

# **Towards a Dynamic Feedback Framework for Public Sector Performance Management**

***Phil Sloper***

*Consulting Group Manager  
Computer Science Corporation (Australia) Pty Ltd  
psloper@csc.com.au*

***Keith T Linard***

*Senior Lecturer, University College, University of New South Wales  
Australian Defence Force Academy CANBERRA ACT 2601 AUSTRALIA  
Tel: -61-2-6268-8347 Fax: -61-2-6268-8337  
k-linard@adfa.edu.au*

***David Paterson,***

*Computer Science Corporation (Australia) Pty Ltd  
dpaters3@csc.com*

*The paper discusses a joint research program by CSC(Aust) and the Australian Defence Force Academy which seeks to bring to the area of Public Sector corporate performance management an holistic approach using soft systems and systems dynamics and drawing upon Kaplan and Norton's Balanced Scorecard (BSC).*

*The implementation and understanding of the BSC has drawn too heavily upon the accounting discipline and its backward looking information sources, despite Kaplan and Norton's emphasis on forward indicators. Practitioners find implementation very difficult across all industry sectors. We suggest that this emerges from an inappropriate strategic management framework as well as technology support issues which mean that reporting and maintenance are labour intensive. More fundamentally, the BSC is essentially a static representation of a complex dynamic system, and it ignores the requirement for business rules for acting on its output.*

---

## ***Introduction***

The last 3 years have seen yet another round of major reforms within the Australian Public Sector. These have sought to move the public sector agencies from the predominantly inputs and process view to an outputs and outcomes basis. This has been supported by the replacement of the former cost accounting framework with accrual accounting and government endorsement of new FMIS, HRMS and Document and Record management systems. These changes remain in the early stages although agencies are now attempting to report in these terms to the Government and.

Despite almost two decades of rhetoric on outputs and outcomes, the high level performance reporting remains illusory. This appears to be due to a lack of understanding across the public sector of the *systemic nature* of performance measurement systems and the performance indicators which make up these systems. The research at the Defence Academy, which is being undertaken with the active involvement of senior managers in Defence and the Public Service, seeks to create an

environment which communicates and educates on these systemic issues. This research program seeks to:

- identify the systems thinking competencies required of the 21<sup>st</sup> century corporation;
- identify the nature of education, training and on-job experience required to inculcate these competencies;
- develop a holistic framework, built on the Kaplan and Norton BSC concepts, for development of strategic level public sector performance management;
- develop principles for ‘knowledge organisation’
  - whose foundation is the data mining, data warehousing, open intelligence IT systems
  - upon which rely a balanced scorecard type reporting system
  - which feeds an enterprise modelling ‘microworld’ based on system dynamics principles
  - which forms or reinforces systems thinking competencies among executive

### ***Public Sector Corporate Performance Management***

The last two decades have seen a growing demand across OECD governments to achieve better value for money from their agencies’ programs. A major focus of the 1990’s has been on performance reporting.

The US Government Performance and Results Act, passed by the Senate June 23, 1993, noted: “ ...*Federal managers are seriously disadvantaged in their efforts to improve program efficiency and effectiveness, because of ... inadequate information on program performance; and ... congressional policymaking, spending decisions and program oversight are seriously handicapped by insufficient attention to program performance and results.*” The GPRA Bill provided a major impetus to reform.

The OECD notes “...in Australia, Finland, New Zealand and Sweden, the reporting requirements for budget systems now must include references to outputs and outcomes, and while there are still many gaps, the quality of the information is gradually being improved.” (OECD, 1998)<sup>1</sup>. Similar observations may be made of the UK, Canada

