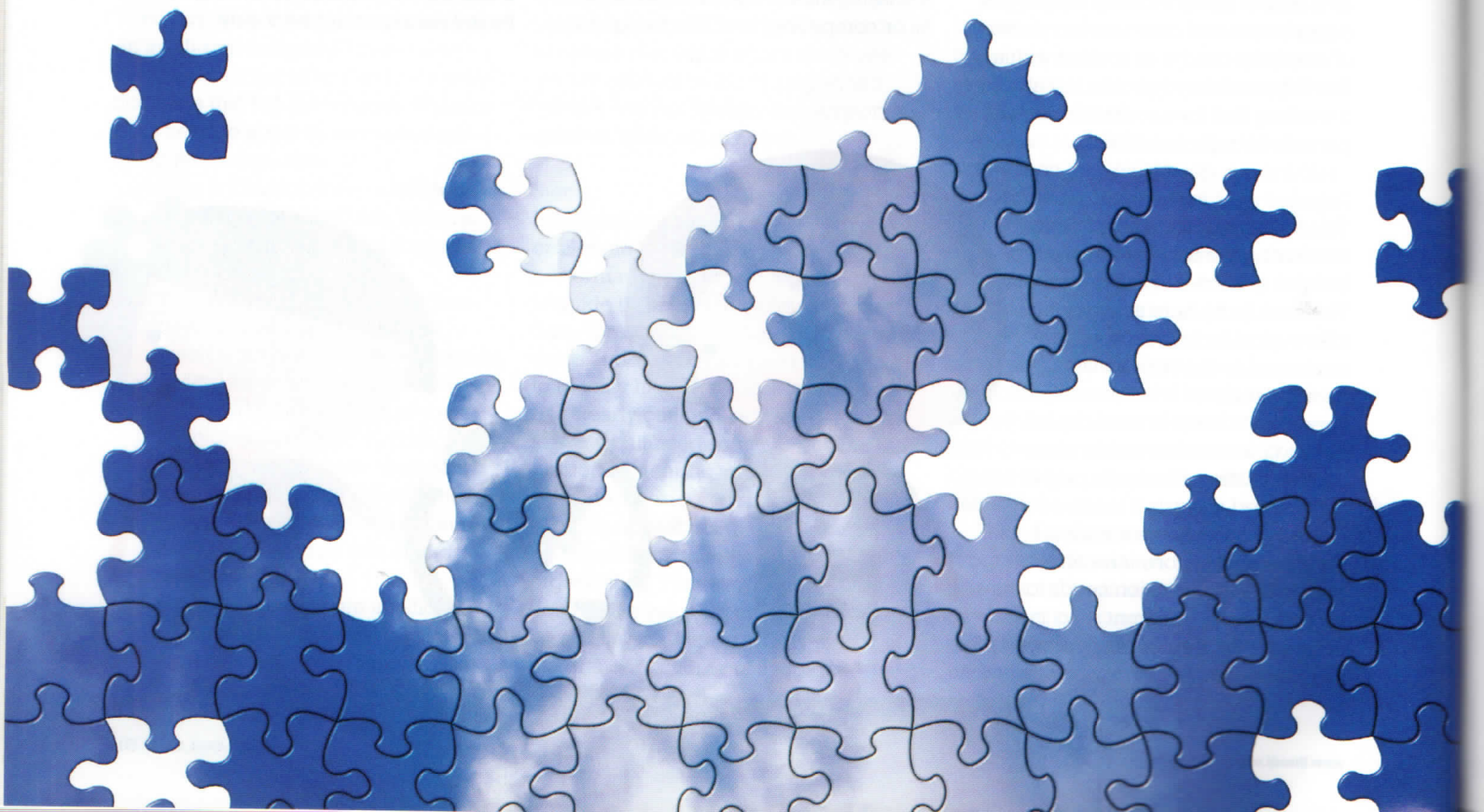
CIRCLES OF INFLUENCE

In his final of three articles, **David Hoyle** draws some conclusions about the difference between systems and processes



If we take Peter Senge's view of a system that it is a set of variables that have influence on one another and assume the process outputs are variables, we can illustrate a system of processes as is shown in figure1.

Walking around the diagram, we can imagine that changes in an organisation's budget will impact the buying strategy such that there might be a drive to find cheaper sources. This will impact the making process, possibly by reducing process yield and as a consequence this might impact sales. If revenues fall as a result, this will influence the budgeting process and around the circle we go once again.

