

Reviewing the SETI Scorecards

Review of the 2001/2002 Key Performance Indicator Reports and Annual Reports of Public Science, Engineering, and Technology Institutions

A project commissioned by the Department of Science and
Technology

Michael Gering and Associates

Authors: Michael Gering, Peter Masemola, and Michael Kahn

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2. Place the stakeholder perspective up front noting the non-profit nature of the sector.
3. Use, for the stakeholder perspective, three Key Result Areas (KRAs), namely Fulfilling of the council mandate, and Support of the NSI/R&D goals, with Ensuring the quality of policy decision making to be reported on if necessary.
4. Use, for the financial perspective, one KRA, namely financial sustainability. This will be depicted by a sources of income table, as set out in the text.
5. Use, for the organisational perspective, four KRAs, overhead efficiency (compulsory), customer satisfaction (if available), best practice (if available), and efficacy of funding decisions (for councils with a significant agency function)
6. Use, for the learning and growth perspective, five KRAs, quality of scientific output, quality of scientific capacity, intellectual capital, development of scientific capacity (if relevant), and external relations (if relevant). The quality of scientific output must be depicted, by the output and publications table as set out in the text.
7. Allow the councils the freedom to combine the KPI and the Annual report where possible. The intention is to reduce the reporting burden and the duplication.
8. Ask the councils with a substantial agency function produce two sets of KPIs one for the agency function and once for the remaining operations. Other councils to produce one set of summary KPIs.

The study does show that a culture of measurement has become apparent among the Science Councils. Furthermore the measures, which are being reported, show that although there is still some way to go, a great deal of progress has been made over the past few years.

1 Introduction

Key Performance Indicators (KPIs) are an important tool both for translating strategy into action and for monitoring progress at a strategic level. This has now been recognised widely in government, and many National, Provincial, and Local administrations are in the process of designing and implementing KPIs in the form of the popular management tool, the Balanced Scorecard.

As far back as 1998, the then Department of Arts, Culture, Science and Technology (DACST) commissioned a report to look implementing Key Performance Indicators (KPIs) for the Science Councils. Although at the time, it was still seen as a predominantly private sector tool, the Balanced Scorecard was chosen as a framework for these indicators. A culture of performance measurement by means of KPIs organised as a Balanced Scorecard gradually took root in the Science Councils.

A comprehensive Balanced Scorecard report was produced for DACST by each of the Science Councils in 2000/2001, although most of the councils had already started using the framework earlier, in many cases triggered by the work leading up to the original KPI report. The Science Councils thus find themselves in the position of being early adopters of this important framework.

One prerequisite of a successful KPI system, and the Balanced Scorecard in particular, is a periodic review of its effectiveness and ongoing alignment. This report reviews the first two years of comprehensive reporting. In particular it reviews the 2001/2002 KPI reports and the annual reports within the context of the Key Performance Areas set out in the Department of Sciences and Technology's KPI framework.

The aim is to build on the strengths and experiences of the individual councils and to share learning across the different institutions.

The introduction of the Balanced Scorecard is one of a progression of interventions by the Department of Science and technology to transform the science sector, beginning with

2 Background to the study

This section places the current project into its historical perspective. The Balanced Scorecard framework was implemented across the Science Councils following recommendations by Kahn, Masemola, and Gering referred to here as the 1998 KPI Report. That project was in turn triggered by the 1997 review of the Science, Education and Technology Institutes (SETIs) referred to as the System Wide Review.

This in turn originated in the recommendations of the White Paper on Science and Technology of 1996. Indeed, it was the White Paper that drew attention to the absence of a culture of performance measurement.

The System-Wide Review was a watershed in the development of a National System of Innovation. It was conducted to establish the extent to which the SETIs address the imperatives facing the country at large. A set of general principles were formulated to guide the basic operations of the SETIs and guidelines were specified towards bridging identified gaps. Specific recommendations were made for speedy implementation in order to achieve immediate restructuring ahead of longer term transformation.

One of the most important principles identified in the System Wide Review is the need for

“Strategic planning that includes vision and long term business plans which integrate the management of human resources, finances, operations, information technology, and marketing or social diffusion; the planning has to ensure linkages of core competencies to strategy, supported by modern systems and structures, and particularly by performance management around Key Performance Indicators and Areas at all levels within institutions and the system”.