### **Two Decades of Public Sector Reform in Australia**

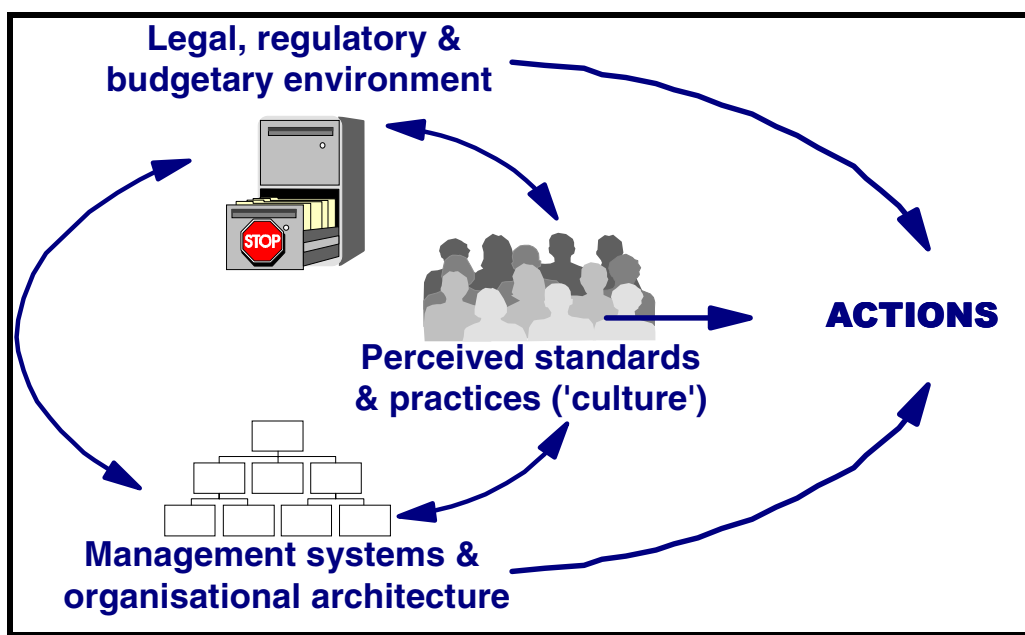
Commencing with the Financial Management Improvement Program in 1984, the Australian federal public sector has seen dramatic management changes:

- corporatisation and / or privatisation of most government business enterprises;
- outsourcing of non-key business activities;
- introduction of ‘user-pays’ principle for inter-agency services;
- program budgetting;
- rolling program evaluations;
- performance based pay for executives;
- introduction of accrual accounting, replacing cost accounting frameworks;
- greater focus on outputs and outcomes

As discussed in Linard (1996)<sup>2</sup>, the Financial Management Improvement Program (FMIP), 1984 through 1989, was profoundly driven by a systems thinking framework.

A basic premise of the FMIP team's approach was that managers do not make stupid decisions because they like doing stupid things. Rather, where pathological behaviour was seen to exist, we looked for those aspects of the "system" which enforced, encouraged, rewarded or reinforced such patterns of behaviour. Because of the nature of the respective remedial actions required, and particularly the locus of control, we categorised these pathologies into three distinct but inter-related systems:

- the budgetary and regulatory environment;
- management systems within departments and agencies; and
- bureaucracy standards and practices (the 'culture').



**Figure 1: Systems in the public sector 'teach' dysfunctional behaviour**

From the outset FMIP focused on patterns of dysfunctional behaviour, rather than on individual problem events, in order to understand the systemic processes that encouraged or reinforced this behaviour. This provided the foundation for identifying possible leverage points for change.

Since that time the systemic dimension to reform in Australia has been overshadowed, as elsewhere, by increasing emphasis on the comparison of practice between the private and public sectors, fuelled by management "fads" such as activity based costing, business process re-engineering and benchmarking. There has been no attempt to understand the systemic implications of such changes. They seem to work in the private sector so they must be good.

A consequence of the loss of systemic focus is that performance indicators become an end of their own, rather than a coherent systemic feedback mechanism. The lack of systemic strategic focus in development of indicators results in organisations proudly pointing to their 1000 plus 'indicators' as evidence of their commitment to servicing their clients. It results in regular meetings of senior executives reviewing agency progress by pouring over page after page of undifferentiated input, process, output,

operational and strategic indicators. At the operational level there is increasing evidence that “... *what gets measured determines what gets done*”<sup>3</sup>

### **Lack of systemic perspective in performance management literature**

The Australian Commonwealth Managers’ Toolbox and the Defence Managers’ Toolbox<sup>4</sup> is a CD repository of virtually every significant non-confidential management document which executives and line managers across the Federal Public Service might need for their job – almost 6000 documents. A crude text search analysis is instructive:

- 685, over 10% of the total, referred explicitly to performance criteria, performance indicators or performance management;
- 5 referred to systems thinking, system dynamics, soft systems, causal loops or cause and effect relationship<sup>5</sup> ...
- 2 referred to balanced scorecard

