

# Quality Management: Reconsidered for the Digital Economy

5<sup>th</sup> Edition, 2022, Routledge, UK

These slides follow the structure of the book with 4 Parts and 24 chapters.

They will not substitute for the reading, thinking, reflection and discussion necessary to develop an adequate understanding of the content.

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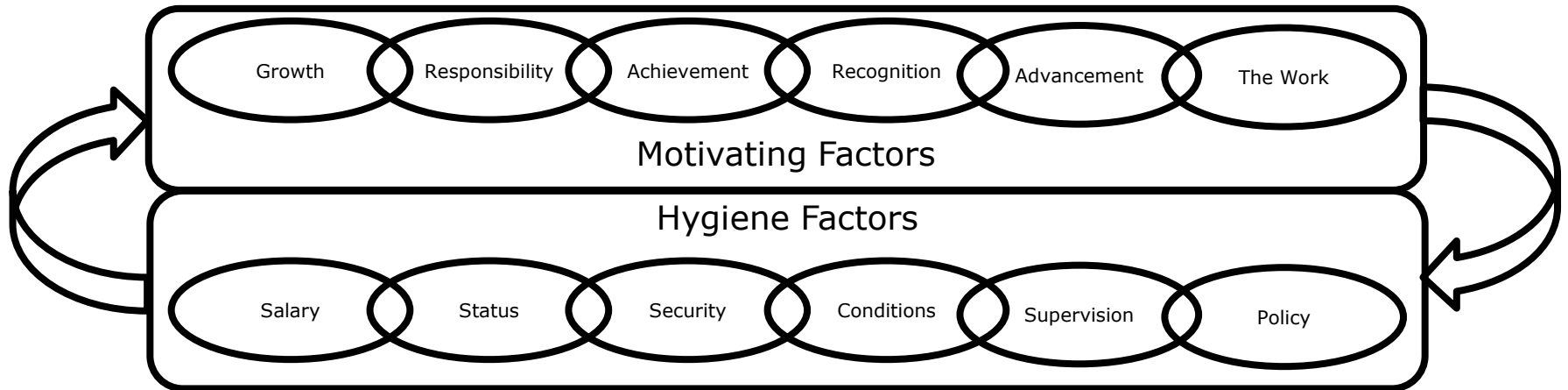
# Quality Imperatives, Management and Cybernetics

Part One

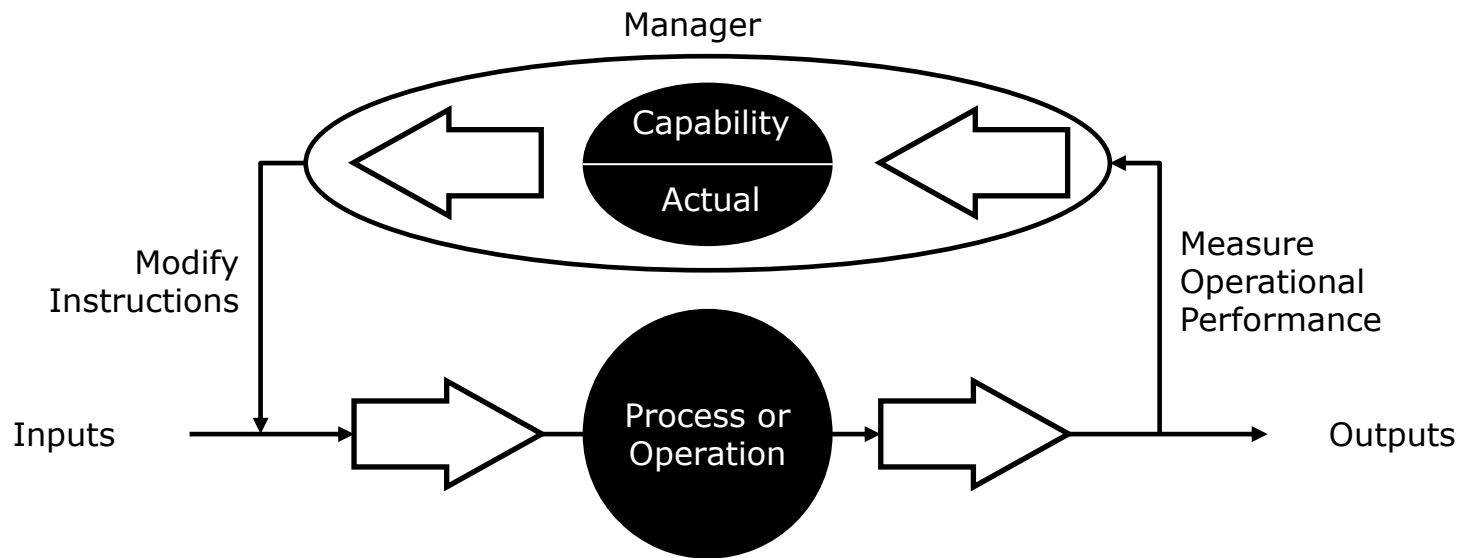
Extracts from:  
“Quality: Reconsidered for the Digital Economy”  
John Beckford  
Routledge 2022

Voluntary	Acceptance of responsibility for actions that goes beyond that prescribed by law
Internalizing and Managing Externalities	Recognising impacts beyond the organisation and accepting them as belonging to it
Stakeholders	Recognising responsibility beyond shareholders and customers to embrace the wider society
Alignment	Understanding that there is no necessary conflict between CSR and profitability. Addressing the alignment of corporate and social interests.
Practices and Values	Not simply about the adoption of good practice as avoiding a negative by about an internal belief system that recognises CSR as a good thing in its own right
Beyond Philanthropy	Assumption that CSR is a mainstream way of doing business, not an addition that keeps society happy

Core Characteristics of Corporate Social Responsibility  
Figure 1.1



Herzberg's Two Factor Theory of Motivation  
Figure 2.1



The Homeostat (from Beckford, 2020)

Figure 2.2

## **Frederick Taylor**

...develop a science for each element of a man's work which replaces the old rule of thumb method

....scientifically select and then train, teach and develop the workman, whereas in the past he chose his own work and trained himself as best he could

....heartily co-operate with the men so as to insure all of the work being done in accordance with the principles of the science which has been developed

ensure that ....There is an almost equal division of the work and the responsibility between the management and the workmen. The management take over all the work for which they are better fitted than the workmen, while in the past almost all of the work and the greater part of the responsibility were thrown upon the men

## Principles of Scientific Management

### Figure 4.1

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## Henri Fayol

To ensure that the plan is judiciously prepared and strictly carried out  
See that the human and material organisation is consistent with the objectives, resources and requirements of the concern  
Set up a single, competent, energetic guiding authority  
Harmonise activities and co-ordinate efforts  
Formulate clear, distinct, precise decisions  
Arrange for efficient selection - each department must be headed by a competent, energetic man, each employee must be in that place where he can render greatest service

Define duties clearly  
Encourage a liking for initiative and responsibility  
Have fair and suitable recompense for services rendered  
Make use of sanctions against faults and errors  
See to the maintenance of discipline  
Ensure that individual interests are subordinated to the general interest  
Pay special attention to unity of command  
Supervise both human and material order  
Have everything under control  
Fight against excess of regulation, red tape and paper control

### Duties of Managers

#### Figure 4.2

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## Henri Fayol

Division of work (specialisation)

Authority

Discipline

Unity of Command

Unity of Direction

Subordination (the interest of the organisation is more important than that of the individual)

Remuneration

Centralisation (a question of continuously varying proportion)

Scalar chain

Order

Equity

Stability of tenure

Initiative

Esprit de corps

## Principles of Management Figure 4.3



### **Max Weber**

Specialisation: Each office (or 'bureau') has a defined area of expertise

Hierarchy: Supervision and control of lower offices by higher ones

Rules: Exhaustive, stable rules, learned by all

Impersonality: Equality of treatment for all according to the rules

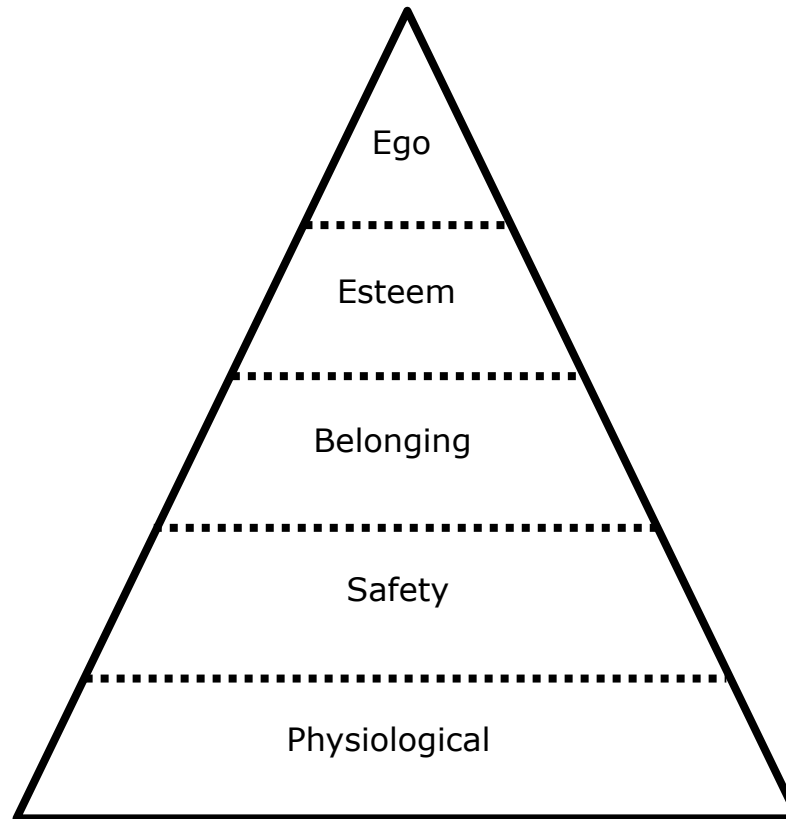
Appointment: Selection according to competence not election

Full-time: Occupation of office as the primary task of the individual

Career: Promotion, tenure and seniority within the system

Segregation: The official activity is distinct from the private individual

### Principles of Bureaucracy Figure 4.4



Maslow's Hierarchy of Needs  
Figure 4.5

# The Gurus

## Part Two

Extracts from:  
“Quality: Reconsidered for the Digital Economy”  
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# The Gurus

Diagrams and Tables

### **Philip Crosby**

Quality is defined as conformance to requirements, not as 'goodness' nor 'elegance'

There is no such thing as a quality problem

It is always cheaper to do it right first time

The only performance measurement is the cost of quality

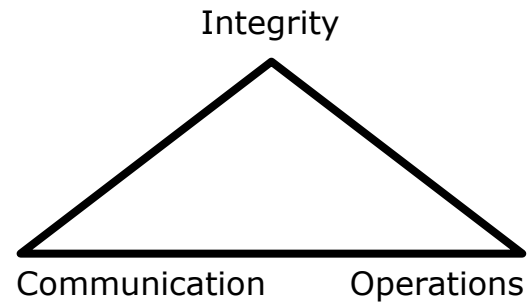
The only performance standard is zero defects

### Five Absolutes of Quality Management Figure 5.1

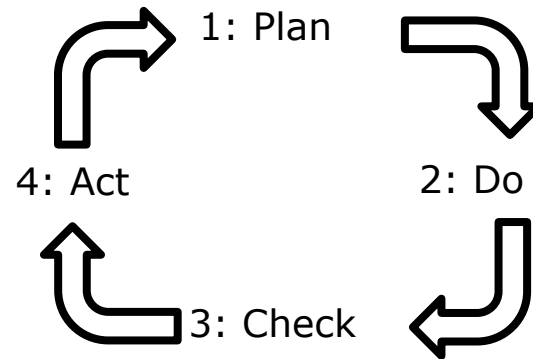
## Philip Crosby

Step 1	Establish management commitment	Step 8	Train supervisors & managers
Step 2	Form quality improvement teams	Step 9	Hold a 'Zero Defects' day
Step 3	Establish quality measurements	Step 10	Encourage setting of goals for improvement
Step 4	Evaluate the cost of quality	Step 11	Obstacle reporting
Step 5	Raise quality awareness	Step 12	Recognition for contributors
Step 6	Take action to correct problems	Step 13	Establish Quality Councils
Step 7	Zero defects planning	Step 14	Do it all over again

14 Step Quality Programme  
Figure 5.2



Triangle of Interactions  
Figure 5.3



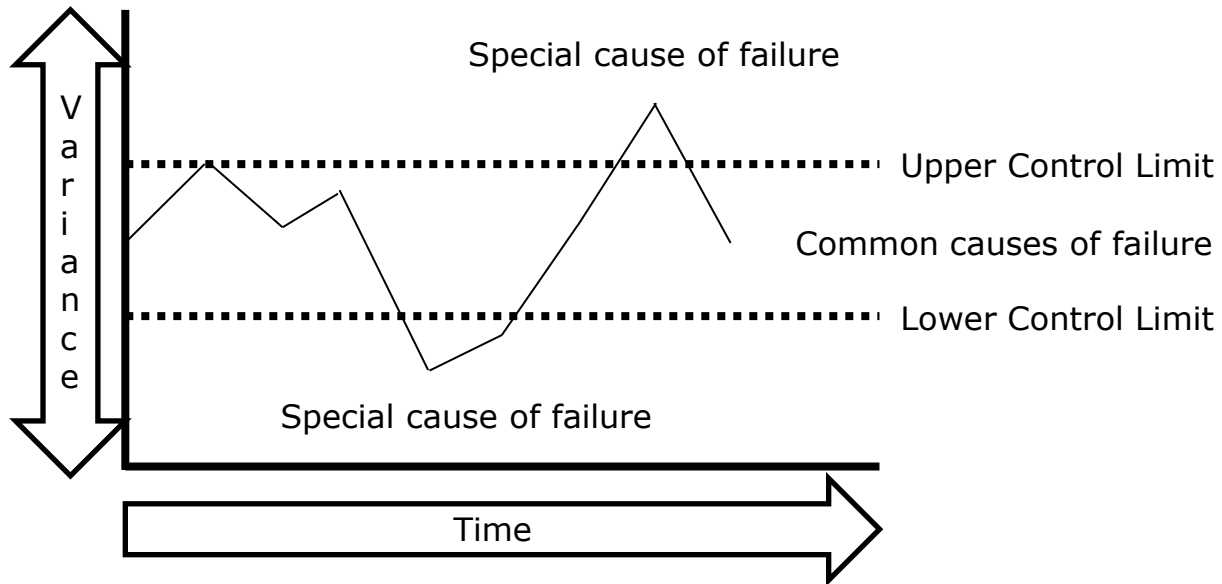
The Plan-Do-Check-Act Cycle  
Figure 6.1



## **W. Edwards Deming**

- Sin 1      Lack of constancy
- Sin 2      Short term profit focus
- Sin 3      Performance appraisals
- Sin 4      Job-hopping
- Sin 5      Use of visible figures only
- Sin 6      Excessive medical costs
- Sin 7      Excessive costs of liability