A principal recommendation of the System Wide Review was that key performance indicators should be established throughout the publicly funded research system and that these should become an integral part of the management and monitoring processes within

Recommendations of the 1998 KPI Report

1. <i>Formally adopt the Balanced Scorecard as the tool for communicating strategy and tracking performance.</i>	In its second year
2. <i>Apply the Balanced Scorecard to core competencies (as defined by the SETI Reviews and accepted by Cabinet) and to appropriate levels within the Science Councils.</i>	Partly adopted by individual councils
3. <i>In terms of norms laid down by DACST, the Science Councils, their Boards and Ministers should set performance targets within the Balanced Scorecard framework to be reviewed at the end of the 1999/2000 financial year.</i>	Adopted by some individual boards
4. <i>The setting of performance targets might be accompanied by consideration being given to the ring fencing of core funds.</i>	Extended use of ring-fencing
5. <i>Designate an independent external agency to monitor and publicly report on the Science Councils' performance against their identified core competencies and performance targets. This might be NACI.</i>	Monitored by DST
6. <i>The Science Councils should strive to adopt quality standards aligned with their balance scorecards based on appropriate ISO or other standards bodies.</i>	Partly adopted by individual councils
7. <i>As a norm, include intended impact assessment in the design of projects. This might be achieved through the use of logical framework planning or equivalent.</i>	Wider use by individual project managers
8. <i>Carry out research on best practice in performance and impact measurement, with particular reference to qualitative measures.</i>	Left to individual councils
9. <i>Further development of appropriate management skills including project management and performance measurement is needed. Attainment of this should be a Board priority.</i>	Left to individual councils
10. <i>Impact assessment requires specific social scientific skills. Priority should be given to developing these at more than one tertiary institution.</i>	Left to Universities to identify need
11. <i>Within one year, all Science Councils should have a performance management and measurement information system in place.</i>	Culture of measurement in place
12. <i>An appropriate process to monitor actual R & D spending that distinguishes fundamental and applied research, be put in place. This must not be conflated with spending on S & T services.</i>	Frascati survey now running
13. <i>Initiate research on the knowledge flows and exchanges within the NSI or regional systems of innovation.</i>	Frascati survey now running
14. <i>Enhance capacity to determine the extent of innovation activity at firm level.</i>	Oslo survey pending
15. <i>Enhance capacity to monitor and disaggregate cross-border knowledge and technology flows.</i>	Not yet addressed

The project took into account the accountability framework provided by the existing Financing and Reporting System that was developed for Science Councils, and was informed by the National Research and Technology Audit as well as the National Research and Technology Foresight.

In this regard, there have been several important developments, both in the external environment and internal to the Councils.

Fourthly, there is much greater alignment of the councils with national priorities, and indeed many Councils have restructured their divisions and organograms to reflect this. Councils are more able to report openly on their alignment to the national priorities and require less prompting as to how to do this.

Finally, the Balanced Scorecard has become a far wider metaphor for reporting, not just in the private sector, but in particular, since Kaplan and Norton's second book *The Strategy Focussed Organisation* (Harvard Business School, 2001), in the public sector.

A full CSF analysis is thus complex and time consuming. This approach had been used by some peer organisations internationally; e.g. the Natural Environment Research Council of the United Kingdom is a case in point. Given the general absence of sufficiently detailed strategic plans, the CSF approach was deemed unsuitable.

The other candidate was the Balance Scorecard of Norton and Kaplan (1996) that serves to translate and implement strategy, by tying together the different aspects of the work of a corporation. It measures and links the hard to quantify elements such as organisational learning and customer satisfaction with the internal practices of the organisation. The scorecard is well suited to rapidly changing knowledge intensive activities. It provides a schema for a strategic management and measurement system.

In its common form, the Balanced Scorecard considers four domains, the financial perspective, customer perspective, internal business perspective, and learning and growth perspective. These four domains provide a balance of lead and lag indicators; internal and external factors; efficiency and effectiveness factors; short and long-term considerations; and the value drivers of the bottom-line.

The approach is not trivial – a random listing of objectives, measures, and targets would not be beneficial. The various objectives must articulate the business strategy – the entire scorecard thus communicates and promotes implementation of the strategy of the organisation.

The obvious utility of a Balanced Scorecard is that it encourages managers to “think 360 degrees”. The past, near present and future views potentially allow one to manage both for stability and change.

Undoubtedly the US deployment was impelled through legislative force, when in 1993 the Government Performance and Results Act came into effect. This Act requires agencies to report back on their performance in a transparent manner. The next step in the evolution of the BSC industry came with the publication of the Kaplan and Norton book in 1996.

4 Performance and reporting of the individual SETIs

Although the Balanced Scorecard methodology has now become widely accepted, its implementation in Government is in the early stages, and the Science Councils find themselves in the position of being early adopters of the system. This is the second year that the councils are now reporting to DST using the Balanced Scorecard as their indicator framework. Many of the Science Councils have been using their own scorecards for some years.

In this section, we look at how the different Science Councils are using their scorecards, how they supplement the statutory financial reports and the key messages coming out of the reports.

As a sector, the Science Councils have built up considerable experience and the aim of this chapter is to look at the individual council submissions and to understand what worked well and what not so well. This will allow the next section, section five to build on the elements of best practice established here.

In this regard, we wish to emphasise four councils. Each of these councils took a slightly different approach and as a result collectively they provide a useful framework and testing ground, when we look at the individual indices in section five.

The CSIR has a long history of indicator reporting and indeed was one of the supporters of the original scorecard. Their comprehensive reporting and use of visual devices make their report an excellent source of good practice and an excellent pool of ideas, in which to fish.