*We skimmed these 685 documents, which ranged from 1 page circulars to multi-hundred page reports covering the decade to early 1999, to identify the guidelines or procedures proposed for developing ‘good’ indicators. We found many platitudes but little substance on specifying indicators.*

The contributors to successive Australasian Evaluation Society conferences, which bring together performance managers and program evaluators from around the country, also have skirted this area. Some provide shopping lists of plausibly relevant indicators, but no give no convincing basis for indicator selection. Others give valid critique of the current approaches, questioning in particular who gives guidance on the indicators, what the indicators actually measure and whether valid measurements can be made. Except for Linard’s 1995 paper on the application of system dynamics<sup>6</sup> there is total silence on systemic issues.

### **Towards the Balanced Scorecard and a more systemic approach (?)**

The balanced scorecard (BSC) methodology<sup>7</sup>, developed by Kaplan and Norton, in a mere 4 years has found wide acceptance in the private sector. Also, with its focus on customer satisfaction and organisational learning and growth in addition to internal process and financial aspects, it appears to provide a way forward in the public sector.

The major players in the implementation of the BSC acknowledge the significance of the systemic dimensions necessary to underpin the framework. The Renaissance Group, of which David Norton is a co-founder, state for example:

*“Recognizing a “Good” Balanced Scorecard: ...Every measure selected for a Balanced Scorecard should be part of a chain of cause and effect relationships that represent the strategy”<sup>8</sup> and again,*

*“... one needs to clearly define the fundamental drivers of organizational performance and create a specific cause and effect relationship that links these drivers to company strategy. This activity enables an organization to link performance with effective process design and decision-making, and it will begin to highlight the skills and knowledge required to improve that performance.”<sup>9</sup>*

The Procurement Executives' Association (PEA), which includes major US Federal Departments, has identified the "Balanced Scorecard" methodology as their chosen methodology for "...*deploying strategic direction, communicating expectations, and measuring progress towards agreed-to objectives*". They also note the importance of identifying 'cause and effect':

*"By illuminating the links between strategies, measures, and expected outcomes at different levels in the organization, and across different operational components, the BSC also encourages cross- functional problem-solving. For example, a Division may identify a Bureau or Department-level policy that impedes its ability to accomplish a certain objective. The Division could raise the issue, using the BSC to demonstrate the cause-and-effect relationship, and work together with the appropriate Bureau or Department management toward a solution."*<sup>10</sup>

The uptake of the BSC has been phenomenal. A 1998 study by the Gartner Group found that "at least 40 % of Fortune 1000 companies will implement a new management philosophy...the Balanced Scorecard... by the year 2000." Uptake by the public sector, at least in the US, has also been extensive, spurred by the 1993 GPRA Bill. In this surge of implementation, however, the systemic dimensions highlighted by Kaplin and Norton seems to have been lost.

Thus, a laborious search of the Web, of several hundred US federal, state and municipal government reports on performance indicators and the BSC revealed a lack substance when it comes to the specification of indicators. A text search of the World Wide Web, using the Alta Vista search engine, recorded over 100,000 'hits' in searching for 'balanced scorecard'. Subsequent refinement of the search to find those papers with a systemic dimension showed a similar paucity to the Australian Government performance management documentation, as illustrated in Table 1.

**Table 1: Number of 'balanced scorecard' hits relating to systems thinking from a total of 105,000 Web references**

	<b><i>Including System Dynamics University Courses, Software Vendors &amp; Consultants</i></b>	<b><i>Excluding System Dynamics University Courses, Software Vendors and Consultants</i></b>
<b>Systems Thinking</b>	65	5
<b>Causal Loops / Cause &amp; Effect</b>	37	3
<b>System Dynamics</b>	30	3

### **The Balanced Scorecard and public sector performance**

As Arie de Geus has emphasised so dramatically, there is something dramatically wrong with corporate business survival rates<sup>11</sup>. "*A full one-third of the (Fortune '500' list of industrials) listed in 1970 had vanished by 1983. ... The demographics of companies, their birth and death rates, seem to indicate that their average life*

expectancy is no more than 40-50 years. This finding seems to be valid in countries as wide apart as the USA, Europe and Japan.” De Geus argues persuasively that attention to systemic issues, and in particular to ‘lead indicators’ through use of business ‘flight simulators’ is critical to survival: “we will not perceive a signal from the outside world, unless it is relevant for an option for the future which we have worked out”.