The Seven Deadly Sins  
Figure 6.2



Sample Control Chart  
Figure 6.3

Principle 1	Create constancy of purpose to improve product and service	Principle 8	Drive out fear so that everyone can work effectively together for the organisation
Principle 2	Adopt a new philosophy for the new economic age with management learning what their responsibilities are and by assuming leadership for change	Principle 9	Break down barriers between departments. Encourage research, design, sales and production to work together to foresee difficulties in production and use
Principle 3	Cease dependence on mass inspection to achieve quality by building quality into the product	Principle 10	Eliminate slogans, exhortations and numerical targets for the workforce since they are divisory and anyway difficulties belong to the whole system
Principle 4	End awarding business on price. Award business on total cost and move towards single suppliers	Principle 11	Eliminate quotas or work standards and management by objectives or numerical goals: leadership should be substituted instead
Principle 5	Aim for continuous improvement of the system of production and service to improve productivity and quality and to decrease costs	Principle 12	Remove barriers that rob people of their right to pride in their work
Principle 6	Institute training on the job	Principle 13	Institute a vigorous education and self-improvement programme
Principle 7	Institute leadership with the aim of supervising people to help them to do a better job	Principle 14	Put everyone in the company to work to accomplish the transformation

Deming: 14 Principles for Transformation  
Figure 6.4

## W. Edwards Deming

- Point 1 Management must agree on the meaning of the quality programme, its implications and the direction to take
- Point 2 Top management must accept and adopt the new philosophy
- Point 3 Top management must communicate the plan and the necessity for it to the people in the organisation
- Point 4 Every activity must be recognised as a step in a process and the customers of that process identified. The customers are responsible for the next stage of the process
- Point 5 Each stage must adopt the "Deming" or "Shewhart" Cycle - Plan, Do, Check, Action - as the basis of quality improvement
- Point 6 Team working must be engendered and encouraged to improve inputs and outputs. Everyone must be enabled to contribute to this process
- Point 7 Construct an organisation for quality with the support of knowledgeable statisticians

### The 7 Point Action Plan Figure 6.5

## **Armand V Feigenbaum**

- Step 1 Set quality standards
- Step 2 Appraise conformance to standards
- Step 3 Act when standards are not met
- Step 4 Plan to make improvements

Four Steps to Quality  
Figure 7.1

## Kaoru Ishikawa

Effect 1	Product quality is improved and becomes uniform. Defects are reduced	Effect 8	Contracts between vendors and vendee are rationalised
Effect 2	Reliability of goods is improved	Effect 9	The sales market is enlarged
Effect 3	Cost is reduced	Effect 10	Better relationships are established between departments
Effect 4	Quantity of production is increased, and it becomes possible to make rational production schedules	Effect 11	False data and reports are reduced
Effect 5	Wasteful work and rework are reduced	Effect 12	Discussions are carried out more freely and democratically
Effect 6	Technique is established and improved	Effect 13	Meetings are operated more smoothly
Effect 7	Expenses for inspection and testing are reduced	Effect 14	Repairs and installations of equipment and facilities are done more rationally
		Effect 15	Human relations are improved

15 Effects of Company-Wide Quality Control (Gilbert, 1992)  
Figure 8.1

## **J Gilbert**

Top management support

Operational management support and involvement

Voluntary participation of the members

Effective training of the leader and members

Shared work background

Solution oriented approach

Recognition of the Quality Circle's efforts

Have an agenda, minutes and rotating chairmanship

Keep to the time allowed for the meeting

Members should inform bosses of meeting times

Make sure that Quality Circles are not hierarchical. If seniority plays any sort of part you'll find the MD's [CEO] secretary thinks she's too good to attend the regular secretaries Quality Forum

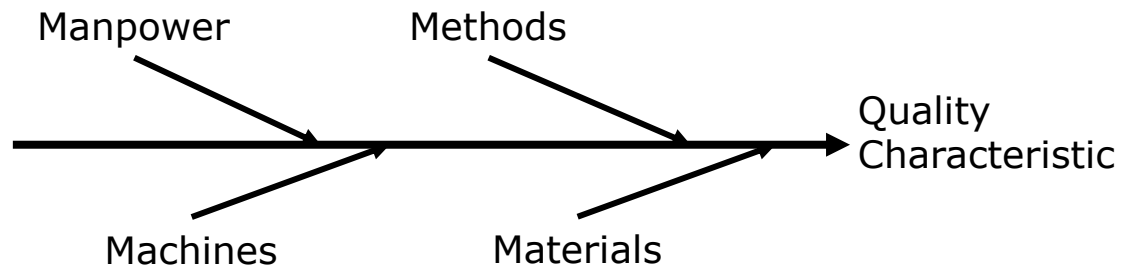
Cornerstones to Successful Quality Circles (Gilbert, 1992)  
Figure 8.2

## **Kaoru Ishikawa**

- Tool 1 Pareto Charts: used to identify the principal causes of problems
- Tool 2 Ishikawa/fishbone diagrams: charts of cause and effect in processes
- Tool 3 Stratification: layer charts which place each set of data successively on top of the previous one
- Tool 4 Check Sheets: to provide a record of quality
- Tool 5 Histograms: graphs used to display frequency of various ranges of values of a quantity
- Tool 6 Scattergraphs: used to help determine whether there is a correlation between two factors
- Tool 7 Control charts: Used as a device in Statistical Process Control

### 7 Tools of Quality Control Figure 8.3





The Ishikawa or Fishbone Diagram  
Figure 8.4

## Joseph Juran

Quality Planning	determine quality goals implementation planning resource planning express goals in quality terms create the quality plan
Quality Control	monitor performance compare objectives with achievements act to reduce the gap
Quality Improvement	reduce waste enhance logistics improve employee morale improve profitability satisfy customers

The Quality Trilogy  
Figure 9.1

## Joseph Juran

- Step 1 Identify who are the customers
- Step 2 Determine the needs of those customers
- Step 3 Translate those needs into our language [the language of the organisation]
- Step 4 Develop a product that can respond to those needs
- Step 5 Optimise the product features so as to meet our [the Company's] needs as well as customers needs
- Step 6 Develop a process which is able to produce the product
- Step 7 Optimise the process
- Step 8 Prove that the process can produce the product under operating conditions
- Step 9 Transfer the process to operations

The Quality Planning Road Map  
Figure 9.2

## Joseph Juran

- |         |   |
|---------|---|
| Step 1  | Create awareness of the need and opportunity for quality improvement  |
| Step 2  | Set goals for continuous improvement  |
| Step 3  | Build an organisation to achieve goals by establishing a quality council, identifying problems, selecting a project, appointing teams and choosing facilitators |
| Step 4  | Give everyone training  |
| Step 5  | Carry out projects to solve problems  |
| Step 6  | Report progress   |
| Step 7  | Show recognition  |
| Step 8  | Communicate results   |
| Step 9  | Keep a record of successes  |
| Step 10 | Incorporate annual improvements into the company's regular systems and processes and thereby maintain momentum  |

### 10 Steps to Continuous Quality Improvement Figure 9.3

## **John S Oakland**

Quality is meeting the customers requirements

Most quality problems are inter-departmental

Quality control is monitoring, finding and eliminating causes of quality problems

Quality Assurance rests on prevention, management systems, effective audit and review

Quality must be managed, it does not just happen

Focus on prevention not cure

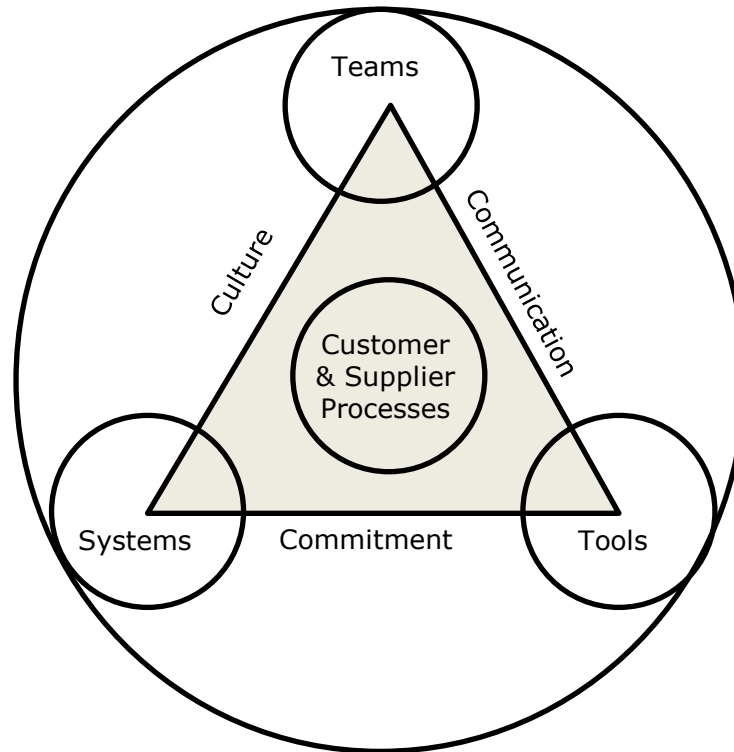
Reliability is an extension of quality and enables us to 'delight the customer'

## 7 Key Characteristics of TQM Figure 10.1

## John S Oakland

- Point 1 Long term commitment
- Point 2 Change the culture to 'right first time';
- Point 3 Train the people to understand the 'Customer-Supplier relationship
- Point 4 Buy products and services on TOTAL COST (sic);
- Point 5 Recognise that systems improvement must be managed
- Point 6 Adopt modern methods of supervision and training and eliminate fear
- Point 7 Eliminate barriers, manage processes, improve communications and teamwork
- Point 8 Eliminate, arbitrary goals, standards based only on numbers, barriers to pride of workmanship, fiction (use the correct tools to establish facts)
- Point 9 Constantly educate and retrain the in house experts
- Point 10 Utilise a systematic approach to TQM implementation

### 10 Points for Senior Management Figure 10.2



Total Quality Management Model (adapted from Oakland, 2021)  
Figure 10.3

## **John S Oakland**

Market Research

Basic Research

Invention

Concept Design

Prototype Testing

Final Product or Service Testing

After Sales Service and Trouble Shooting

Quality Function Deployment Activities  
Figure 10.4



Each part of a system has a definable purpose;

The parts of the system are interdependent;

We can understand each part by seeing how it fits into the system;

We cannot understand the system by identifying the unassembled parts;

To understand the system we must understand its purpose,  
its interdependencies and its interactions

## Characteristics of a System

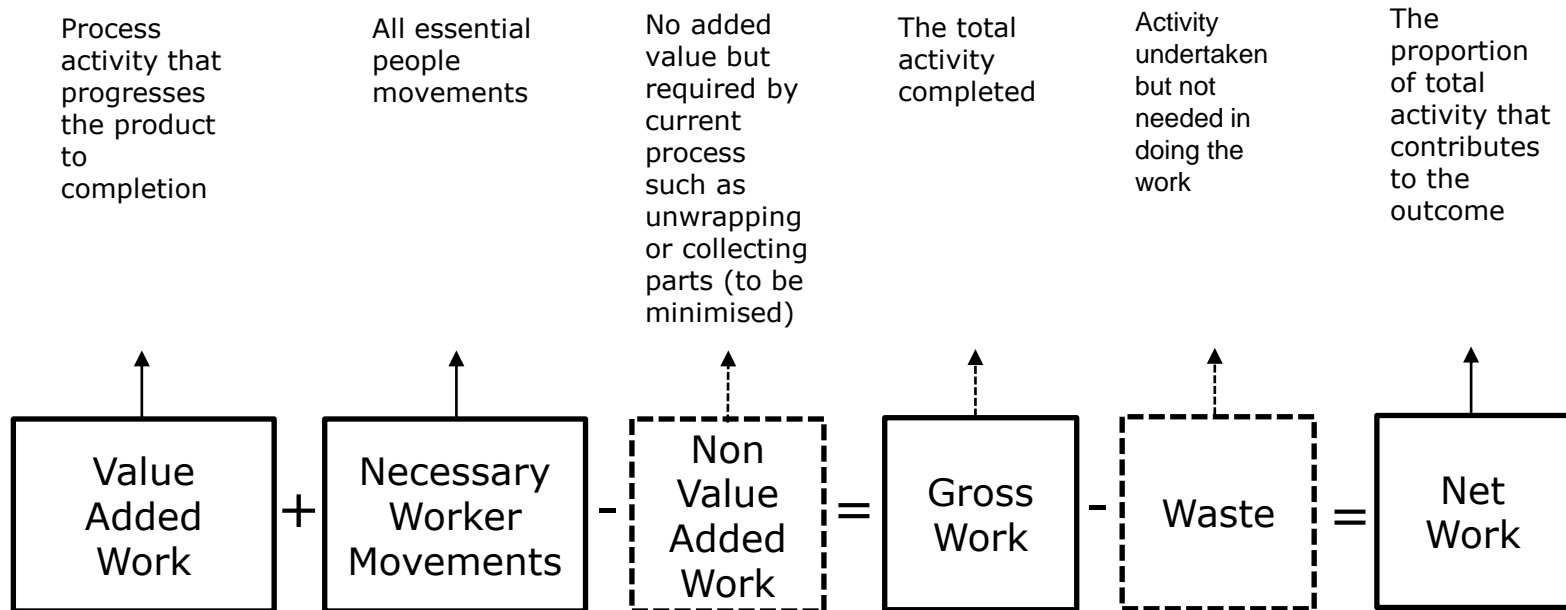
### Figure 11.1

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Understanding Waste: Adapted from Ohno (1978)

Fig 11.2

## Genichi Taguchi

System Design

Parameter Design

Tolerance Design

3 Stage Prototyping Method  
Figure 13.1

## Genichi Taguchi

Principle 1	Communication
Principles 2	Control
Principle 3	Efficiency
Principle 4	Effectiveness
Principle 5	Efficacy
Principle 6	Emphasis on location and elimination of causes of error
Principle 7	Emphasis on design control
Principle 8	Emphasis on environmental analysis

Organisational Principles  
Figure 13.2

## Genichi Taguchi

- Step 1 Define the problem
- Step 2 Determine the objective
- Step 3 Conduct a brainstorming session
- Step 4 Design the experiment
- Step 5 Conduct the experiment
- Step 6 Analyse the data
- Step 7 Interpret the results
- Step 8 Run a confirmatory experiment

### 8 Stages of Product Development Figure 13.3

# Systemic Thinking and Contemporary Methods

Part Three

Extracts from:  
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# Systemic Thinking and Contemporary Methods