The MRC comes closest, in our view, to the original intention of the Balanced Scorecard. They have devised their own scorecard with the stakeholder perspective, in the form of their mandate, as the primary sector. For each perspective, they report on two to three key objectives. The MRC uses its own management Balanced Scorecard as the cornerstone of the report to council.

4.1 Africa Institute of South Africa (AISA)

The Africa Institute was established in 1960 as an independent non-profit organisation, but only became a fully-fledged Science Council during 2001. It focuses on political, socio-economic, international and development issues in contemporary Africa. With a total income of just under R 11.6M in 2002, it is also one of the smallest Science Councils.

The 2000/2001 KPI report produced by the Africa Institute comprised a list of some thirty-two indicators that were mooted along with a list of qualitative targets. This makes their 2001/2 KPI report their first genuine KPI report. The directors are therefore in the first iteration, and have intimated that they are looking to simplify and streamline the process. The Africa Institute KPI report consisted of four separate KPI reports, namely for the Finance and Admin division, for the Publication Division, for the Library and Documentation Services Division, and for the Research and Development Division. These are then coalesced into a total, rather than a summary report.

The Africa Institute's annual report is, apart from the financials, qualitative in nature. The KPI report complements this with both quantitative and anecdotal information. Particularly useful are the indicators, which emphasise the outputs of the Institute. However there are many different qualitative and quantitative indicators represented by ten graphs and over 200 paragraphs and sub-paragraphs over in 17 pages. It is not obvious to an outsider where the focus of the reader should be. None of the five quadrants are presented clearly.

The interviews have indicated that the KPI report is in the process of being simplified and focussed. No doubt, this will result in the second KPI report becoming simpler, more compact, and easier to understand. The 1997 System-Wide Review recommended the creation of management and governance structures, which will imbue creative independence with quality control. The second round of the KPI reporting should help toward instilling the culture of measurement and support the new management structures.

4.3 Council for Scientific and Industrial Research (CSIR)

The CSIR is the largest of the Science Councils with a turnover of some R908M, and has developed the reputation for taking a leadership role in many science sector developments.

For example, their drive towards increased sustainability goes back to the late 1980s. Currently some R564M of their revenue comes from external contracts, and this excess of external income over parliamentary grant now poses twin questions: what is the optimum level of sustainability, and at what stage does external revenue engender too short term a focus.

Their larger size has implications for their rate of demographic change and their representivity, which while improving steadily, currently sits at 27% black and 34% women professionals.

The CSIR also has a long history of indicator reporting, having developed their 'basket of measures'. Indeed, the CSIR was one of the supporters of the original Balanced Scorecard work carried out for DACST in 1998. They report on many of their indicators in their annual report, including a table of some twenty-two measures.

The measures in the CSIR annual report include financial measures (growing our business through focussed business development), operational indicators (embedding quality in everything we do), what we have called transformation measures (CSIR - transformation excellence), stakeholder measures (enhanced impact on South Africa's sustainable development and presidential imperatives), and a key set of learning and growth measures (harnessing the information revolution). In addition, there are many visual devices (tables and graphs) including sources of income, customer satisfaction, environmental, and staff composition.

The KPI report supplements the annual report, presenting the KPI information according to the departmental scorecard framework. In addition to the narrative, there are many

4.4 Council for Geoscience (CGS)

The Council for Geosciences is mandated to recognise, document, and disseminate basic geological knowledge to South Africa in order to underpin the social and economic development of the country. CGS has total revenue of R98M, of which some R23M comes from sales and contracts.

The annual report consists of seventeen sub-reports describing the activities of each of the cost centres, the director's report, plus the statutory accounts.

The director's report contains useful operational KPIs. It lists the scientific and technical performance of the CGS in the form of its statutory scientific outputs. In the case of the CGS, these are audited alongside the financial reporting. The percentage completeness is then calculated for fourteen of the cost centres. This indicator reflecting the statutory work is then combined multiplicatively with the external revenue to produce an index which in principle grows hyperbolically with external revenue. These two tables are copied along with a list of KPI indicators as part of the DACST report.

The KPI report consists of twenty-two indicators in six categories, business growth, investing in organisational excellence, customer/client relationships, operational best practice, investing in people and stakeholder interactions. These indicators are all numerical and for each a performance against target is calculated.

The matching with targets is a practice that should be followed by all the Science Councils and the CGS is exemplary in this regard.

The KPIs have the advantage that they are part of the CGS's measurement system. However, they are not necessarily fully aligned with what the department might wish to know. That, and the lack of either narrative accounts or explanations, might make them somewhat eclectic and relatively difficult for outsiders to use.

The financial indicators elaborate on much of what is in the annual report, with several of the key tables repeated and discussed. The stakeholder perspective begins by analysing the impact on the NSI goals, namely quality of life, competitiveness, and a well-educated population and reinforces this with appropriate text and tables, including the increased assistance to SMMEs over the past ten years. The organisational perspective has tables on the various outputs and a narrative on the research portfolio. The learning and growth contains narrative on the innovative technologies, and the transformational perspective supplements the figures on employment equity plus the developmental activities to support this.

At the back, they provide a roadmap giving the Key Result Areas and the measures that they chose to use for each KRA. The report closes with the challenges facing Mintek and a conclusion.