De Geus’ conclusions parallel the findings, from a different standpoint, of Kaplan and Norton. Dr. Robert Kaplan, Professor of Leadership Development at the Harvard Business School, and Dr. David Norton, co-founder of Renaissance Inc., spent years researching the elements of successful organizations. They found that most organizations focus too heavily on "lag" indicators, such as financial statements and market share surveys, rather than on "lead" indicators to reveal the health of their organizations.

The product of this research was the BSC, which is an outcomes oriented performance management system that seeks to link the short and long term activities of an organization with the vision, mission, and strategy of the organization through the establishment measurable, consensus-driven goals.

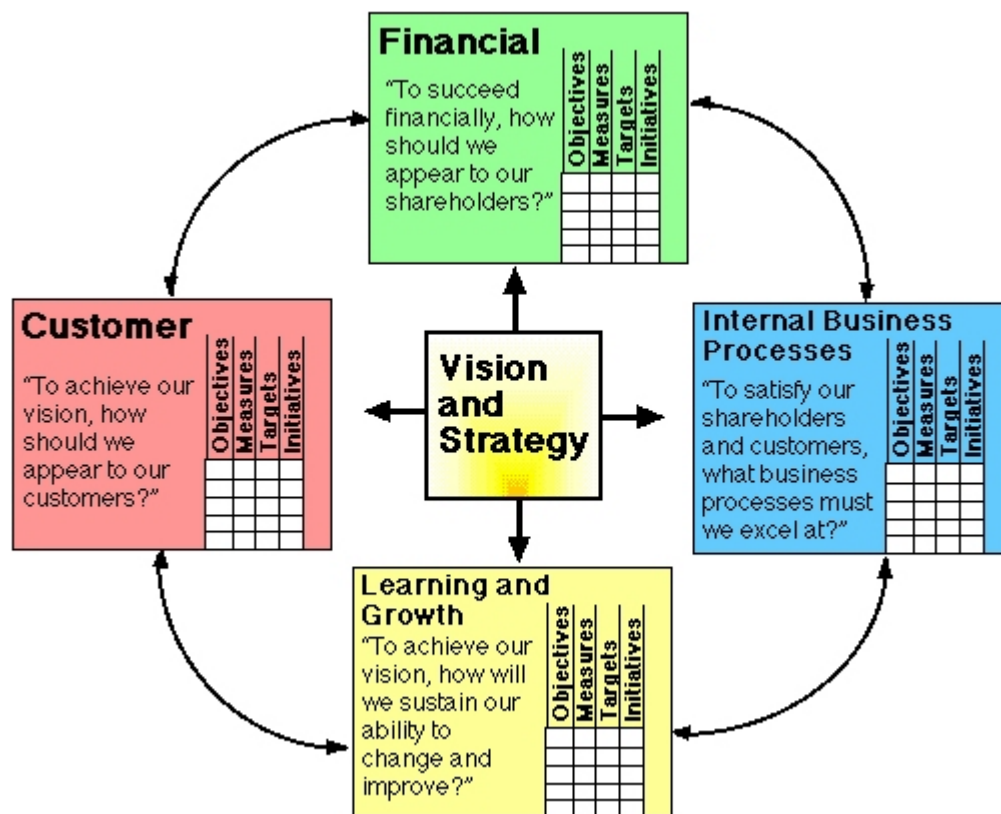


Figure 2 Balanced Scorecard (Kaplan and Norton)

Kaplan and Norton explicitly recognised the systemic inter-relationship within and between four sectors, incorporating both lead and lag indicators, which impact on organisational performance. In their classic model, two of these have an inward oriented dimension, a learning sector and a processes sector, and two an external focus, a customer sector and the traditional financial sector.

Given the often blind acceptance of BSC by many managers, at least in Australia, without a full appreciation of Kaplan and Norton's work, the following points need emphasis:

- BSC is an approach to the implementation of strategy – it does not take the place of strategy development or planning;
- BSC cannot be disaggregated into sectors (the 4 quadrants of Figure 2) considered in isolation - it is the relationships within and between the BSC sectors that are the fundamentally important breakthrough in this methodology;
- BSC creates / requires a systems view of the company's strategy and its implementation;
- the 4 quadrants in Figure 2 are not 'mandatory' - neither Kaplan and Norton's book nor its preceding academic papers impose such a rigid requirement;
- the performance indicators which are used to form the sectors include a combination of both forward looking and lag (backward looking) indicators.