Diagrams and Tables

## **ISO9001:2015**

Customer Focus

Leadership

Engagement of People

Process Approach

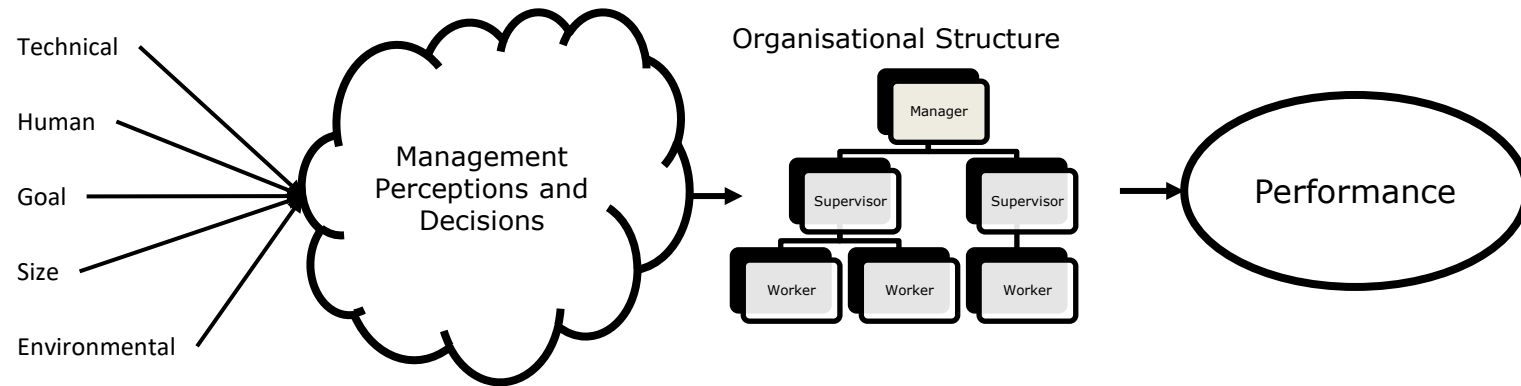
Improvement

Evidence-based Decision  
Making

Relationship Management

Quality Management Principles  
Figure 14.1



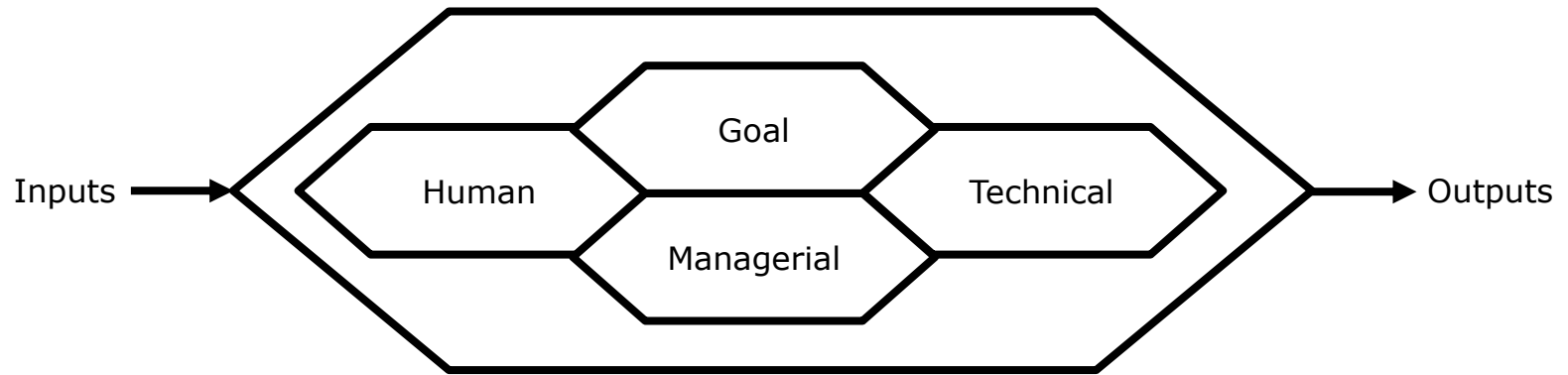


The Contingency Perspective (Adapted from Jackson, 1990)  
Figure 15.1

## Parsons & Smelser

Adaptation	the system has to establish relationships between itself and its external environment
Goal Attainment	goals have to be defined and resources mobilised and managed in pursuit of those goals
Integration	the system has to have a means of co-ordinating its efforts
Latency	the first three requisites for organisational survival have to be solved with the minimum of strain and tension by ensuring that organisational 'actors' are motivated to act in the appropriate manner

Functional Imperatives of a System  
Figure 15.2



The Organisation as a System  
Figure 15.3

### **Mason & Mitroff**

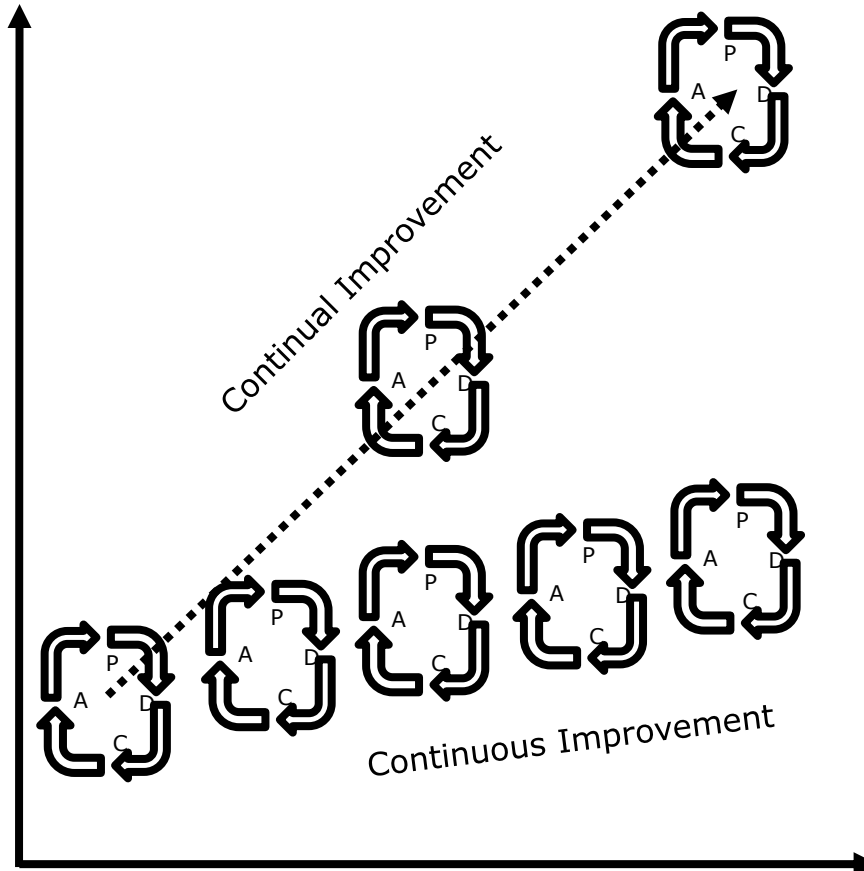
- Phase 1 Group Formation
- Phase 2 Assumption Surfacing
- Phase 3 Dialectical Debate
- Phase 4 Synthesis

Four Phases of SAST  
Figure 16.1

## Robert Flood

Principle 1	There must be agreed requirements, for both internal and external customers
Principle 2	Customers' requirements must be met first time and every time
Principle 3	Quality improvement will reduce waste and total costs
Principle 4	There must be a focus on the prevention of problems, rather than an acceptance to cope in a fire-fighting manner
Principle 5	Quality improvement can only result from planned management action
Principle 6	Every job must add value
Principle 7	Everybody must be involved, from all levels and across all functions
Principle 8	There must be an emphasis on measurement to help to assess and to meet requirements and objectives
Principle 9	A culture of continuous improvement must be established (continuous includes the desirability of dramatic leaps forward as well as steady improvement)
Principle 10	An emphasis should be placed on promoting creativity

### 10 Principles of TQM Figure 16.2



Continual and Continuous Improvement  
Figure 16.3

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### **Stafford Beer**

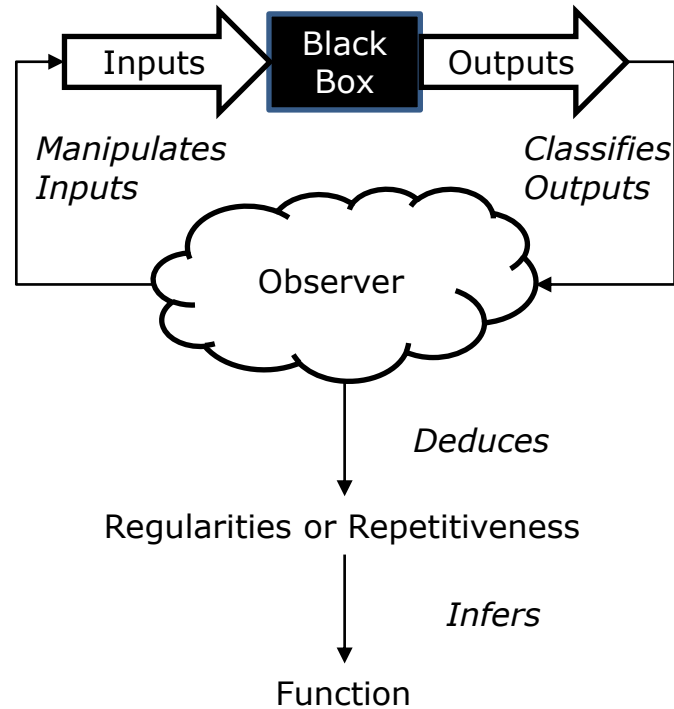
- Characteristic 1 extreme complexity
- Characteristic 2 a degree of self-regulation
- Characteristic 3 probabilistic behaviour

Characteristics of Cybernetic Systems  
Figure 17.1

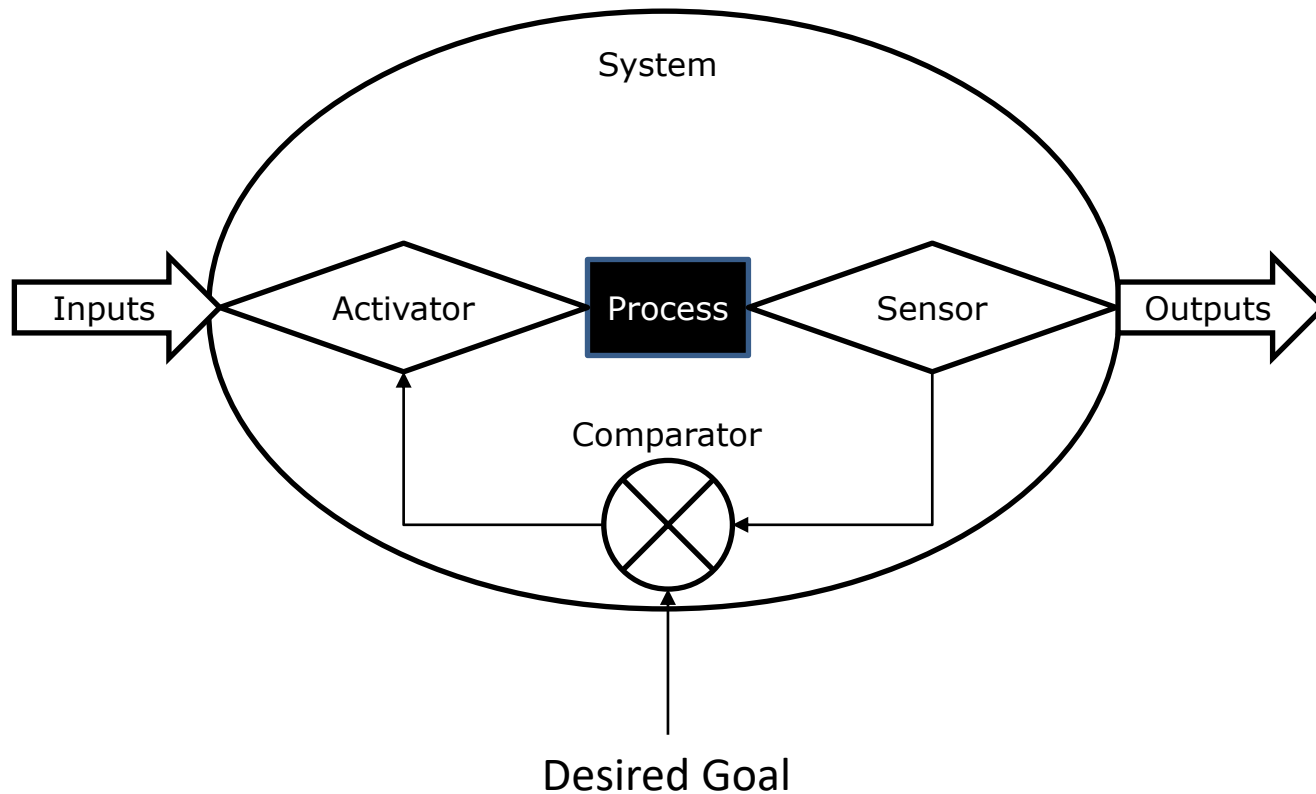
- Tool 1 the black box technique - to address extreme complexity
- Tool 2 feedback to enable self regulation
- Tool 3 variety engineering to handle probabilism

Tools of Cybernetics  
Figure 17.2





The Black Box Technique  
Figure 17.3



A Closed-loop First Order Feedback System  
Figure 17.4

Criterion 1	All the elements of the system must be working properly and the communication channels between them must be adequate
Criterion 2	In an organisation, responsibility for action, (which carries with it accountability), must be clearly allocated
Criterion 3	Controls must be selective
Criterion 4	The control must highlight or activate the necessary action

Design Criteria for Feedback Systems  
Figure 17.5

## Variety Management

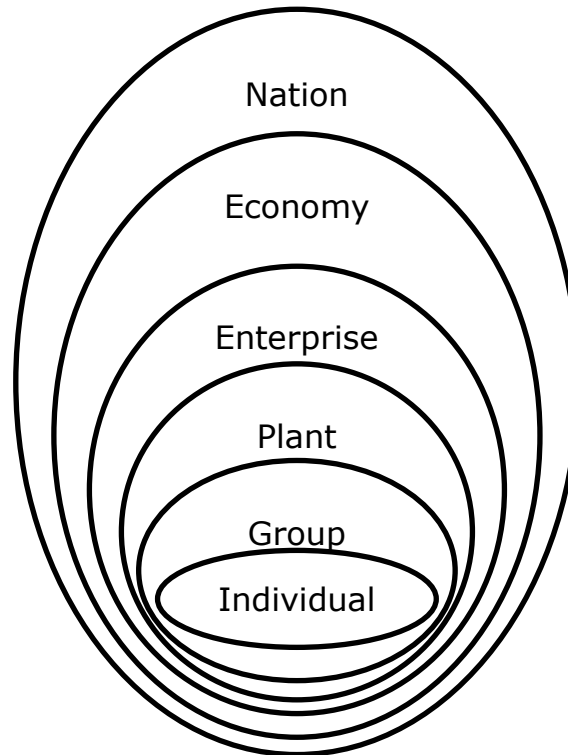
### Reduction

Structural: delegation, functionalisation, divisionalisation  
Planning Priorities: establishing objectives and priorities  
Operational: budgeting, management by exception  
Rules/Policies: instructions and norms of behaviour