The Mintek report comes closest to what was envisaged in the original 1998 indicator study. It supplements the annual report, but uses many of the tables and indicators already reported. Mintek seems to navigate potential ambiguity by choosing to report a trend once. The report is therefore at once comprehensive, and relatively easy to use.

It is therefore a useful foil for the section looking at how the Science Councils dealt with the five perspectives.

4.7 The Human Sciences Research Council (HSRC)

The Human Sciences Research Council provides an interesting case study. It began its wide-ranging transformation at the time it introduced the scorecard measures. The HSRC therefore used the scorecard to convey its priorities, guide its actions and to monitor its transformational progress.

In 2000, the HSRC committed itself to the goal of conducting social science that makes a difference. This involved refocusing the research groups to be aligned with national priorities, restructuring the administration to produce a sustainable cost base, and creating a user orientation with the emphasis on contract research.

The transformation is reflected in a set of indicators known under the acronym of COUPE, namely Contracts and Earnings, Outreach, User orientation, Performance (in terms of both Equity and Efficiency), and Excellence. These indicators are closely aligned to the Balanced Scorecard perspectives.

The *Contract and Earnings* indicators overlap strongly with the Financial and Investment Perspective. The *Outreach indicator* is one of the Stakeholder Perspective indicators, and similarly, the *User Needs indicators*. The *Performance (equity) indicators* are directly related to the Transformational Perspective. *Performance (efficiency)* relates closest to the Organisational Perspective. The *Excellence indicators* are essentially Learning and Growth Indicators, inter alia what is needed to excel into the future.

As well as the year's highlights for the HSRC and the priorities of the research groups, the annual report itself contains key performance measures. These include a graph relating research earnings to parliamentary grant, a 'sources of income' table, table of publications summarising the full list of publications also presented, demographic breakdown by race and gender, and proportion of researchers with Masters and PhD degrees.

4.8 Medical Research Council (MRC)

Over the past three years, the MRC has doubled its budget from R125M in 2000/1 to R250M in 2002/3. This is due partly to an increase in government funding, representing the impact of reorganising and reprioritisation of the research focus, but also largely due to increased ability to attract external funding, which over the same period rose at an even greater rate. At the same time, the number of publications in refereed journals rose from 429 to 506, and significant progress was made in terms of representivity and demographics.

In addition to the financial statement the MRC's annual report contains many useful graphs, tables, and indicators. The research spend is split according to national priorities, the publication output in peer-reviewed journals is presented, and then with the factor weighting them for impact. The growth in media profile is presented in rand value. The employment equity figures are presented, as well as the study support expenditure by race and gender, and the appointments, also by race and gender. In addition, a table lists for each programme the number of projects, PhD and Masters students, and refereed papers. A comprehensive list of awards and achievement is given.

The MRC's scorecard is a simple focussed supplement to the annual report. It provides an overview, a summary or road map of the indicators that will be presented and then a presentation of the chosen few, a limited number of two to four indicators per category.

The MRC's Balanced Scorecard perhaps most closely follows the original intentions of Kaplan and Norton.

As recommended for a public sector organisation, the Stakeholder Perspective heads MRC scorecard. The Stakeholder Perspective is represented in the form of 'building a healthy nation'. This is supported by the Organisational perspective, the Financial and Investment perspective and the Innovation Learning and Growth Perspective. Due to the current emphasis, they have also added a Transformational Perspective, but assume that

4.9 National Research Foundation (NRF)

The National Research Foundation acts as both an agency to promote and support research through funding and as the council managing the national research facilities. The facilities and networks managed by the NRF include the Hartebeesthoek Radio Astronomy Observatory (HartRAO), the Hermanus Magnetic Observatory (HMO), the iThemba Laboratory for Accelerator Based Sciences (iThemba LABS), the South African Astronomical Observatory (SAAO), and the South African Institute for Aquatic Biodiversity (SAEON), and now the Foundation for Science and Technology (FEST). In its agency function the NRF has a budget of some R640M rand and includes funds allocated by DST for ring-fenced activities, the management of the Innovation Fund, the Technology for Human Resources Industry Programme (THRIP), and roughly 2800 individual grants of varying size. The budget (2003/4) for this activity displays some R58M to administer some R548M worth of funds. The budget for the research facilities is a further R154M.

The NRF reports the scorecard indicators as part of the annual report and not in the form of a separate report to NACI. Although the 2003/04 –2005/6 Business Plan consolidates the KPIs into one set for the agency function agency and a further set for the Facilities. These facilities previously reported as individual entities, each with their own interpretation of the generic KPIs.

The different indicators were therefore not treated consistently. This inconsistency was evident in the measures reported, the framework used within which to report them, and even when reported, the definitions used.

For example, a relatively simple concept such as institutional demographics has varying treatments. For one Facility, employment equity is reported in terms of percent of black and women staff members. Another Facility reports the percent of students from disadvantaged communities. A third Facility merely reports that “the employment equity

4.10 South African Bureau of Standards (SABS)

SABS, the leading standardisation body in the sub-Saharan region, is the most commercial of all the Science Councils. It also has a relatively small focus on pure research.