Kaplan and Norton's emphasis on 'cause and effect', where acknowledged, is often expressed in a deterministic 'cause and effect chain' (i.e. flowing only to the top) as depicted in Figure 3. Few implementations recognise feedback and delay. Especially in the public sector, the time lag between program inputs and measurable outputs are very significant and ignored with peril.

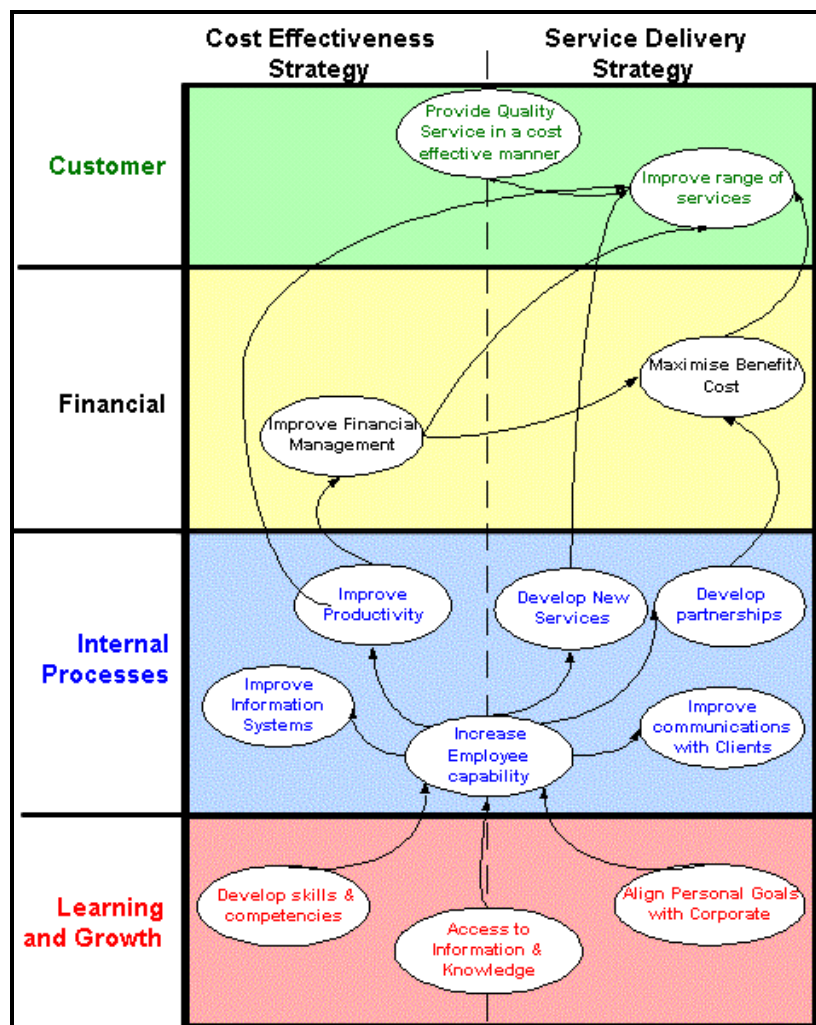


Figure 3: Balanced Scorecard 'cause and effect chart'

Our study of full and prototype implementations has shown that BSC implementations often 'fail' (reports internationally suggest that up to 70% fail to achieve management expectations). Our initial review suggests the following factors are significant in these failures:

- practitioners blindly follow the four quadrant model even though there may be valid reasons for departing from this in specific public sector cases
  - particularly at the top Government level, which forms the strategic focus for Government policy departments, the four sector model seems inadequate – although the necessity for both lead and lag indicators remain
  - a first cut at the top level 'whole of government' model is addressed later
- practitioners separate the sectors in their process of identifying performance measures for each, and fail to re-capture the holistic view
  - the 'stovepipe' result largely ignores interaction between sectors, which is particularly incongruous in the case of lead indicators
- practitioners also work in a 'bottom up' fashion resulting in masses of tactical, operational and a few strategic performance indicators
  - in fact, scorecards with several thousands of indicators have been found
- because the BSC is intuitive simple and elegant, organisations and implementors tend grossly to underestimate the difficulty and complexity of generating a good balanced scorecard
  - as a consequence, the timeframe is too short, inadequate resources are applied and direct responsibility is at too low a level to ensure active engagement by most managers
- even if a 'reasonable' BSC is developed, it will still suffer from the problem that even experienced managers, have great difficulty in understanding the implications of change in multiple interrelated decision variables (a well designed BSC will have 15 to 20 key first line indicators)
  - when delayed feedback is involved in complex systems it is virtually impossible for the human mind, unaided, to assess the consequences<sup>12</sup>

### **Towards a Systems Thinking Dimension**

Systems thinking and system dynamics cannot address all the difficulties noted above. However, the insights and techniques of the discipline have the potential to enhance greatly both the process of developing the BSC and the efficacy of its use by managers. Table 2 illustrates the prototype process we are currently applying. We start by sensitising the implementation team (agency managers and consultants) to feedback dynamics, using SD classics such as the 'Beer Game' or 'Friday Night at the ER'. A full debriefing introduces SD concepts and some simple modelling.

Identification of the BSC sectors is the critical first step. Structured analysis is used to identify the range of organisation objectives, Cluster analysis is then applied to identify plausible sectors and the nature and strength of interrelationships among the objectives within and between sectors. The 'indicated' sectors are then tested against the 'classic' four quadrants and for 'lead-lag' aspects to come up with an agreed suite of sectors. Qualitative SD techniques ('hexagons', influence diagrams etc) are used to identify feedback and delay relationships within and between sectors. A very high level SD model is made of relationships.



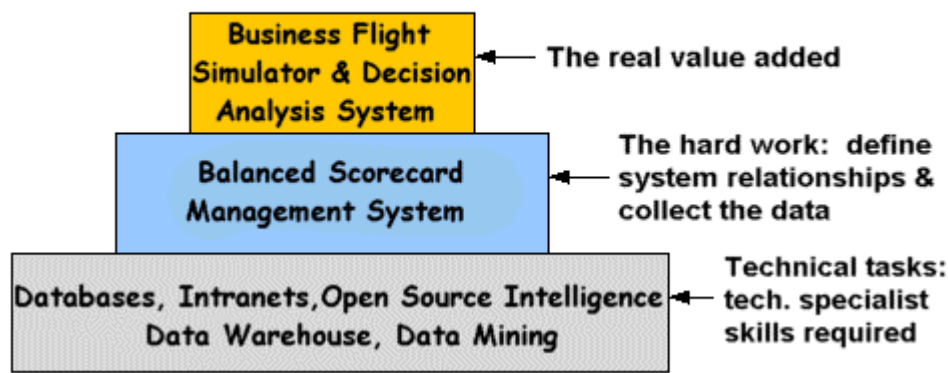
**Table 2: Qualitative and Quantitative System Dynamics  
in the Balanced Scorecard Development Process**