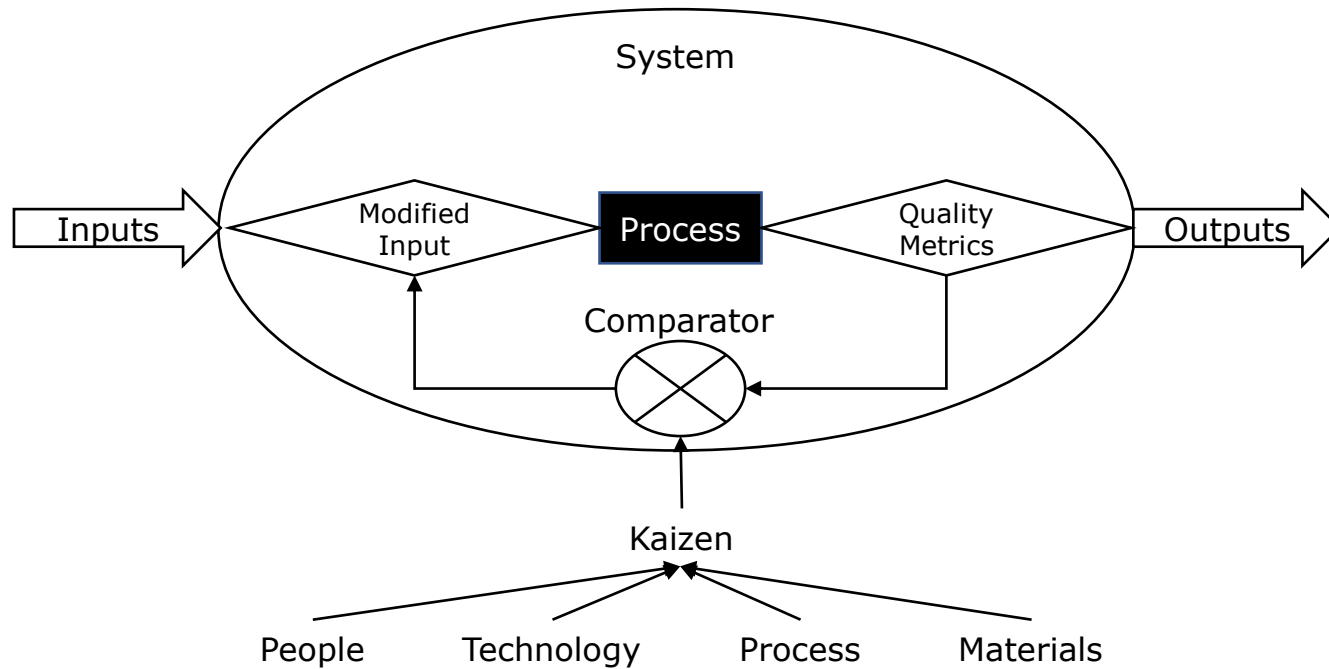
### Amplification

Structural: team work and groups  
Augmentation: recruit or train experts, employ independents  
Information: management or executive information systems (which may also act as attenuators)

Variety Reduction and Amplification Techniques  
Figure 17.6



Recursions of a System  
Figure 17.7

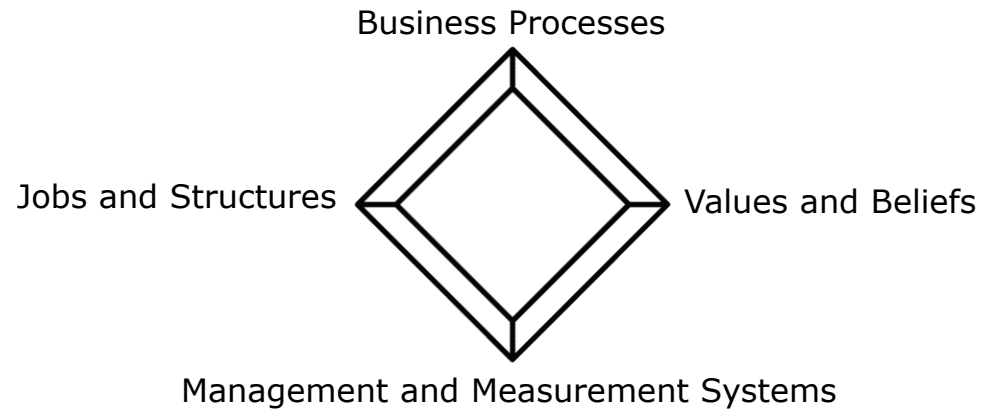


A Closed-loop Quality Feedback System  
Figure 17.8

## **Hammer & Champy**

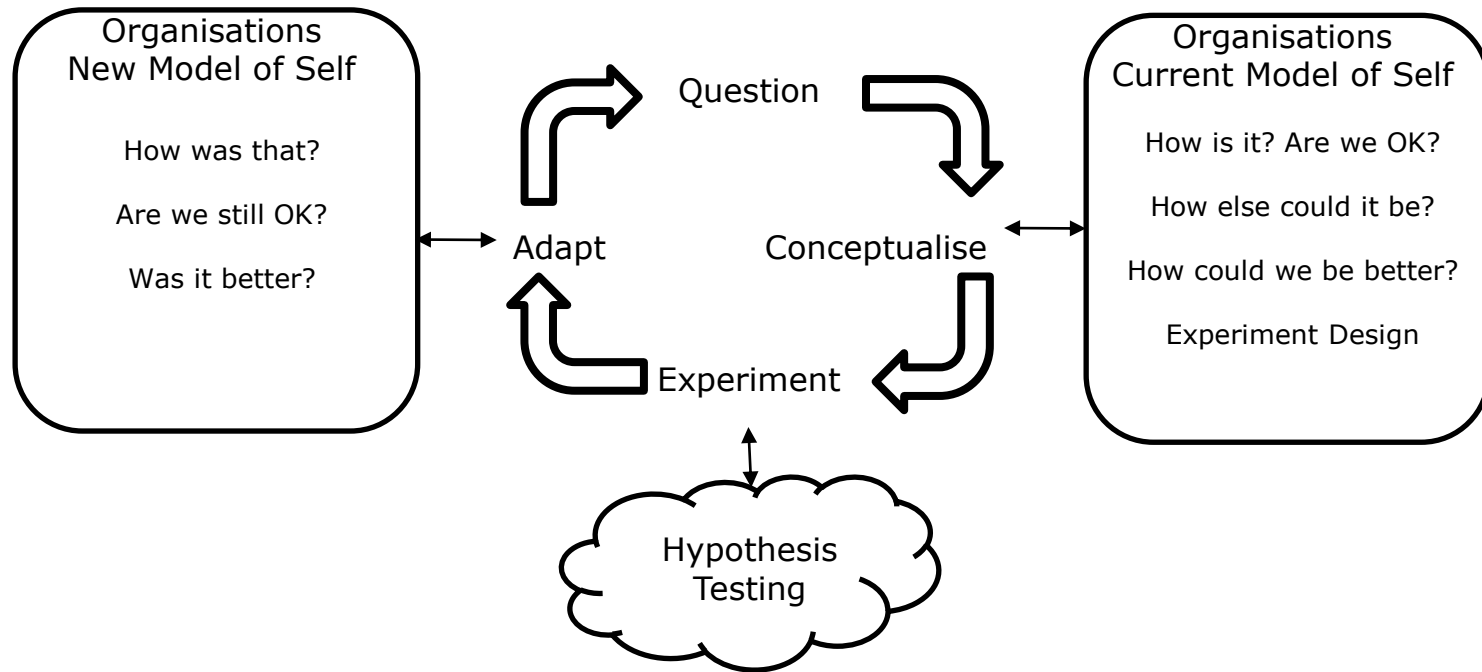
Key Word 1	Fundamental
Key Word 2	Radical
Key Word 3	Dramatic
Key Word 4	Processes
Key Word 5	Performance

Business Process Reengineering: Key Words  
Figure 18.1



**The Business System Diamond**  
Figure 18.2





A Model of Learning  
Figure 19.1

## **Peter Senge**

Key Word 1	People
Key Word 2	Continually
Key Word 3	Create the Results
Key Word 4	New Patterns of Thinking
Key Word 5	Collective Aspiration/Learning Together

The Learning Organisation: Key Words and Phrases  
Figure 19.2

### **Learning Disabilities**

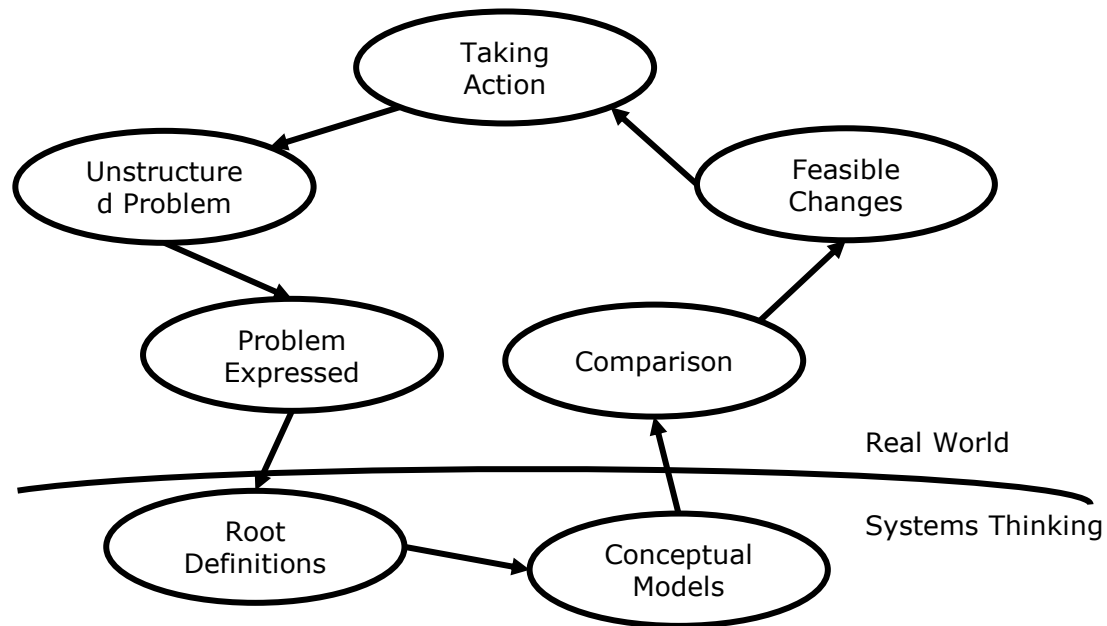
Disability 1	I am my position
Disability 2	The enemy is out there
Disability 3	The illusion of taking charge
Disability 4	The fixation on events
Disability 5	The parable of the boiling frog
Disability 6	The delusion of learning from experience
Disability 7	The myth of the management team

The Learning Disabilities  
Figure 19.3

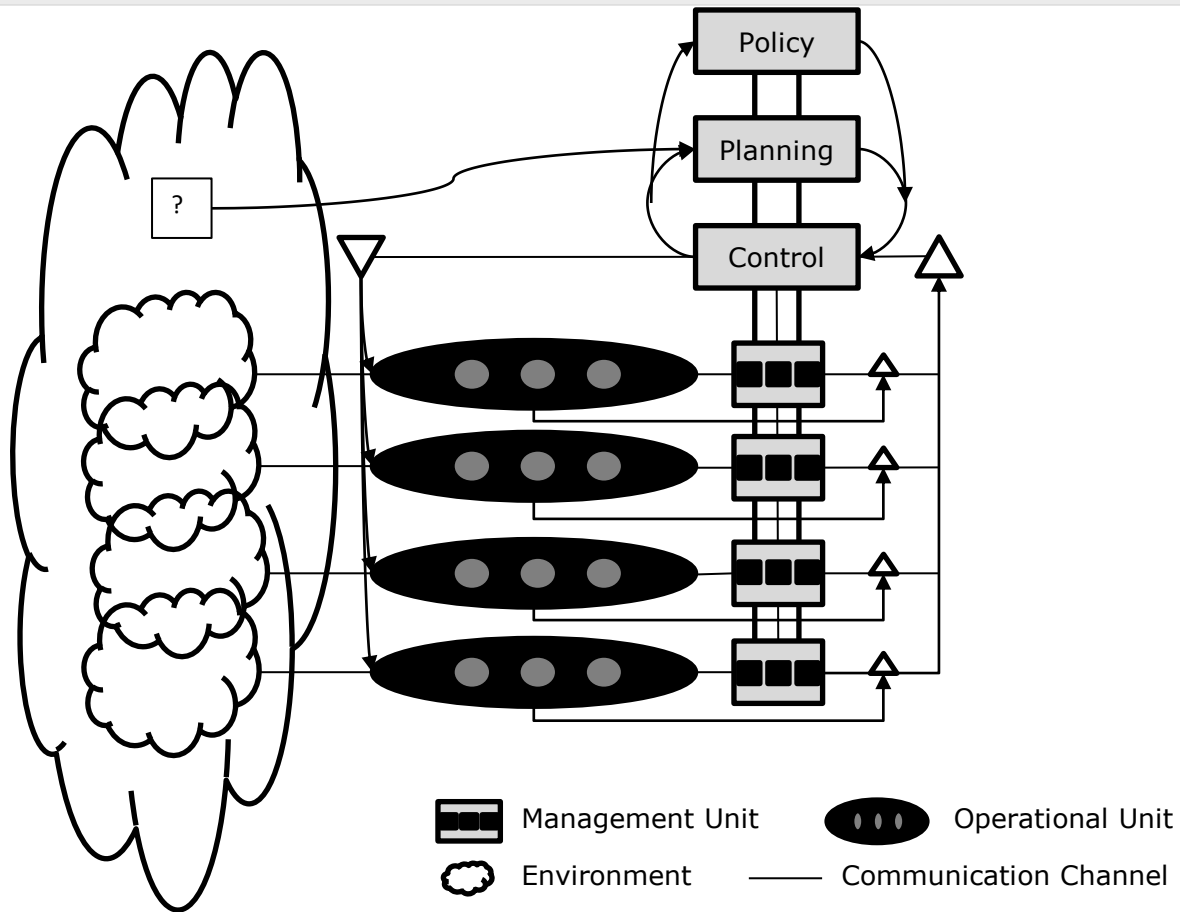
### **Five Disciplines**

Discipline 1	Systems thinking
Discipline 2	Personal mastery
Discipline 3	Mental models
Discipline 4	Shared vision
Discipline 5	Team learning