The financial reporting reflects this emphasis, where standard accounting ratios such as operating margin and return on net assets are used in the commercial sense. The one page financial overview reports on the commercial revenue, core funding, operating profit, assets employed and cash flow. Five-year plots show a steadily increasing commercial revenue and an even stronger revenue per employee. The last two years shows capital expenditure strongly outstripping depreciation, indicating significant investment into future.

The annual report also looks at Key Performance Indicators, targets and graphs against four objectives, growing the business and profitability, human resource development and transformation, social investment and development, and product service and quality.

The objective - Growing the Business and Profitability is of course close to the financial and investment perspective. Five measures are presented, including growth, profit to sales margin, ratio of external earnings, return on net assets, operating costs to revenue and cash flows. These indicators are graphed and we note that SABS of all councils have been most able to calculate Return on Investment, in this case in the form of RONA.

The second objective is human resource development and four measures are presented along with a two page discussion including information on organisational ethics, training and development, development of knowledge capital, employment equity and skills development. The Employment Equity tables with top management, senior management, professional, skilled, semi-skilled and unskilled by gender and race would be very useful at this point.

4.11 National Laser Centre (NLC)

The National Laser Centre started operations in April 2000, and was officially launched as recently as November 2001. The NLC is an organisation that focuses on the development and application of laser technology. Its activities are focussed in three main areas, namely the development of laser application technology in order to improve the competitiveness of South African industry, transfer of Laser Technology information and knowledge, and the creation of a rental pool primarily targeted at universities and technicons.

In their first two years, the NLC has demonstrated its ability to generate external revenue ranging from R7.07M in 2000, R6.32M in 2001 and R9.52M projected for 2002, these figures constituting approximately 50% of the NLC's turnover. Through its African Laser Centre initiative it is playing an important role in technology transfer in the continent, in line with the government's NEPAD initiatives.

The National Laser Centre used the Balanced Scorecard as a tool to develop their strategic thinking and to operationalize the strategic initiatives into measurable action. It further used the Balanced Scorecard in its mid term evaluation by the advisory board in October 2002.

For this reason the Balanced Scorecard presented by the NLC is well aligned to the departmental measures. The Balanced Scorecard, as presented to the department, supplements the financial statements. It is relatively quantitative and provides the basis for their medium term planning.

5 The findings with respect to the Balanced Scorecard Perspectives

The previous chapter looked at the individual council responses to the original Balanced Scorecard report. This chapter looks at the Balanced Scorecard Perspectives, and how the Councils used the perspectives in their balanced scorecard reporting.

The first section looks at how the perspectives support one another. Our fundamental proposal is that the Stakeholder Perspective, in the form of the departmental mandate, is used as the primary perspective. The Financial and the Organizational perspectives support this. The Learning perspective monitors the investment needed to remain competitive into the future. The Transformation perspective monitors a key stakeholder concern.

The five subsequent sections look at the five perspectives in turn. Each section reports on three topics.

For each perspective, we firstly look at what worked and what did not work. In this, we draw heavily on the submissions of four councils the CSIR, the HSRC, MINTEK, and the MRF identified for this purpose in the previous section.

Secondly, we look at the original Key Result Areas as defined in the 1998 report.

Many of the Councils report that the scorecard has become a tool of choice and the perspectives are widely accepted, with minor intellectual qualifications. The actual usage though has important implications on the Key Result Areas.

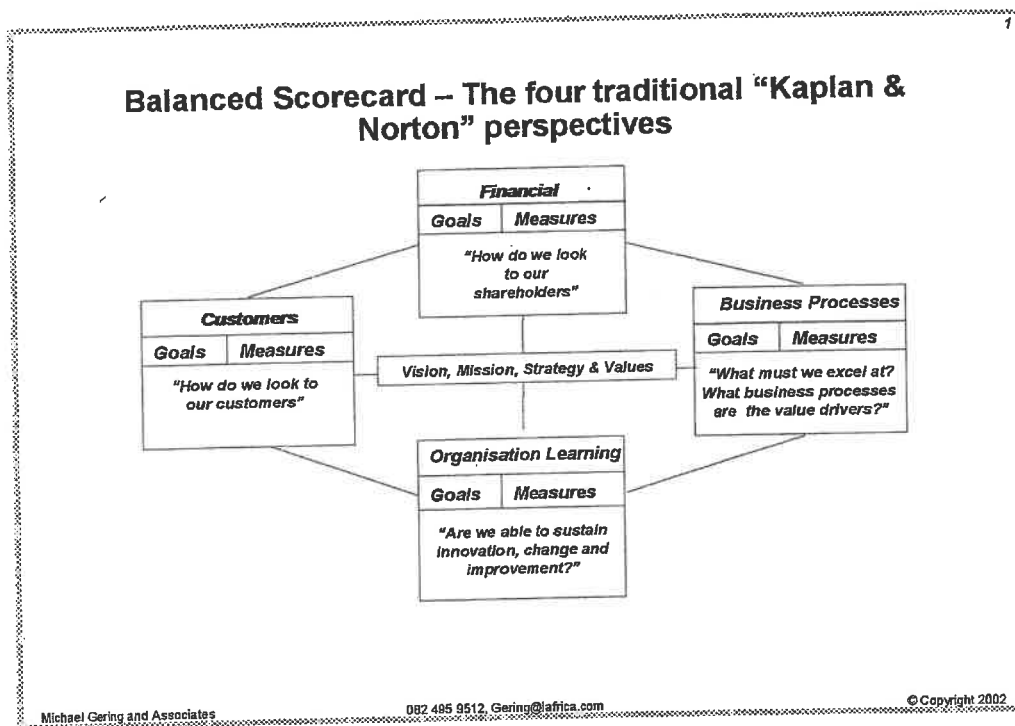
Thirdly, we look at and recommend best practice for each perspective. For each of the perspectives we look at the minimum reporting required to paint a system level picture. We also draw attention to some of the practices that would enhance the reporting of the individual councils.

