<tbody>
<tr>
<td>A</td>
<td>communication</td>
<td>missing knowledge about stage of work makes planning difficult and results in further delays</td>
</tr>
<tr>
<td>B</td>
<td>control</td>
<td>lack of monitoring and control</td>
</tr>
<tr>
<td>C</td>
<td>communication</td>
<td>development work is more difficult if not all partners are involved and informed about the problems</td>
</tr>
<tr>
<td>D</td>
<td>control</td>
<td>lack of monitoring and control</td>
</tr>
</tbody>
</table>
The underlying conflict lies between the different work systems. The relations between the work systems in the innovation domain are through the exchange of persons in the various project groups and through meeting of people working in them to exchange ideas, concerns and hopes. There is a tendency of innovative people to remain with the successes of the past, to continue on the same theme. “The result is often overspecialisation or the creation of a style, a school of thought, a dogmatic environment. What is normally understood as planning is incompatible with the concept of innovation. Innovation activities inherently tend to be uncertain and the development of an innovative ideal is full of pleasant and unpleasant surprises.”\(^{107}\)

Roles and functions at BreatheTex are not clearly allocated and this is leaving areas with poor control. Mistakes could slip through without being noted.

Lack of intelligent conversations and representations.

**PP 5: Globalisation and Entrepreneurship**

Spirituality. Being mindful imposes to see the wonders of the world and the miracle of the universe around us. An intelligent organisation cannot be without that curiosity and the ability of wondering about the endless variety of life.

The Ubuntu philosophy – I am because of others – is based on cohesion. Cohesion, which is functioning as a gravitational force, can accept the principle of uncertainty in a new dimension of ethics and a new form of leadership with political and social responsibility. Only an open mind can initiate change and eventually action for growth – growth being the water for the mills of the economy.

It is eventually the strong drive for innovation, which will carry the entrepreneurial effort. Innovation has to be relevant for a particular market and has ideally been exposed to a competitive market at home. Innovation is not necessarily created from scratch – often it will form ‘Gestalt’ through iteration and collection of information.

Entrepreneurial drive, a viable organisation and good innovation have the best chance to be successful when opportunities open – which sometimes come as a ‘churn.’

The feedback in the loop leads us back to the knots and bolts, or opportunity costs, of the global competition. Entrepreneurs might bend the rules but will not break them in order to keep the cycle going.

Innovation is equal to intellectual capital network.

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## Affinity Diagram of Innovation Management