The 5 Disciplines  
Figure 19.4



Soft Systems Methodology  
Figure 20.1



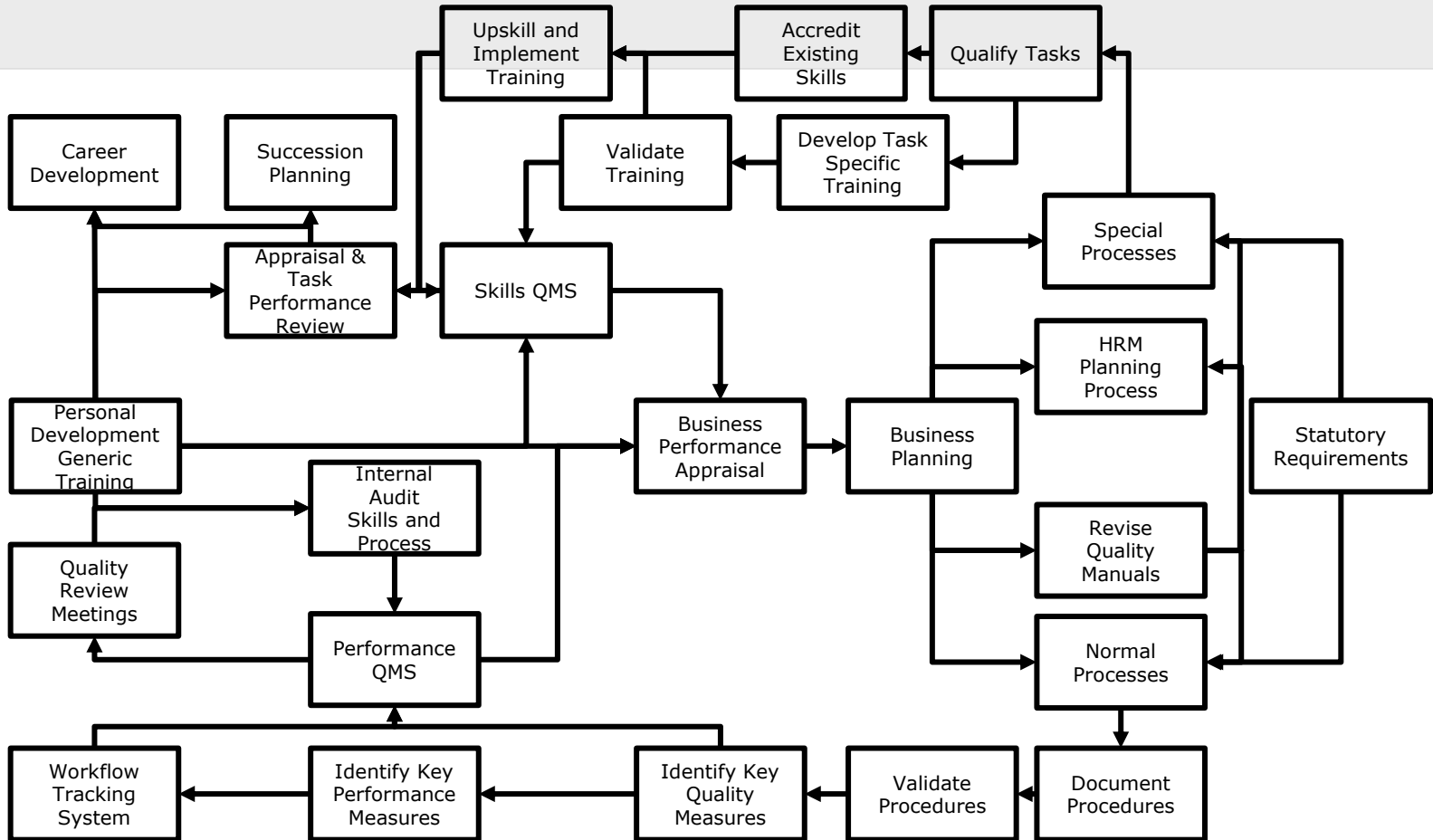
The Viable System Model  
Figure 20.2

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The Skills Based Quality Management System

Figure 20.3

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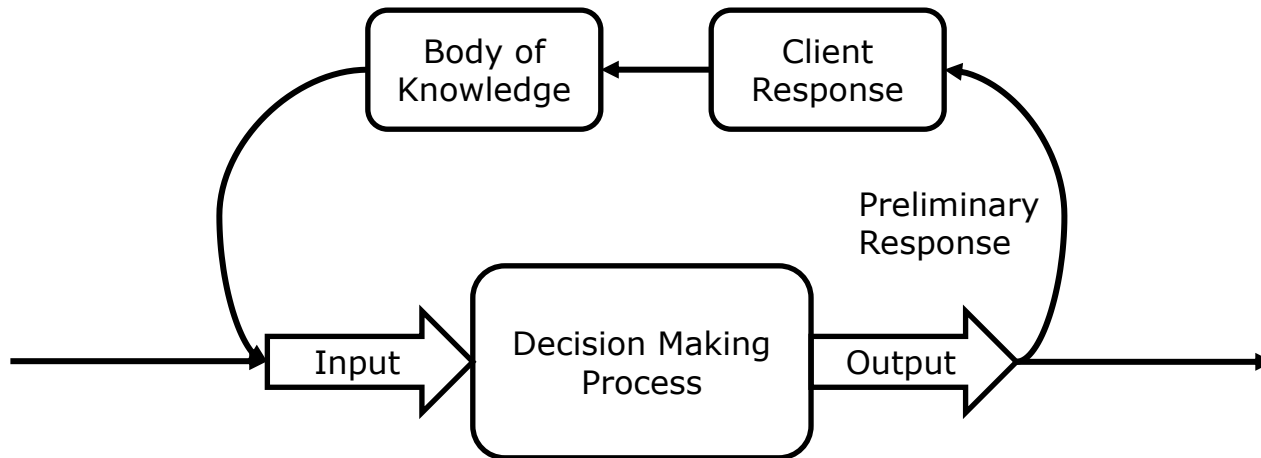
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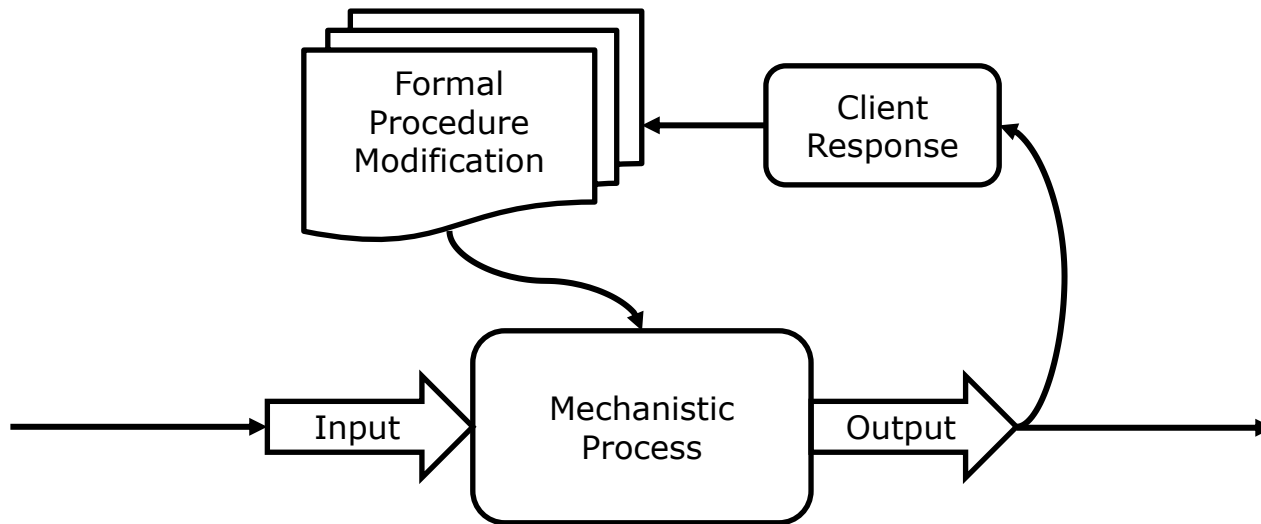


Basic Process  
Fig 20.4

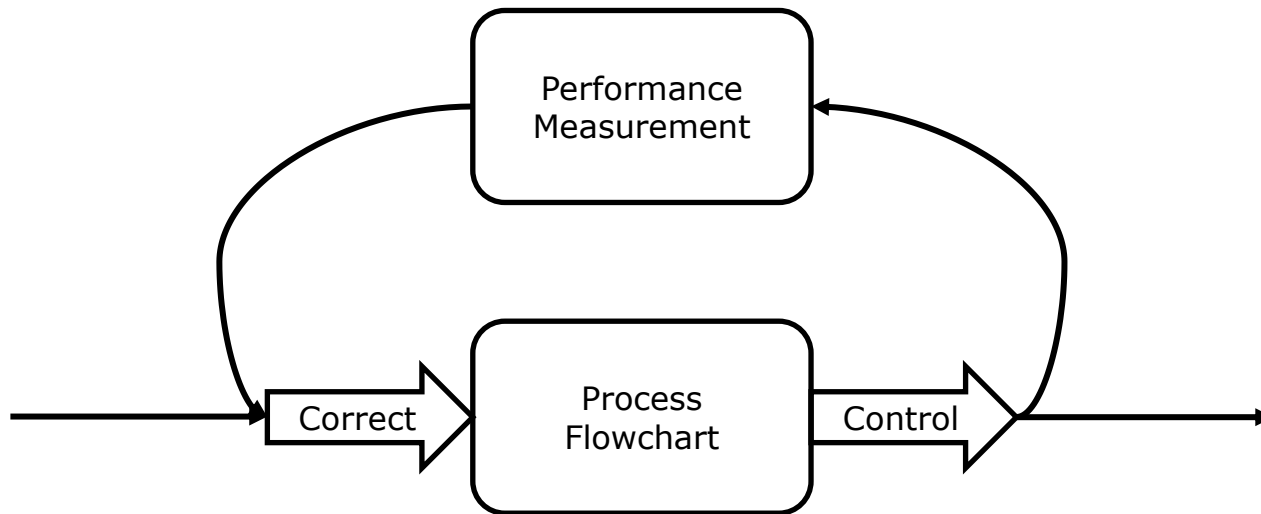




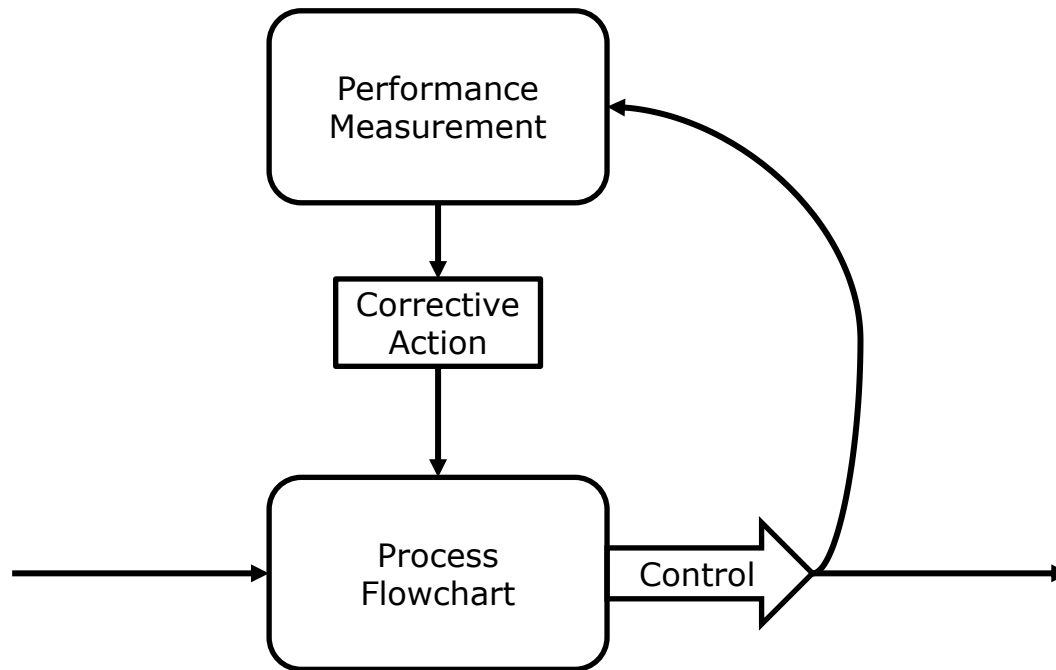
Error Rectification through Applied Knowledge  
Fig 20.5



Self-Regulating Process Model  
Fig 20.6



Routine Performance Management Model  
Fig 20.7



Direct Error Correction Model  
Fig 20.8

Generic	Role	Professional
MBA	Specific Masters & Research Programmes	Memberships and Professional Recognition
NVQ Level 5	Knowledge Based Quality Management	
NVQ Level 4	Skills Based Quality Management	Product Assurance and Development
NVQ Level 3	Procedure Based Quality Management	

Skills & Education Comparison Model  
 Fig 20.9

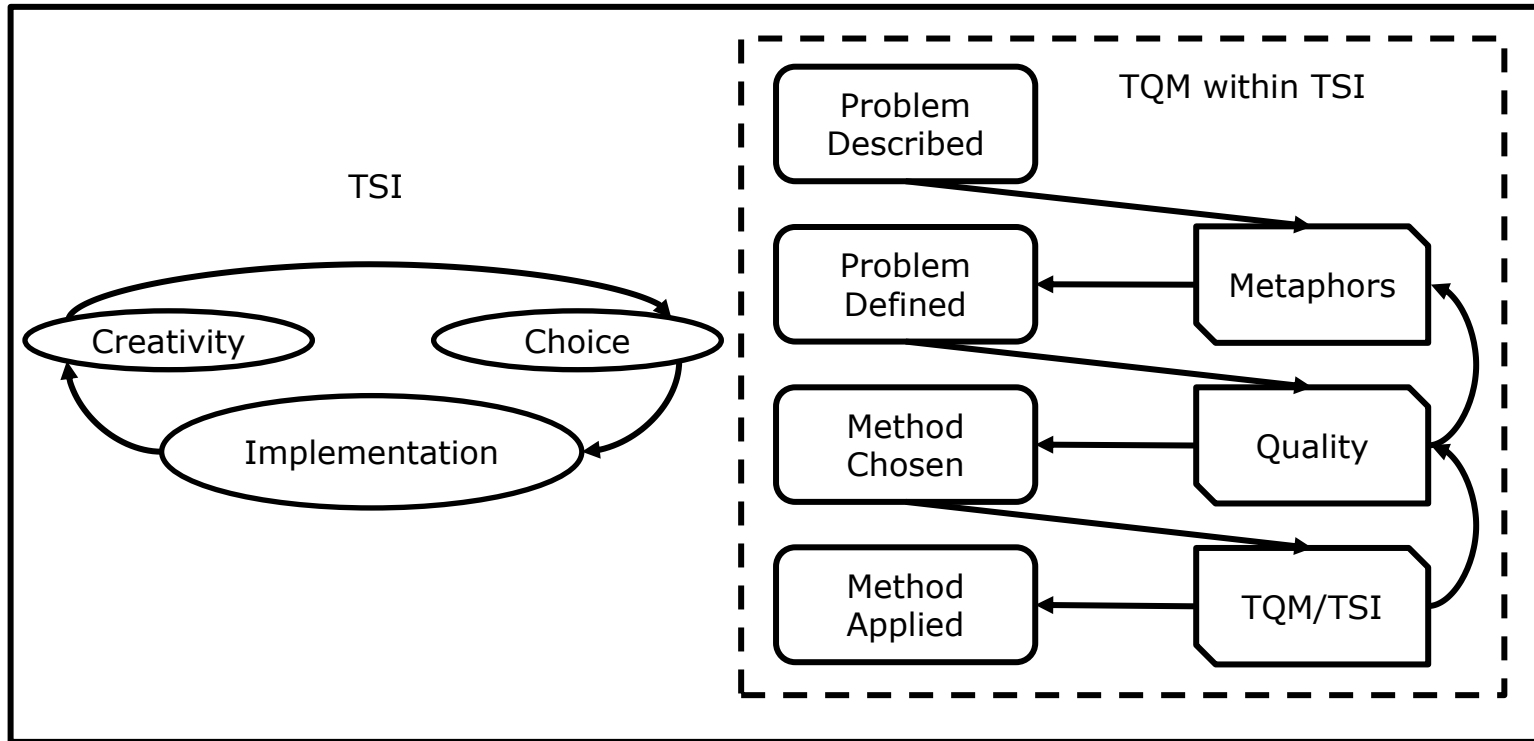
# Case Study

Part Four

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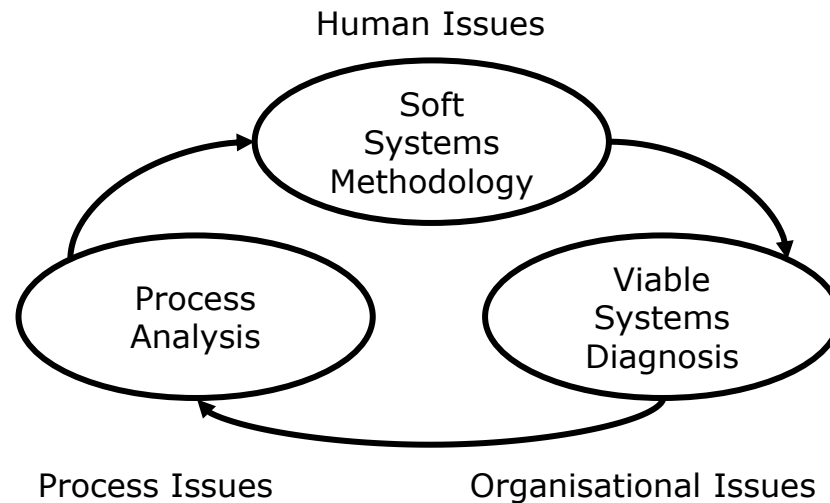
# Case Study