5.1 Putting the stakeholder on top

The idea of a Balanced Scorecard was triggered by the realisation that, even in private sector organisations, the traditional financial measures must be supplemented with other less traditional measures to paint a more complete picture of corporate performance.

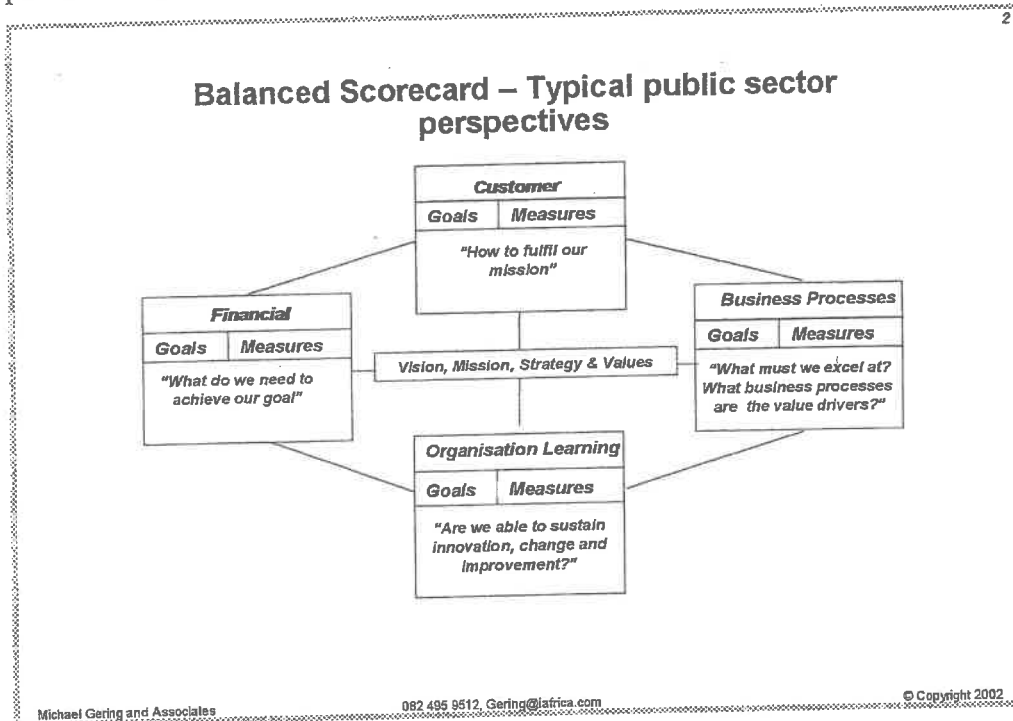
Thus although a company might well be charged with making a profit, even in the private sector, other dimensions come into play.

To make a profit, the company must be attractive to its customers. And to attract customers it will need to develop the appropriate business processes. Finally, money and effort will have to be invested into organisational learning if the organisation is to maintain its competitive standing into the future.



As noted earlier, Kaplan and Norton’s first book was published in 1996 and resulted in the widespread adoption of the Balanced Scorecard as a concept. Non-profit

public sector scorecard as presented in their later book is found below.



The original Balanced Scorecard gives four perspectives, but suggests that they “should be used as a template and not as a straight jacket”. No mathematical theorem exists that four perspectives are both necessary and sufficient.

At the time of the original Balanced Scorecard, demographic transformation was clearly a strategic imperative. This was added as a fifth perspective. Transformation remains a top of the mind issue, monitored both by the department and the politicians.

The Science Councils were fairly uniformly supportive of the Balanced Scorecard as a framework and the perspectives chosen, but as we have seen, the use of the perspectives was different. What is also important is the actual performance targets, besides those laid out in the PFMA and the Employment Equity Act, are not specified.

group metals industry, ferrous metals industry, non-ferrous metals group industry, industrial minerals industry and opportunity enhancement.

Such an application of funds is to be recommended together with anecdotal evidence of research impact of individual measures.