Wherever you find a variable, there will be a process that has produced it even if one has not yet been identified. For example, you might not have a defined process for creating values but organisations have beliefs that they stand by even though they were not formed by any conscious process.

If we now apply this concept to the organisation model shown as figure 3 in last month's article and select the "develop corporate culture" process (shown in yellow) from the mission management business process as shown in figure 2 we can develop some typical process interactions as shown in figure 3 (over the page).

In this model, values are an output of the "develop corporate culture" process in figure 2 and these will influence all processes. As an example they influence the process measures that are an output of the "develop process structure" process. So if one of the values is "quality is top priority", the corresponding measures will put quality first and as a result influence

Figure 1: A system of interacting processes

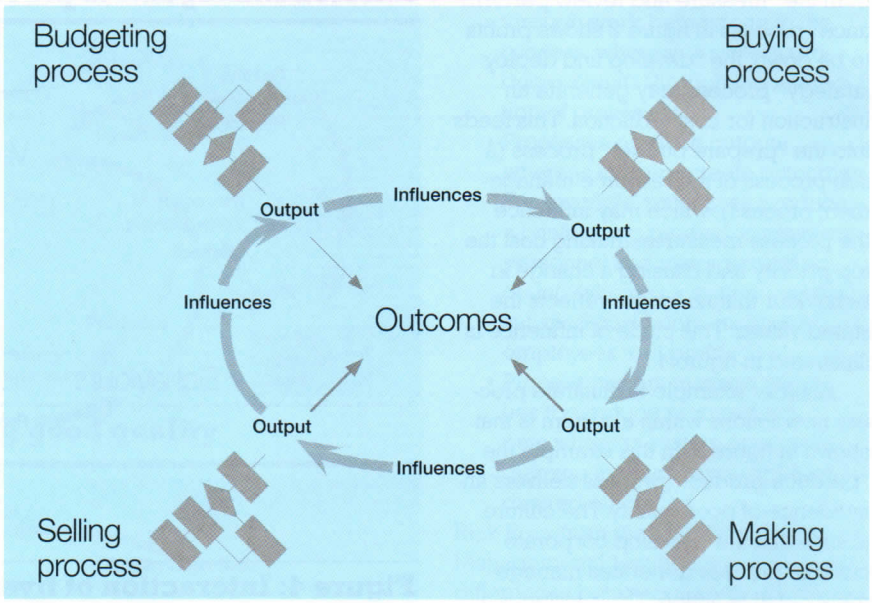
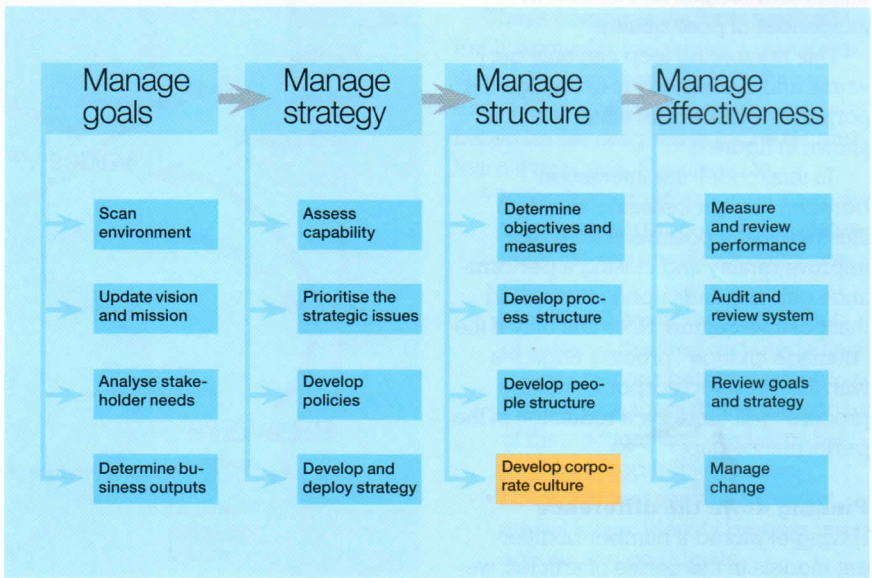


Figure 2: Mission management process overview



behaviour that hopefully will reflect the corporate values. However, if the output from the "measure and review performance" process in figure 2 shows profits to be down, the "develop and deploy strategy" process may generate an instruction for cost reduction. This feeds into the "prepare budget" process (a sub process of the resource management process), which may influence the process measures, making cost the top priority and causing a change in behaviour that no longer reflects the stated values. This circle of influence is illustrated in figure 4.