Diagrams and Tables

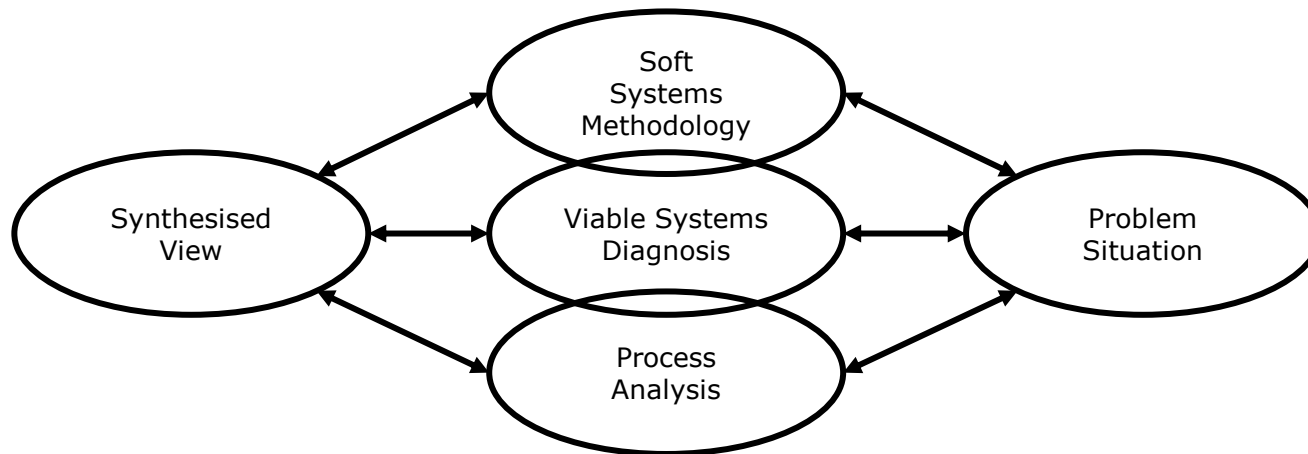


TQM within TSI within TQM  
Figure 21.1

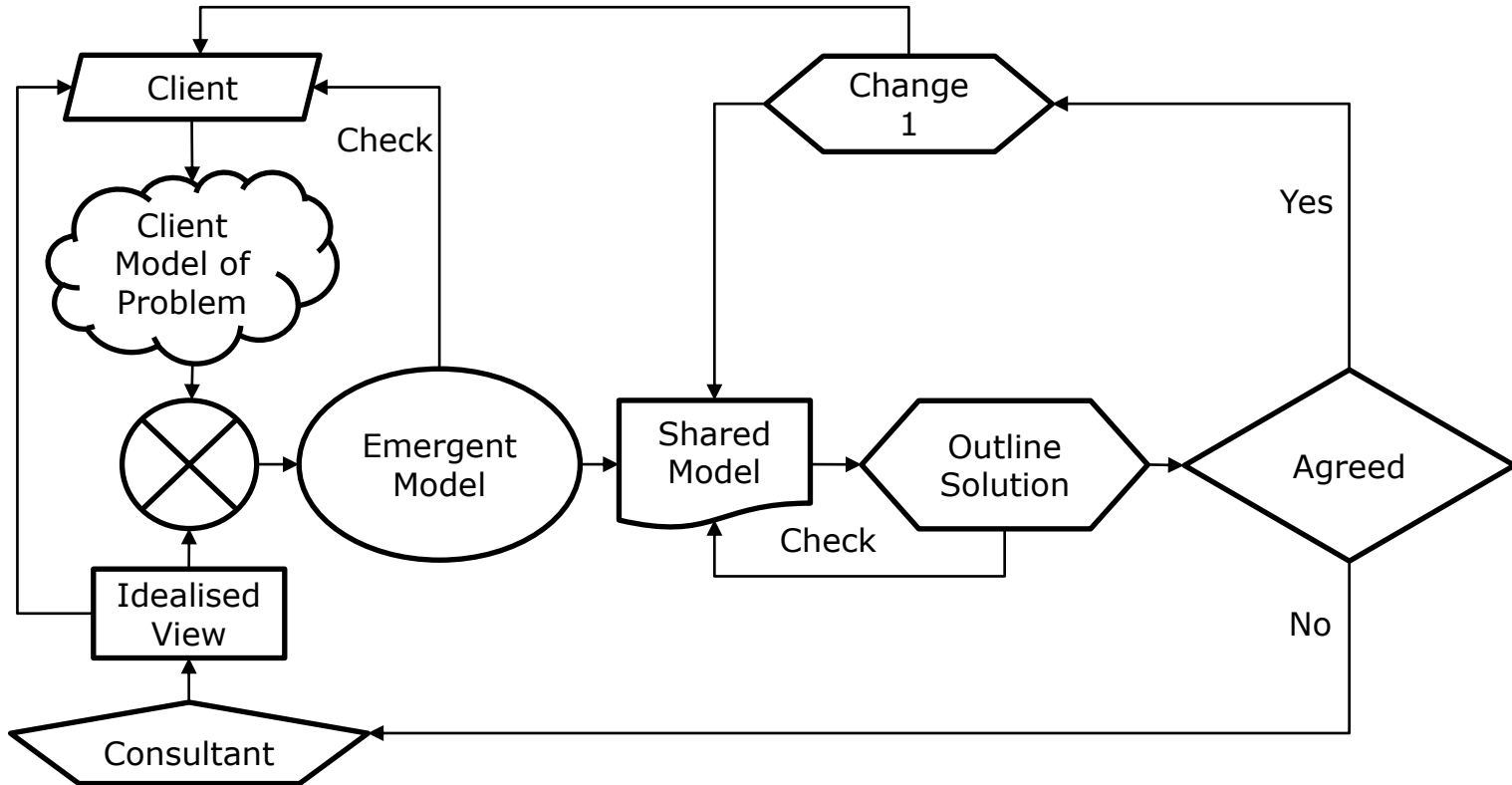




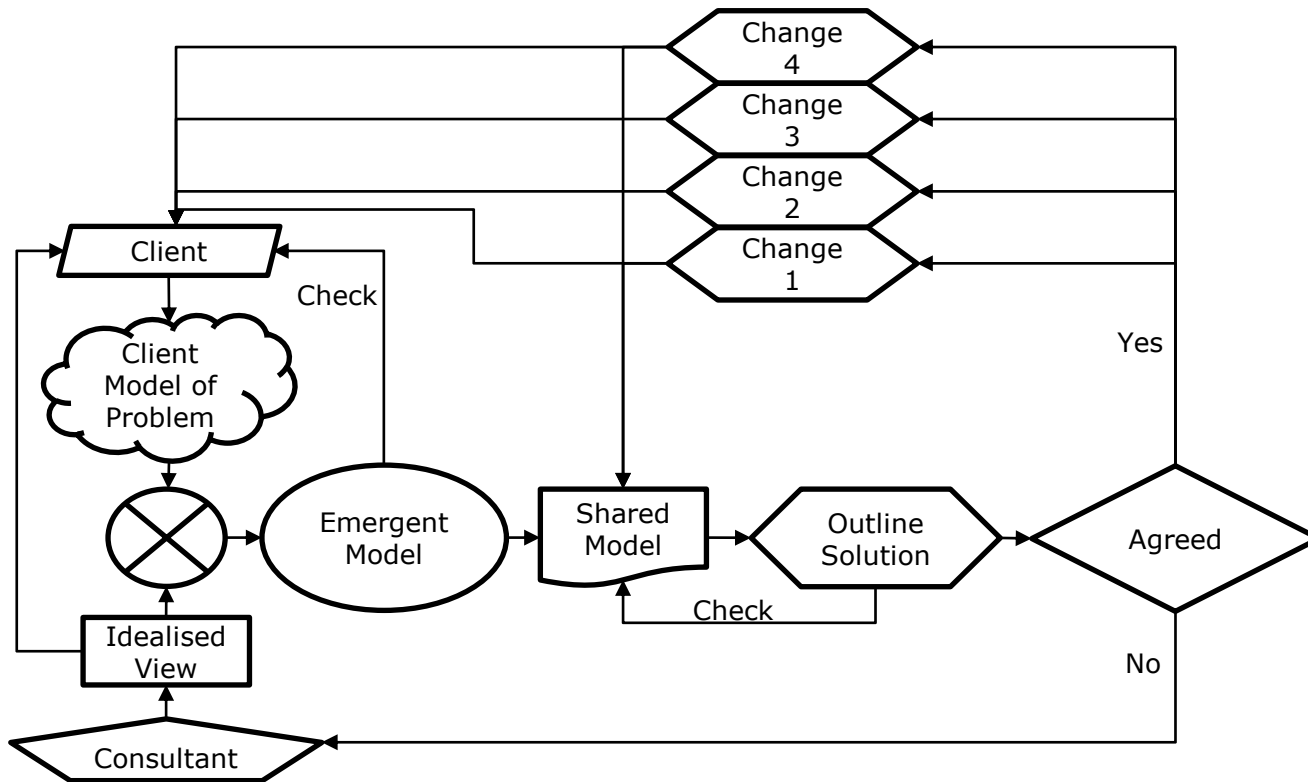
Tools for the First Intervention  
Figure 21.2



Synthesizing the Diagnosis  
Figure 21.3



Developing a Shared Model (adapted from Beckford & Dudley, 2014)  
Figure 21.4



Iterative Framework for Action (adapted from Beckford & Dudley, 2014)  
Figure 21.5

### **Peter Checkland**

Stage 1	Finding Out
Stage 2	Rich Picture
Stage 3	Root Definitions
Stage 4	Redesign
Stage 5	Real World Comparison
Stage 6	Debate and Decision
Stage 7	Taking Action

Seven Stages of Soft Systems Methodology  
Figure 22.1

### **CATWOE Mnemonic**

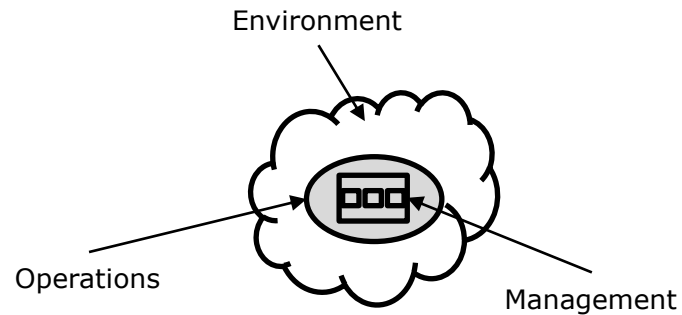
Customers	Those who gain by or suffer from the activity
Actors	Those who perform the activity
Transformation	The action itself
Weltanschauung	The world-view of the situation which validates the action
Owners	Those who can stop the activity (often the management)
Environment	External constraints upon the system behaviour

### Six Principal Elements of a System Figure 22.2

### **Root Definitions**

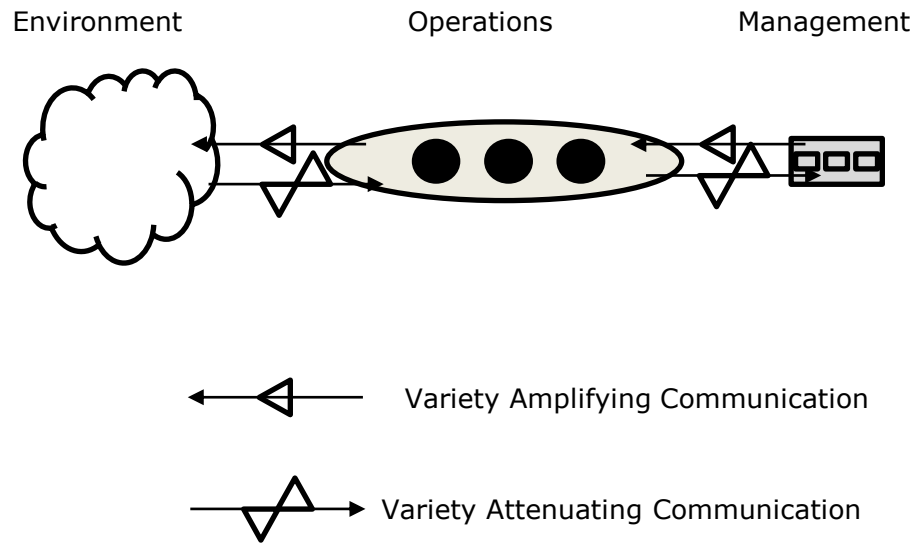
- Question 1    What is required?
- Question 2    Why is it required?
- Question 3    Who will do it?
- Question 4    Who will benefit?
- Question 5    Who will be hurt or damaged?
- Question 6    What external factors constrain the activity?