STAGE	OBJECTIVE	TOOLS & TECHNIQUES
<b>Pre Implementation</b>	Sensitise project ‘champion’ and implementation team to feedback and delay dynamics associated with performance indicators  <b>Outcome:</b> Shared vision on process	‘Beer Game’ or other SD flight simulators  Debriefing / overview of SD
<b>Enterprise Level</b>	Understand key outcome and feedback relationships between agency and its clients in the longer term  Agree on appropriate BSC sectors for agency and key performance indicators for each  <b>Outcomes:</b> Shared vision on BSC sectors Shared vision on key relationships between BSC sectors Key performance indicator High level enterprise SD model Specification of core competencies	<u>Understanding key relationships</u> <ul style="list-style-type: none"> <li>• stories &amp; graphs</li> <li>• cluster analysis</li> <li>• causal loop diagrams</li> <li>• SSM ‘rich pictures’</li> <li>• ‘hexagons’</li> <li>• cognitive maps, SODA</li> </ul> <u>High level enterprise SD model</u> <ul style="list-style-type: none"> <li>• SD modelling software</li> <li>• Sensitivity testing with Monte Carlo &amp; optimisation tools</li> </ul>
<b>Business Process Level</b>  <b>Stage 1 (within sectors)</b>	Understand key output and feedback relationships within BSC sectors  Agree on key sectoral process performance indicators  <b>Outcomes:</b> Shared vision on key business rules within each BSC sectors High level sectoral SD models Key process performance indicators within BSC sectors Specification of core competencies	<u>Understanding key relationships</u> <ul style="list-style-type: none"> <li>• stories &amp; graphs</li> <li>• cluster analysis</li> <li>• causal loop diagrams</li> <li>• SSM ‘rich pictures’</li> <li>• ‘hexagons’</li> <li>• cognitive maps, SODA</li> </ul> <u>High level sectoral SD models</u> <ul style="list-style-type: none"> <li>• SD modelling software</li> <li>• Sensitivity testing with Monte Carlo &amp; optimisation tools</li> </ul>
<b>Business Process Level</b>  <b>Stage 2 (within &amp; between sectors)</b>	Understand key output and feedback relationships within and between BSC sectors  Review key sectoral process performance indicators in the light of cross-sectoral impact  <b>Outcomes:</b> Shared vision on key business rules within and between BSC sectors Revamped strategic enterprise SD model Revamped sectoral SD models Key process performance indicators within BSC sectors	<u>Understanding key relationships</u> <ul style="list-style-type: none"> <li>• stories &amp; graphs</li> <li>• cluster analysis</li> <li>• causal loop diagrams</li> <li>• SSM ‘rich pictures’</li> <li>• ‘hexagons’</li> <li>• cognitive maps, SODA</li> </ul> <u>High level sectoral SD models</u> <ul style="list-style-type: none"> <li>• SD modelling software</li> <li>• Sensitivity testing with Monte Carlo &amp; optimisation tools</li> </ul>
<b>Data Level</b>	Integration of SEM and sectoral SD models with real time quantitative and qualitative data	System Integration and Knowledge Management Systems <ul style="list-style-type: none"> <li>• data warehouse &amp; data mining</li> <li>• open source intelligence</li> <li>• intranets &amp; corporate databases</li> </ul>
<b>Management Flight Simulator</b>	Development of management flight simulators	SEM / SD modelling tools, Microworlds software

Structured analysis is then applied to identify plausible indicators within each sector; and qualitative and quantitative SD is used first to model relationships within each sector and then to elaborate the models with the inter-sectoral relationships.

Finally, using Monte Carlo simulation and genetic algorithm optimisation techniques in conjunction with the SD models (e.g. using Powersim Solver 2, or more laboriously integrating the SD model with external packages such as @Risk and Evolver) understand the sensitivity of outcomes to changes in the various indicators.

The end point of the process is the development of a business flight simulator which can be used by managers both to understand the complexity of their decision environment and as a decision analysis system to test particular options. The total concept is illustrated in Figure 4.



**Figure 4: System dynamics, BSC and the underpinning technologies**

### **The Whole Person and the Fully Visioned Organisation**

Whilst the classic four sector BSC model may be appropriate for a for-profit organisation, it is not a priori obvious that it is equally appropriate to the public sector agency. In particular, one focus of our research is on 'whole of government BSC. No government would go to an election on the basis of achievement in only the four sectors. The diversity of stakeholders (voters) precludes that. On the other hand, diverse studies in cognition suggest that the intelligent non-expert can generally only cope with about seven independent facts simultaneously. This, we suggest, sets an upper limit on the number of sectors we might choose.

Drawing on 'culture change' work by Linard and Barbara for ABC-TV, a useful starting point for defining the characteristics of an holistic organisation is a statement of the characteristics of a 'whole' or 'fully visioned' person (one who is secure in her / him self, recognising her / his mental models, and working to bring about a shared vision):

**A 'whole' or 'fully visioned' person may be defined as one who . . .**

- directs his / her abilities and talents . . .
- oriented to higher values and towards others
- under the guidance of values and norms

- taking responsibility for her / his physical and psychological health
- staying in harmony with her / his self and the environment
- acquiring knowledge, insight and skills
- and ensuring the interrelationship between these aspects matures the person so they make responsible decisions in line with aims

By analogy, Table 3 suggests the characteristics of a ‘fully visioned organisation’ (a learning organisation with a ‘shared vision’). As applied in the ABC-TV project, this framework was profoundly holistic, ... each of the seven sectors necessarily embodies all the others ... like a fractal containing subsets of itself.