Another example to illustrate process interactions within a system is that shown in figure 5. In this example the "produce product" process delivers an incidence of poor quality. The culture is such that the "develop corporate culture" process generates management punitive action. This produces a climate of fear and blame that leads to the organisation's staff hiding errors and in turn creates an increase in the incidences of poor quality.

This reinforcing loop can only get worse and the remedy is to change the corporate culture. The effect of this is shown in figure 6.

In this model, the interaction between four processes is shown to illustrate that a positive culture can improve quality and closing a performance gap depends upon maintaining that positive culture. Note that only if the "manage change" process engages with the "develop corporate culture process" will there be a reduction in the performance gap.

Pinning down the difference

Having explored a number of different models in this series of articles, we

Figure 3: Interaction between two processes of the mission management process

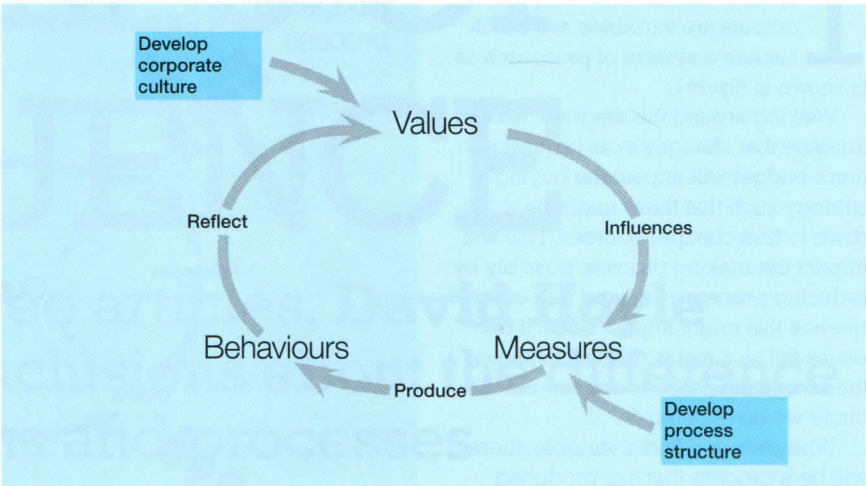
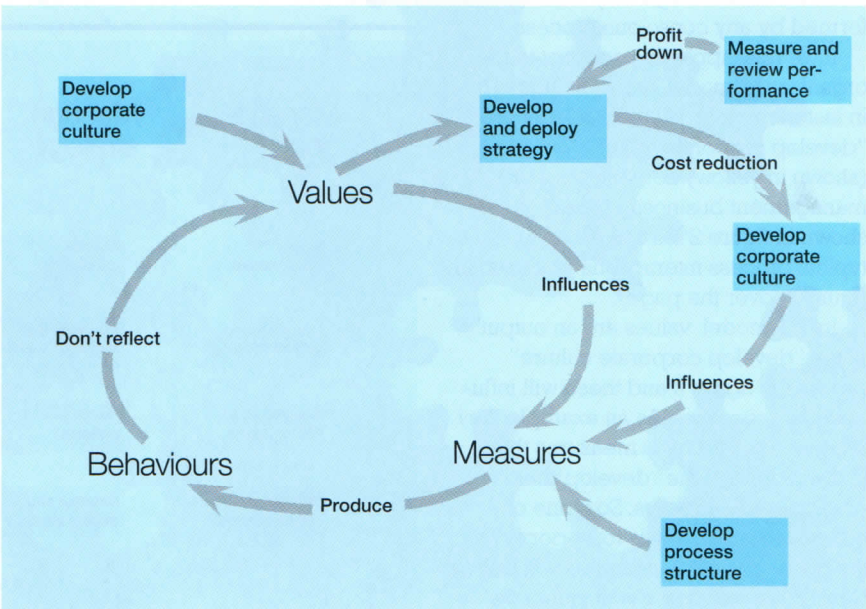