Six Questions for Refining 'Root Definitions'  
Figure 22.3

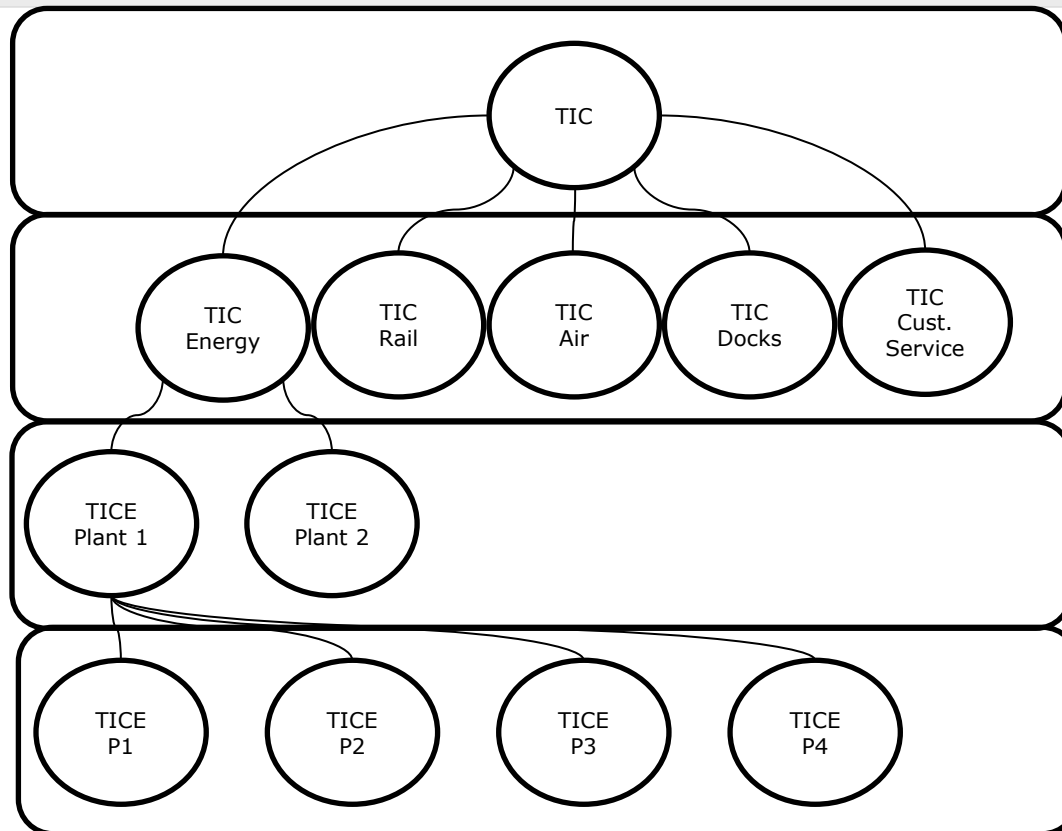


The Organisation in its Environment  
Figure 22.4



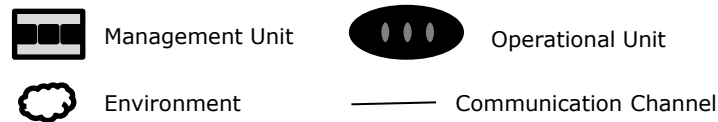
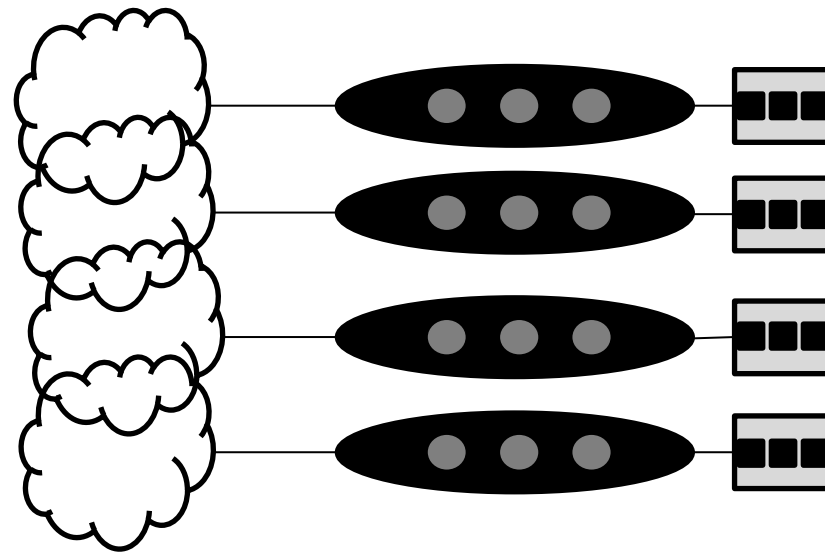


The Environment, Operations and Management Separated  
Figure 22.5

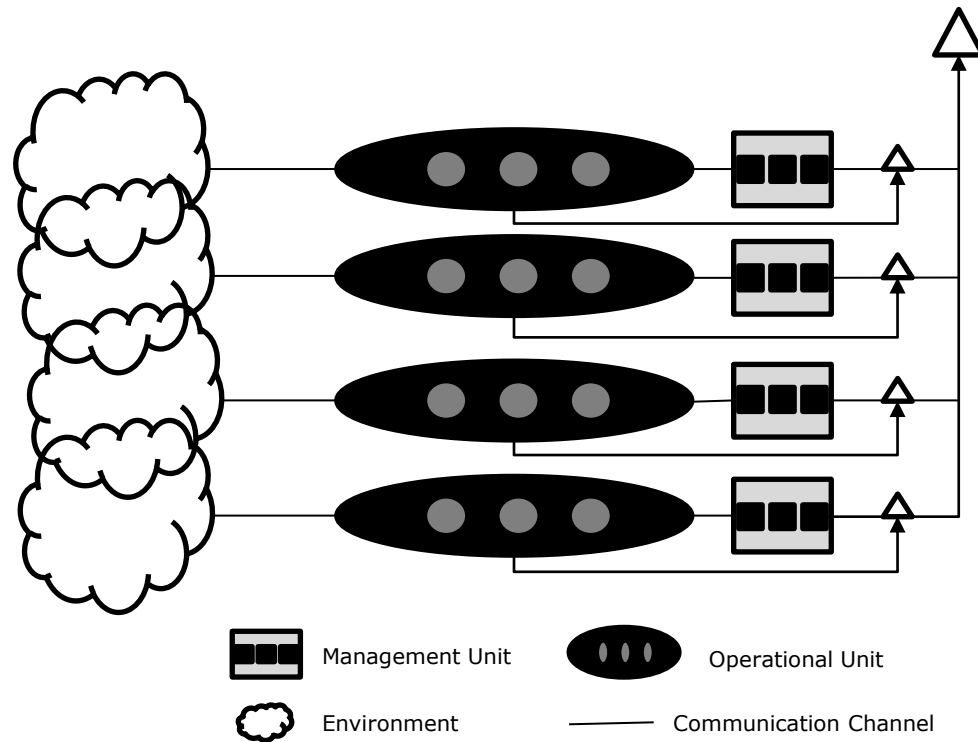


**A Chain of Recursively Embedded Viable Systems**

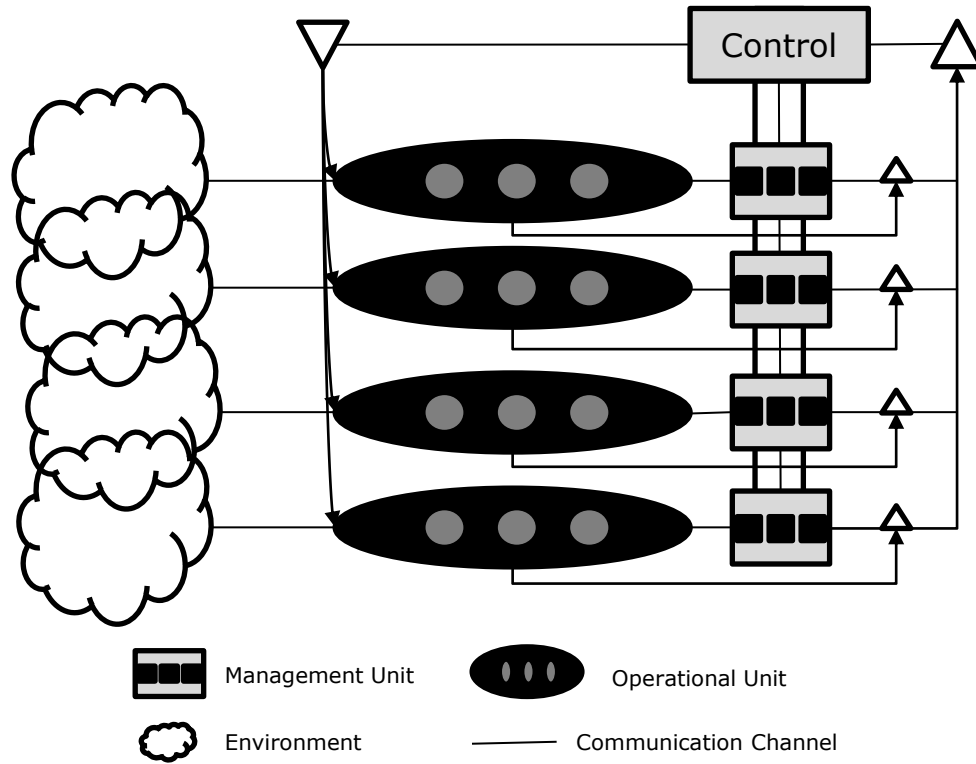
Figure 22.6



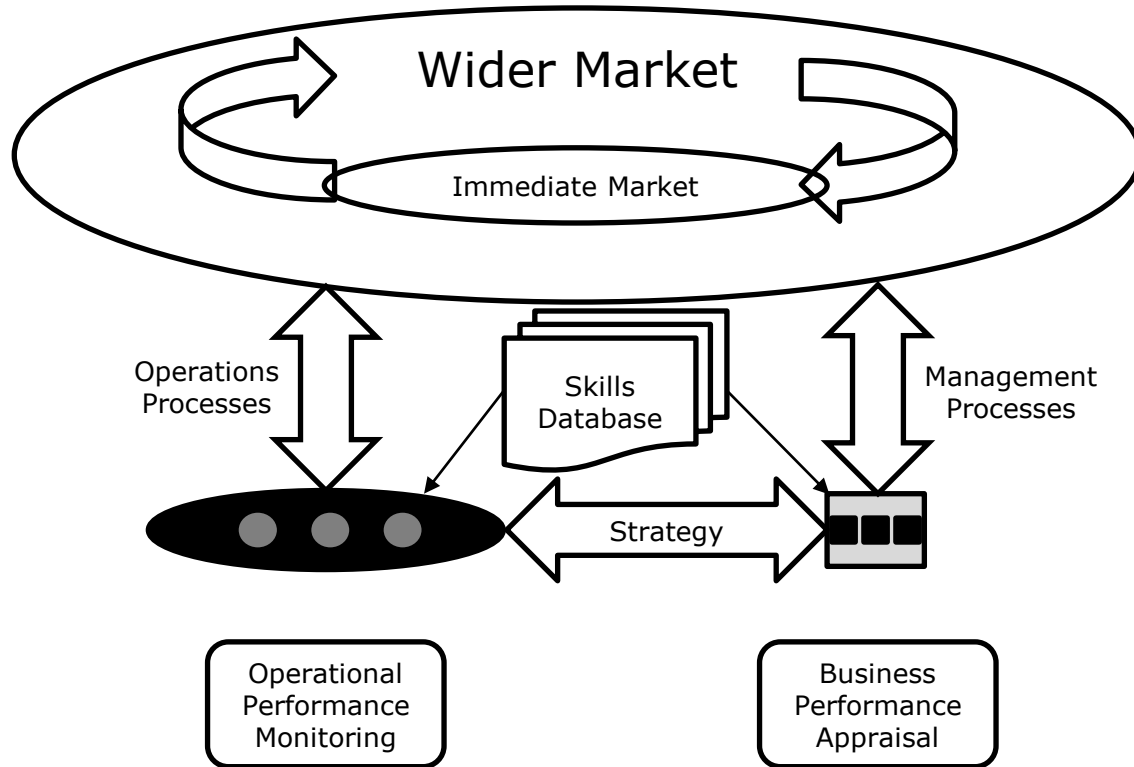
A Set of Implementation Elements  
Figure 22.7



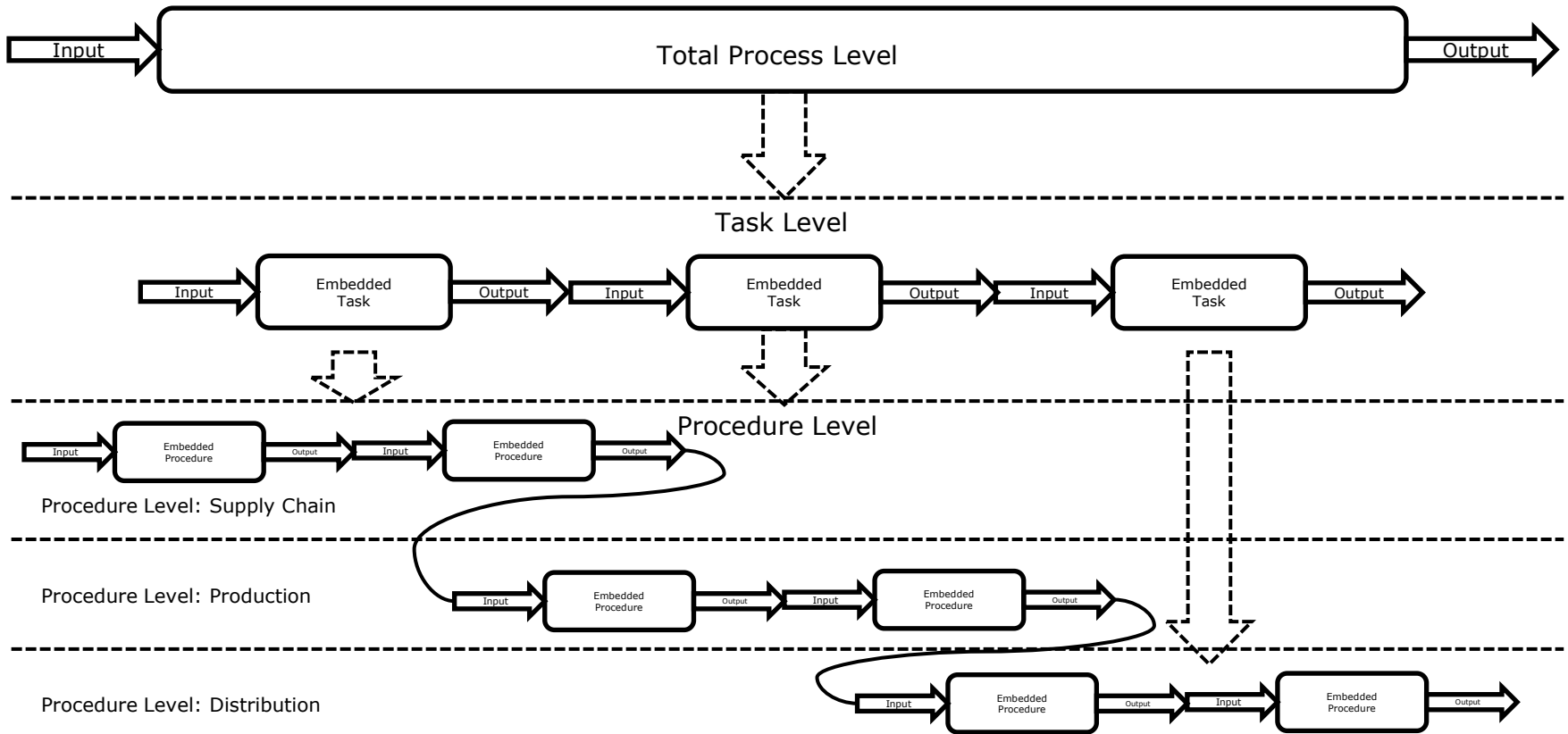
Operational Elements with Co-Ordination and Interaction  
Figure 22.8