<table>
<thead>
<tr>
<th>Common Language and Map</th>
<th>Heterarchic System as participative Democracy</th>
<th>Creative Abrasion and Conversations</th>
<th>Vision of Knowledge Transfer</th>
<th>Variety, Diversity and Emotions</th>
<th>Intelligent Selection</th>
<th>Self-Organisation, Change and Development</th>
<th>Transient Structure and Time</th>
<th>Management as Interactive Node</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding meaning of new language</td>
<td>Transferability to added-value domain</td>
<td>Notion of conflict and ownership of innovations</td>
<td>Alchemy - Holistic approach</td>
<td>Innovation is a process of uncertainty</td>
<td>Diversity</td>
<td>Attenuation</td>
<td>Viability of subsystems without higher systems</td>
<td>Person improvement</td>
</tr>
<tr>
<td>Language between different subsystems</td>
<td>Human activity systems</td>
<td>Creative conflict</td>
<td>World as a system</td>
<td>Amplification</td>
<td>Multiple Perspectives</td>
<td>Requisite Variety and the right selection</td>
<td>Viability beyond survival</td>
<td>VSM useful</td>
</tr>
<tr>
<td>Metaphors pros and cons</td>
<td>Boundary less virtual organisation</td>
<td>Exempt from fear and failure</td>
<td>Normative and ethical dimension</td>
<td>Allowing and creation of variety</td>
<td>Coherence and complexity</td>
<td>Filtering of requisite variety</td>
<td>Multiplications and recombination</td>
<td>Personal learning as trans-formative process</td>
</tr>
<tr>
<td>Conversations design</td>
<td>Interdisciplinary teams</td>
<td>Desire and passion</td>
<td>Vision</td>
<td>Only variety can master variety</td>
<td>Incompatibility of innovation with mental models</td>
<td>Regulation and variety engineering</td>
<td>Self-organisation</td>
<td>Paradox of control</td>
</tr>
<tr>
<td>Map and meaning</td>
<td>Participative democracy</td>
<td>Machiavellian struggle</td>
<td>Imagination</td>
<td>Positivistic science as most current ideology</td>
<td>Diversity necessary for innovation</td>
<td>Planning with out the aim to predict a unpredictable future</td>
<td>Not only viability but dedication to development</td>
<td>Bean counter approach incompatible to innovation</td>
</tr>
<tr>
<td>Phenomenology</td>
<td>Innovators exist in isolation</td>
<td>Notion of difficult relations and power</td>
<td>Network of different branches of science</td>
<td>Innovation and the concept of chaos (entropy)</td>
<td>Risk taking can limit or increase the chance to find solutions</td>
<td>Comparison with what has learnt (brain)</td>
<td>Self-destruction</td>
<td>Time</td>
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<td>Representation</td>
<td>Innovation as inheritance to the added value domain</td>
<td>Interpersonal relations?</td>
<td>Cohesive complex molecules - exchange of different fields</td>
<td>Variety of behaviour</td>
<td>Selection = Intelligence</td>
<td>Dialectics of building and renewal</td>
<td>Networks have limited lifetime</td>
<td>Leaders are just participants of interactions</td>
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<td>Representational Platform and common understanding</td>
<td>Dialectic tension between conservatives and innovators</td>
<td>Creative abrasion</td>
<td>Exchange of information important</td>
<td>Trial and error for maximising resource capacity</td>
<td>Pattern big amounts of information</td>
<td>Dealing with change</td>
<td>Time and anticipation</td>
<td>Managers as therapists</td>
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<td>The map to be the territory</td>
<td>Participatory democracy</td>
<td>Allow a latitude of speculations</td>
<td>Import of technological knowledge from outside</td>
<td>Informal improvisation</td>
<td>Change as an universal law</td>
<td>Heterarchic organisations have temporary structures</td>
<td>Molecules of Emotions</td>
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<td>Models to create common domain rather than the shared view</td>
<td>Sense of belonging over personal relationships</td>
<td>Courage to fail or failure</td>
<td>Heterarchic organisations strong in innovation and flexibility</td>
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<td>Paradox of stability</td>
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<td>Language</td>
<td>Shared problem solving</td>
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<td>Hegel's Law of Change</td>
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<td>Representational Platform</td>
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<td>A non-linear world</td>
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**Copyright UCT**

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### VARIABLES

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**Innovation Management ID**
Innovation Management Model
Declaration

I know that plagiarism is wrong. Plagiarism is to use another’s work and to pretend that it is one’s own.

I have used a standard convention for citation and referencing. Each significant contribution to, and quotation in, this essay/report/project/assignment from the work, or works, of other people has been attributed, and has been cited and referenced.

This essay/report/project/assignment is my own work.

I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

Signature: .................................

Student no: MTZSTE001
Process Road Map

**PART A**
PROBLEM - FORMULATION
Explanation of the Methodology

- **S** INDIVUAL + ORGANISATIONAL SITUATION
- **C** CONCERN
- **Q** QUESTION
- **R** INDIVIDUAL RATIONALE
- **R** ORGANISATIONAL RATIONALE
- **A** ANSWER/PROBLEM FORMULATION

**PART B**
DEALING WITH THE PROBLEM

- **S** SITUATION AROUND THE RESEARCH QUESTION
- **C** CONCERN
- **Q** QUESTION
- **R** RATIONALE
- **A** ANSWER
- **E** EVALUATION

**Situation**
Why is this a problem, issue, concern? What are the contextual or situational elements that make this a concern that needs to be dealt with? Why does something have to be done about this concern?

**Concern**
What has motivated or prompted the writer to write the paper? What is the problem, issue or concern the writer attempts to deal with in the paper?

**Question**
Reframe the concern into a question so that if the question is appropriately answered, the answer would propose a way of satisfactorily dealing with the concern.

**Answer**
What answer to the question does the writer suggest?

**Rationale**
R1 In what way does the writer envisage dealing with C? What is the process of dealing with C and if the approach proposed by A were implemented, how would events/matters unfold leading to the resolution of C?
R2 What support for the Answer does the writer provide? If the Answer is the claim does the writer give evidence and warrants

**Evaluation**
Evaluate reading in terms of:
Relevance: Concern relevant in the situation? Utility: Does answer deal with the concern? Validity: Does R adequately validate A Ethics: Is A the appropriate thing to do in S against readers knowledge, values and experience