Comment on the original 'key result areas'

The first and foremost concern, as set out in the original indicator of 1998, was that the Science councils show strategic alignment with the intention underlying the NSI as a whole. Most of this would take the form of a narrative. In 1998 particular goals were selected for further comment.

Key Result Area/ Critical Objective	Comment
Support of the NSI goals	➤ Typically in the form of a narrative. Some councils have set out an application of funds. Some are using some form of impact analysis.
<i>Sustained democratisation & transformation</i>	➤ <i>Part of NSI goals</i>
<i>Promoting macro-economic goals & objectives</i>	➤ <i>Part of NSI goals</i>
<i>Ensuring access to knowledge infrastructure</i>	➤ <i>Part of NSI goals</i>
<i>Technology diffusion/dissemination of information and research results</i>	➤ <i>Publications as part of learning and growth</i>
Ensuring quality of policy decision making	➤ Reported on anecdotally
Promoting networks & linkages	➤ Reported on as a KPI or anecdotally

(The bolded Key Result Areas are the ones, which appear more effective)

Application of funds (suggested format)

Priority area	Budget	Grant	Key activities	Major outcome/impact
Total				

Support of the R&D strategy/NSI goals (suggested format)

Area	Activity	Expected impact
Impact on quality of life		
Impact on Growth and Wealth Creation		
Impact on other NSI or National Priority		

Ensuring the quality of decision making (suggested format)

Policy recommendation	Expected impact

Comment on the original 'key result areas'

Key Result Area/ Critical Objective	Comment
Investment is well targeted and managed	➤ At a high level this is covered by the financial statements, coupled with the explicit sources and application of funds table
<i>ROI on intangible property/savings to the state & society</i>	➤ <i>Apart from the SABS, most councils had difficulty with this indicator. The concept is ambitious in an intellectual capital environment.</i>
Soundness of market /user relationships	➤ At a high level, this is and the next objective, competitiveness are covered by the sources of fund table proposed.
Competitiveness (first, second or last port of call)	➤ This is covered at a high level by the sources of funding table.
<i>Effective and efficient management of costs</i>	➤ <i>For a high level scorecard, this can be seen as an organisational rather than a financial measure</i>
<i>Effective and efficient management of technology</i>	➤ <i>For a high level scorecard, this can be seen as an organisational rather than a financial measure</i>
<i>Effective and efficient management of assets (e.g. capital equipment, reserves, etc.)</i>	➤ <i>For a high level scorecard, this can be seen as an organisational rather than a financial measure</i>

(The bolded Key Result Areas are the ones, which appear more effective)

Source of income table (suggested format)

Source of income	Previous year	Budget	Current year	Percent
Parliamentary Grant – core funding				
Project specific (ring fenced) parliamentary grant				
Innovation fund				
External contract funding - government				
External contract funding - Local				
External contract funding - International				
Income from intellectual property (patents, royalties, etc.)				
Non-operational income (rent, interest, etc.)				
Total				

Clearly, the sustainability ratio plays a key role, and councils may well wish to continue plotting one single KPI, namely the ratio of external to total income as a time series.

Here care must be taken with the definitions. Certainly, the non-operational income, such as interest and rent is typically an annuity form of previously unused grant; to report it as external income stretches the definition.

Similarly project specific parliamentary grant may be seen as either grant, or as external funding, depending on the nature of the award and whether it is invested in long term scientific sustainability or driven by a particular short term need. Ideally, the allocation will be done by agreement between the parent ministry and the council. If one figure is used the percentage or actual external grant figure should be presented as a time series.

Comment on the original 'key result areas'

Key Result Area/ Critical Objective	Comment
Close to operational best practice	<ul style="list-style-type: none"> ➤ Some of the respondents were able to answer using e.g. Baldrige or other independent awards ➤ Efficiency ratios used to benchmark also internationally
<i>Quality of science and technology base</i>	➤ <i>Duplicated in financials (contract income) and to learning and growth (platform for future work)</i>
Quality of science and technology services and products	➤ Some of the respondents do comprehensive quality checks (e.g. the CSIR)
<i>Relevancy of the research portfolio</i>	➤ <i>Duplicated in customer and finance categories</i>
<i>Profile i.r.o partnerships/ joint ventures/ co-operation agreements</i>	➤ <i>Sometimes relevant, though not necessarily reported on here</i>
<i>Corporate culture</i>	➤ <i>Corporate survey not necessarily an annual event. Sometimes reported on. Possibility of double guessing the CEO and council</i>

(The bolded Key Result Areas are the ones, which appear more effective)

Performance excellence should also be reported here. We would recommend that where councils have information the reporting of annual workforce surveys, external type Baldrige reporting would be useful.

Some of the councils, in particular the NRF and the MRC are funders and their stakeholders include the broad research community.

Internationally funders are typically expected to account for the efficacy of their funding decisions. Councils, which disburse a significant amount of their funding would be expected to report on the efficiency and the effectiveness of the disbursement process.

Indicators would include Number of applications, Time to complete review of Applications, Number of successful applications, Number of appeals, Number of appeals upheld.

already reported under scientific output but could include any significant area where information is codified within the organisational framework.