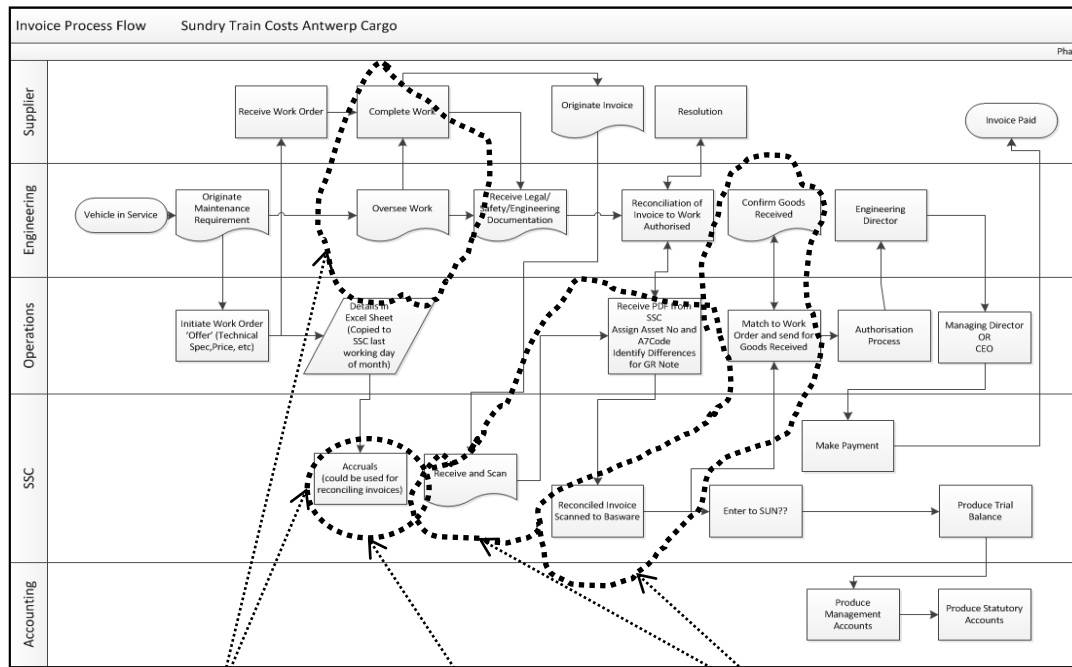
The Self-Regulating Organisation  
Figure 22.9



The Ultrastable Organisation  
Figure 22.10



**Nested or 'recursive' process levels**  
Figure 22.11



Primary manageable source of delays

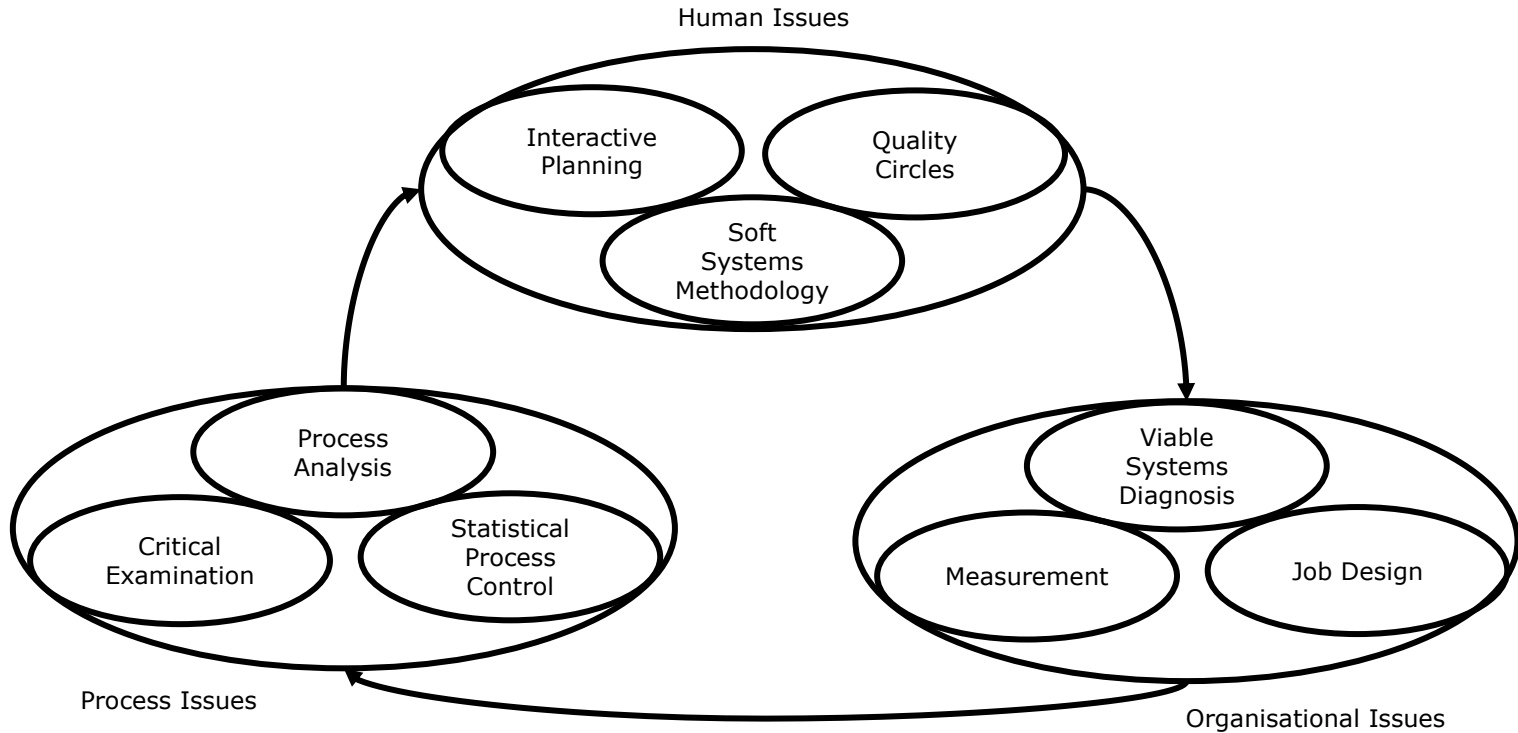
Unused Data

Adds activity not value

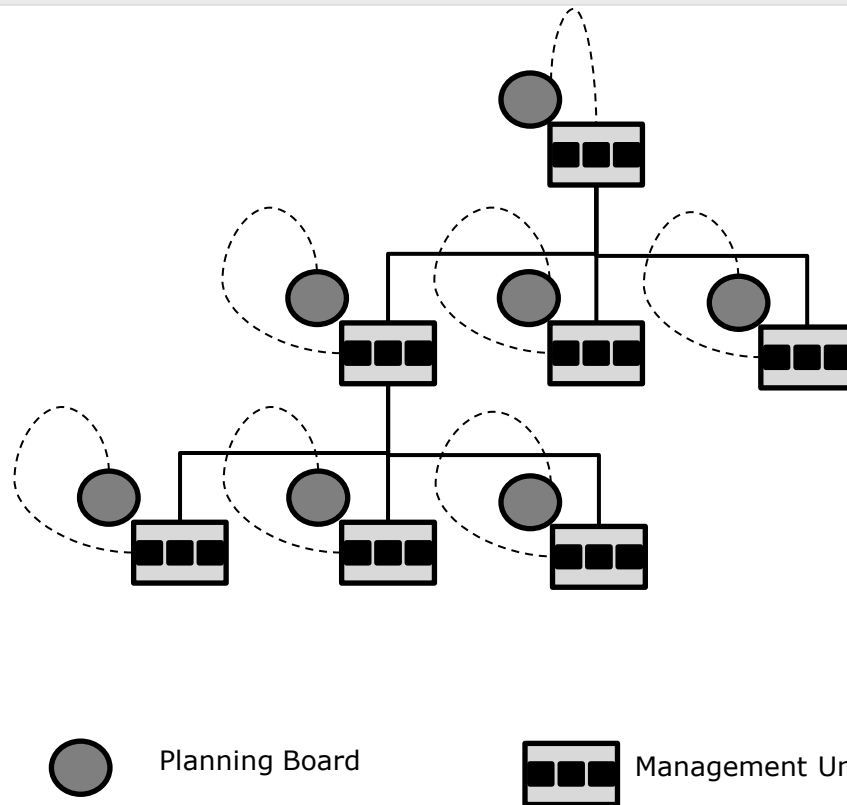
Work order unamended if specification changes

Order to Pay – Diagnosis  
 Figure 22.12





Tools for the Second Intervention  
Figure 23.1



**Organisational Design for Interactive Planning** (Adapted from Ackoff, 1981)  
Figure 23.2

### **Russell Ackoff**

- |        |                                      |
|--------|--------------------------------------|
| Step 1 | Formulating the Mess                 |
| Step 2 | Ends Planning                        |
| Step 3 | Means Planning                       |
| Step 4 | Resource Planning                    |
| Step 5 | Design of implementation and control |

Five Steps of Interactive Planning  
Figure 23.3

### **3 Types of Study**

Systems Analysis	The organisation, how it works, its environment
Obstruction Analysis	The obstacles to corporate development
Reference Projections	Predict future performance by extrapolating current performance in a given environment

### 3 Methods of Formulating the Mess Figure 23.4

### Aims of Quality Circles

Improve and develop the enterprise

Respect human relations and build job satisfaction

Stretch human potential and capabilities

### Aims of Quality Circles Figure 23.5

## Critical Examination

	<b>Primary Questions</b>	<b>Secondary Questions</b>
Purpose	What is done? Why is it done?	What else might be done? What should be done?
Place	Where is it done? Why is it done there?	Where else might it be done? Where should it be done?
Sequence	When is it done? Why is it done then?	When might it be done? When should it be done?
Person	Who does it? Why do they do it?	Who else might do it? Who should do it?
Means	How is it done? Why is it done like that?	How else might it be done? How should it be done?

Critical Examination  
Figure 23.6

### **Natural Work Units**

Geographical	assigned according to location
Organisational	assigned according to division or department
Alphabetical	assigned by customer alphabetical grouping (e.g. A-D, E-K, L-R, S-Z)
Numerical	assigned by bin number or part number
Customer	assigned by customer type or size
Industry Sector	assigned by technical sector expertise

Natural Work Units  
Figure 23.7

A willingness to accept responsibility

Ability which matches the increased requirements

A level of training commensurate with the new responsibilities

Requirements for Vertical Loading  
Figure 23.8



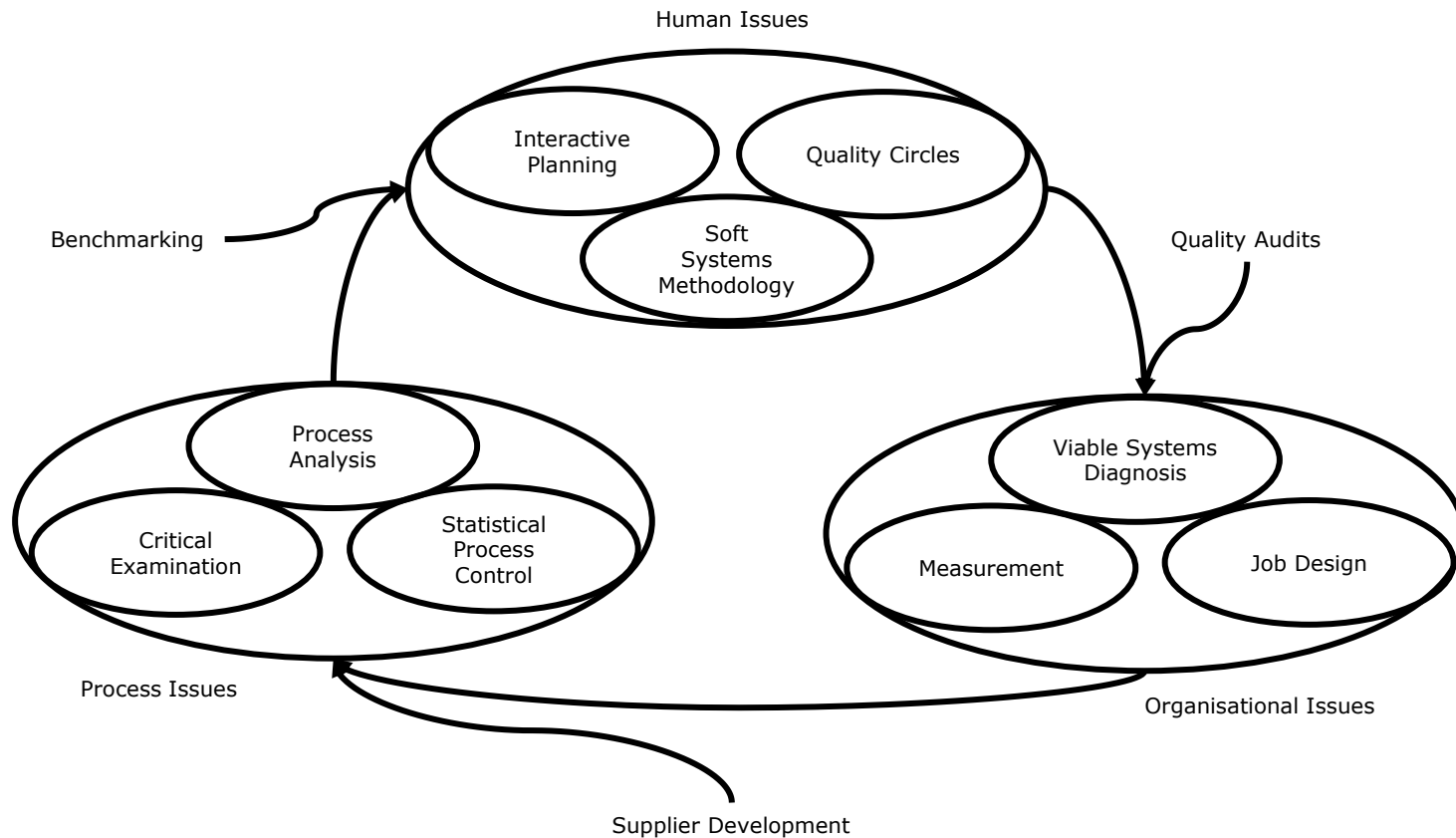
Driven by the process itself

Real time (or as near as possible)

Continuous

Meaningful (in the recipients language)

Task Feedback Information  
Figure 23.9



Tools for the Final Intervention  
Figure 24.1

- Step 1 Identify what characteristics to benchmark
- Step 2 Identify benchmarking partners
- Step 3 Design the data gathering methodology
- Step 4 Selecting analytical tools
- Step 5 Implement changes

Five Steps in Benchmarking  
Figure 24.2

Stage 1	Senior Management commitment to Supplier Development
Stage 2	Audit & evaluation of internal standards
Stage 3	Define and quantify the desirable or necessary changes
Stage 4	Develop agreement with identified suppliers
Stage 5	Form joint teams and develop training programme (if necessary);
Stage 6	Teams define precise objectives, deliverables and timescale
Stage 7	Implement changes and monitor impacts

Seven Stages of Supplier Development  
Figure 24.3