<b>Table 3: The Fully Visioned Organisation ...</b>	
directs, monitors and evaluates the application of physical resources and people skills, fostering in all staff a sense of service;	<b>Resources management</b>
having a client focus, providing a variety of informational and other services;	<b>Client orientation</b>
being guided by values which take their origin from the Platform and are given vitality through leadership which fosters a shared vision embracing all citizens;	<b>Ethics and vision</b>
the creation of which shapes and is shaped by the health of the nation’s social framework, especially its lived sense of community and elimination of discrimination;	<b>Social framework</b>
which evolves within and is given effect through a well integrated and effective community framework;	<b>Organisational framework</b>
the vitality of which depends on education, training and creative challenge;	<b>Education and training</b>
and which also depends on open communications maintaining awareness of individual and group achievements, building a sense of pride and belonging to a community.	<b>Internal communications</b>

This seven sector ‘whole of government’ framework will undoubtedly undergo refinement as we model interrelationships between election policies and the aspirations of diverse and often conflicting interest groups. When validated, in whatever form, it can then act as a the top level in the hierarchy of government BSC’s.

## **Conclusion**

This paper has shown that, outside the system dynamics confraternity, systemic concepts have made minimal headway in the field of performance indicators generally and the balanced scorecard methodology in particular. We have suggested that failure to account for the systemic dimensions erodes the credibility of the performance management systems. We have also suggested that even were these systems, for example in the guise of BSC, validly constructed, there is every reason to suggest that

managers would not be able to make sound decisions on the basis of their information. We have outlined the broad approach being taken in the applied research at the University College, applying systems concepts in all aspects of the design and development of a BSC, at whole of Government level and for elements of the bureaucracy.

### **Afterword ... Implementing the systemic dimensions by numbers ... ONE!**

After the exhaustive and exhausting search of the performance indicator literature in preparing this paper, we were left with the feeling that perhaps the Australian military had the right idea. With directions so precise one can almost hear the Sergeant barking the command, the instruction issued by Support Command Australia sums up (in a brief annex to a lengthy manual) *all* that is required ... but leaves much to local initiative on how: “*Understand what you are investigating. If you haven’t done so, describe its logic, and / or process map the activity. Identify the resources, funds, people etc. and the cause effect relationships of the process being investigated.*”<sup>13</sup>

- 
- 1 OECD. *Public Management Reform and Economic and Social Development* 1998
  - 2 Linard, K. *Public Sector Performance Management – Now and for the Future*. Proc. Performance Management in the Public Sector. The Asia Business Forum, Kuala Lumpa, August 1996
  - 3 OECD (1998), op. cit.
  - 4 Department of Defence. *Defence Managers’ Toolbox (Incorporating the Commonwealth Managers’ Toolbox)*. Canberra, April 1999. (This is a compact disc ‘library’ of unclassified Federal Government and Defence Department documents.)
  - 5 References to medical ‘cause and effect’ and accident ‘cause and effect’ were not included in this count, as they did not relate to performance management.
  - 6 Linard, K. *Dancing Towards Disaster – Performance Indicators in the Public Sector*. Proc. Australasian Evaluation Society International Conference, 1995.
  - 7 Kaplan, R. and Norton, D. *The Balanced Scorecard: Translating Strategy into Action*. Harvard Business School Press, 1996.
  - 8 Renaissance Worldwide, Inc. *How Knowledge Management Drives Competitive Advantage*. 1999. [http://hunter-group.com/THG/ART/white\\_km.htm](http://hunter-group.com/THG/ART/white_km.htm)
  - 9 Renaissance Worldwide, Inc. *The Balanced Scorecard -- An Overview*. 1999. <http://www.rens.com/viewpoint/papers/scorecard.html>
  - 10 Procurement Executives’ Association. *Guide to the Balanced Scorecard Performance Management Methodology*. Washington. 1999
  - 11 De Geus, A. *Strategy and Learning*. Rotterdam School of Management. 1996
  - 12 Diehl, E and J Sterman. *Effects of Feedback Complexity on Dynamic Decision Making*. MIT Sloan School of Management, Research Report D-4401-1. March 1994.
  - 13 Headquarters Support Command Australia. *Support Command Australia Instruction (SCAI) Log 1-1 Evaluation in SCA*. Jun 1998