Scientific Output (suggested format)

Category	Number	Number per researcher	Number per employee
Reports			
Journal articles, conference proceedings, chapters in books			
Books			
Refereed articles			
Publications with external co-authors			
Patent filings			
Patents awarded			

Qualification of staff (suggested format)

Staff qualifications	Number	Percent	
Researcher staff with PhD degrees			
Research staff with PhD and Masters Degrees			
Staff enrolled for Masters or PhD degrees			
Students enrolled for Masters and PhDs		Black	
		Women	

Information on staff qualifications will be available as they are required in more detail for the Frascati survey.

Comment on the original 'key result areas'

Key Result Area/ Critical Objective	Comment
<i>Training and Development</i>	<ul style="list-style-type: none"> ➤ <i>In part covered in the Learning and growth perspective</i> ➤ <i>The relevance to Employment Equity should be judged against the ultimate measure, i.e. workplace demographics</i>
Employment Equity	➤ Employment equity
<i>Remuneration Equity</i>	➤ <i>Seldom reported. Now become a legal part of the employment equity plan</i>
<i>Democratisation</i>	➤ <i>Difficult to report. Is being seen as the role of management to set the appropriate cultural signals</i>

(The bolded Key Result Areas are the ones, which appear more effective)

	Male						Female						Total
	SA Afr.	SA Clrd.	SA Ind.	SA W.	Non SA Africa	Non SA Other	SA Afr.	SA Clrd.	SA Ind.	SA W.	Non SA Africa	Non SA Other	
Top													
Senior													
Professional													
Skilled													
Semi Skilled													
Unskilled													
Total													

Recruits

Those councils struggling with a historical legacy in terms of under representation of the designated group might wish to report on their new recruits.

	Male						Female						Total
	SA Afr.	SA Clrd.	SA Ind.	SA W.	Non SA Africa	Non SA Other	SA Afr.	SA Clrd.	SA Ind.	SA W.	Non SA Africa	Non SA Other	
Recruits													

Furthermore, the indicator beloved by accountants "Is the audit report unqualified?" is apparent and requires no further comment. The narrative relating the Council's output to national priorities is typically more professional and smoother.

We therefore recommend combining the KPI and Annual report provided each council presents the minimal tables and indicators set required by the DST. If a council fails to do so, we believe a separate report does become necessary.

Secondly, different councils have differing approaches to following the DST framework. Some of the Councils have carefully followed the framework, painting by numbers to produce what they believe to be the required picture. Others, such as the MRC, have produced their own frameworks and their own indicators within that framework to produce a compelling vision of their organisational status. Still others have done both. They have reported on the indicators that they see as important and then gone on scrupulously to fulfil the departmental report.

The first KPI report was commissioned before the Balanced Scorecard was common practice. Nor was a culture of measurement apparent at that time. The report deliberately provided a range of measures to allow councils and the readers some freedom to select those most appropriate from those on offer.

A culture of measurement is now apparent. The Balanced Scorecard is widely used in industry and is being initiated, with varying success, widely in government. It is the tool of choice among the Science Councils. It is now appropriate to move to minimal common indicator set and to expect Councils to supplement this with indicators relevant to their individual circumstances.

Recommendation 6

There should be five learning and growth KRAs, quality of scientific output, quality of scientific capacity, intellectual capital, development of scientific capacity (if relevant) and external relations(if relevant). The quality of scientific output to be depicted, at least by the output and publications table in the text.

<i>External relations (if relevant)</i>	<ul style="list-style-type: none"> ➤ <i>Number of international key note address,</i> ➤ <i>Number of international awards won</i> ➤ <i>Projects with external collaborators</i> ➤ <i>Publications with external collaborators</i>
Transformation	
Organisational demographics	<ul style="list-style-type: none"> ➤ Employment Equity Demographics (table) ➤ Percent black researchers and managers ➤ Percent women researchers and managers

The actual KPIs and tables are presented in the text and will allow comparability across the sector. All these indicators are being used by some of the councils.

Again, councils are expected to add indicators that they feel are appropriate.

Recommendation 7

Councils should be free to combine the KPI and the Annual report where possible. The intention is to reduce the reporting burden and the duplication.

Recommendation 8

Councils with a substantial agency function produce two sets of KPIs one for the agency function and once for the remaining operations. Other councils to produce one set of summary KPIs.

Performance measurement has increasingly become a concern of democratic governments the world over, particularly as with the emphasis on value for money increases. This is apparent in the increased use of competitive funding, the burgeoning of the National Innovation fund, THRIP and competitive funding under the Biotechnology strategy. Given the intention of marketable project outputs, performance measurement becomes an expectation.

But whilst easy to advocate, performance measurement is a far from simple task. An unstated objective of the original 1998 performance indicator project was to contribute toward building a culture of measurement. Both the reporting and the culture of reporting now exist.

In all three cases, the nature of the debate appears to have shifted. Not only has more been achieved than some believed possible at the start, but indeed more is still believed possible now, than many claimed possible then.