Figure 4: Interaction of five processes producing conflicting values



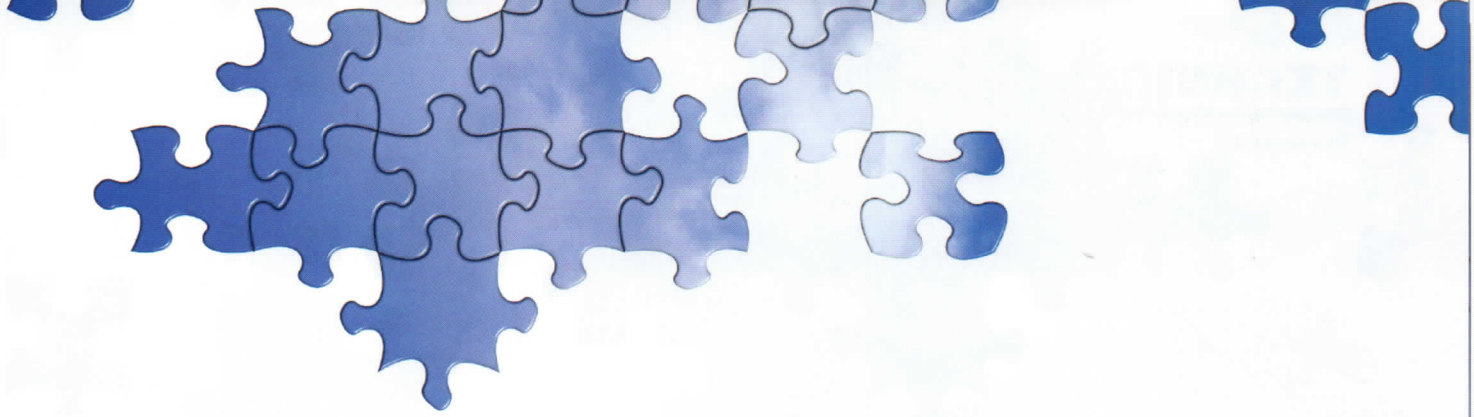


Figure 5: Interactions causing poor quality

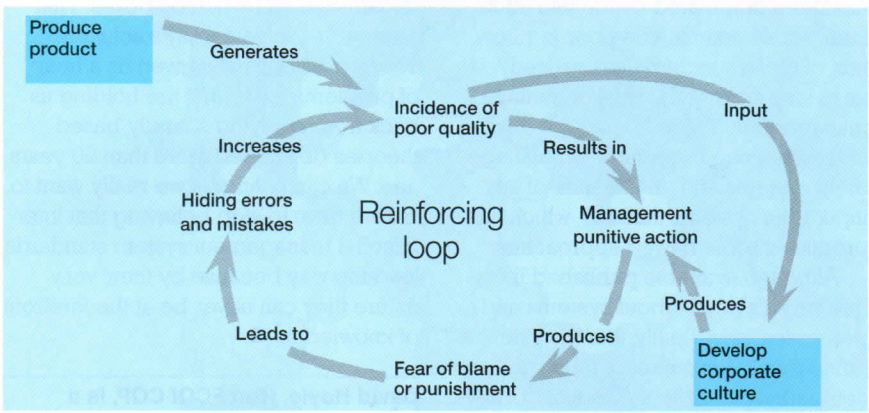
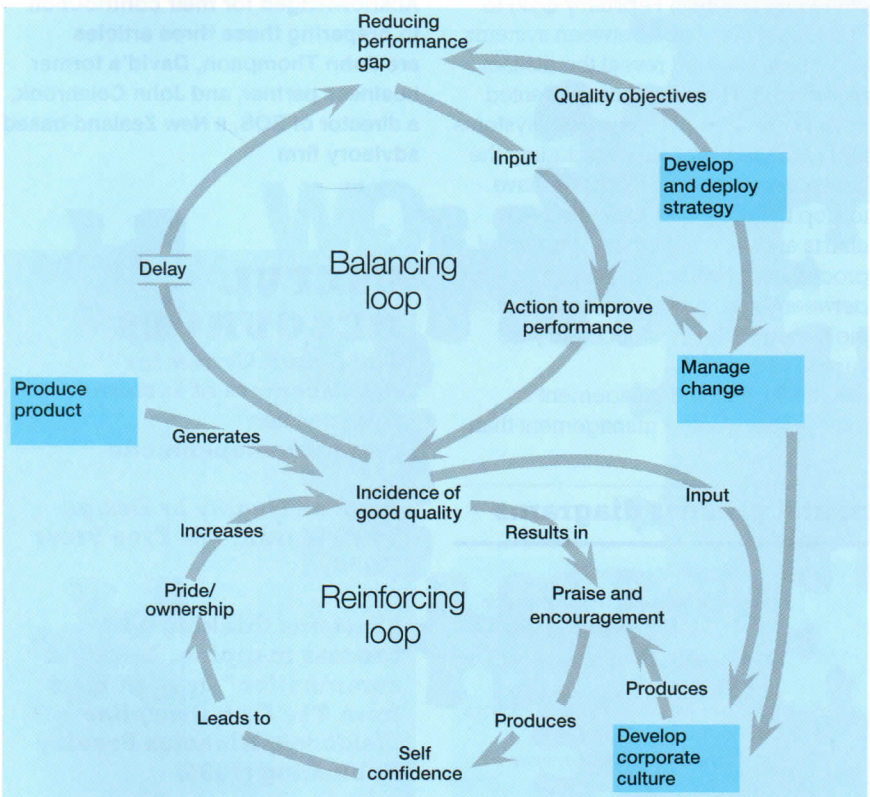


Figure 6: Interactions causing good quality



can see a distinct difference between systems and processes:

- A process produces results through work being done in the process, whereas a system produces results through the interaction of processes
- Processes produce outputs whereas systems create outcomes. For example, processes produce a conforming product, competent personnel and management accounts whereas a system creates satisfied customers, motivated employees and profit
- Process owners manage activities to produce required outputs whereas system managers manage interactions to produce desired outcomes.

Rick Ross from the MIT Sloan School of Management identified some striking differences between system diagrams and process diagrams that assist in clarifying these concepts. These are summarised in table 1 (over the page).

These comparisons have several implications for both quality managers and system auditors. Quality managers need to ditch those system models based on the diagram in ISO 9001 and learn a new skill. They need to:

- View their organisation as a series of interacting processes and determine the organisation's outcomes
- Change from a focus on flow charts and linear thinking to that of systems thinking and modelling the interactions between processes
- Enable managers to see the impact of their actions and decisions before they jeopardise success
- Diagnose root causes, construct causal loops, identify process interactions and coordinate

improvement programmes that aim to build more robust systems of processes. These will deliver outputs that produce desired outcomes for the organisation's stakeholders.

It follows therefore that the CEO, being the organisation's leader, would be the system manager rather than the quality manager who would have more of an analysis and advisory role.

System auditors need to become system thinkers and focus less on conformity to specific requirements and more on examining system dynamics and searching for strengths and weaknesses. They need to:

- Establish how the organisation has reacted to changes in the business environment
- Establish which processes are necessary for the organisation to function effectively
- Establish that these processes are being managed effectively
- Establish how the interactions between these processes are determined and managed.

The fact that none of these are derived from the requirements of ISO 9001 should not be a barrier as all are consistent with the intent of ISO 9001.

A way forward

In the last 20 years the field of quality has been dominated by the ISO 9000 family of standards. The poor application of these standards has caused us to lose sight of the goal of quality management. There is a lack of clarity in the published standards on management systems and an absence of any input from systems thinkers, which has produced some flawed approaches.

Although available published literature reveals much about systems and processes individually, there is little that compares the two except the Rick Ross comparison in table 1. The work of several authors has been drawn on for this series of articles (referenced at the end of the first article in February *QW*) to identify relationships between systems and processes and reveal the distinct differences. The diagrams presented have shown how we can model systems and managed processes including the interactions between them. We have to stop tinkering with tasks and flow charts and start managing systems of processes because it is the interaction between these processes that produce the system outcomes necessary for sustained success.

Quality system management is more about change management than documentation management and auditors should focus more on the system dynamics than on ticking boxes. That approach was yesterday's solution. These solutions have given us a heap of problems today that are holding us back from applying soundly based theories developed more than 50 years ago. We can change if we really want to, but we have to stop believing that international management system standards lead the way because by their very nature they can never be at the forefront of knowledge

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Table 1: Comparison of system and process diagrams

Process diagrams	System diagrams
Show flow of activities in a straight line	Show cause and effect in a circle
The labels are verbs and tasks	The labels are nouns and variables
The arrows indicate sequence	The arrows indicate influence or causality
A change in one activity does not necessarily affect other activities	A change in one element produces a change in all variables
Tends to represent a static picture	Always represents a dynamic picture

QW USEFUL RESOURCES

The Ackoff Center for Advancement of Systems Approaches
www.acasa.upenn.edu

***Juran on Quality by Design* by J M Juran, The Free Press (1992)**

"Systems thinking with process mapping: A natural combination" by Rick Ross from *The Fifth Discipline Fieldbook*, Nicholas Brealey Publishing (1994)