Designing, implementing and updating performance measurement systems

Mike Bourne, John Mills
University of Cambridge, Cambridge, UK
Mark Wilcox
University of Northumbria, Newcastle, UK
Andy Neely
University of Cranfield, Cranfield, UK, and
Ken Platts
University of Cambridge, Cambridge, UK

Keywords Performance measurement, Implementation, Alignment, Strategic management

Abstract This paper addresses issues met when designing, implementing, using and continuously updating performance measurement systems in manufacturing companies. The paper develops, from theory, a framework for analysing the implementation of a performance measurement system and uses this framework to interpret three longitudinal case studies. The paper concludes that specific processes are required to continuously align the performance measurement system with strategy. When these processes are combined with a well defined model of strategic success, the measurement system can enhance the strategic management process by challenging the assumptions and the strategy itself.

Introduction
There is currently considerable interest in performance measurement. Management interest can be gauged from the high levels of attendance at the large number of industrial conferences on the subject. Academic interest is manifest through the considerable number of papers on the topic (Neely, 1999). But this interest is not new. In the late 1970s and 1980s, authors expressed a general dissatisfaction with traditional backward looking accounting based performance measurement systems, identifying their shortcomings and arguing for change. In the late 1980s and early 1990s, this dissatisfaction led to the development of “balanced” or “multi-dimensional” performance measurement frameworks. These new frameworks placed emphasis on non-financial, external and future looking performance measures. They were then quickly followed by the development of management processes specifically...
designed to give practising managers the tools to develop or redesign their performance measurement system. The result has been the publication of alternative balanced performance measurement frameworks and suggested management processes for the design of performance measurement systems.

As can be seen from the above, most of the more recent academic literature and practitioner activity has focused on the early stages of the development of the performance measurement system, the conceptual frameworks and processes for designing the performance measures. There are few longitudinal studies of the implementation and continuous updating of performance measurement systems, the subject of this paper.

The paper begins with a brief review of the academic literature, covering the main criticisms levied at traditional performance measures, the balanced performance measurement frameworks and published performance measurement design processes. The paper then goes on to develop a theoretical framework which categorises and describes the steps an organisation goes through when using a management process to develop a performance measurement system. This framework extends from the design processes into the implementation, use and updating of performance measures. The paper then uses this framework to chart the design, development and implementation of performance measurement systems in three UK manufacturing companies over a two year period. It compares their experiences and looks specifically at the difficulties the management teams encountered whilst attempting to implement metrics and measure performance. The issues of continuously updating the performance measures and the measurement systems are then illustrated and the paper concludes by discussing the usefulness of the framework developed and the implications for performance measurement system development.

**Background literature**

Traditional performance measures, developed from costing and accounting systems, have been criticised for encouraging short termism (Banks and Wheelwright, 1979; Hayes and Garvin, 1982), lacking strategic focus (Skinner, 1974), encouraging local optimisation (Hall, 1983; Fry and Cox 1989), encouraging minimisation of variance rather than continuous improvement (Johnson and Kaplan, 1987; Lynch and Cross, 1991), not being externally focused (Kaplan and Norton, 1992) and even for destroying the competitiveness of US manufacturing industry (Hayes and Abernathy, 1980). At the time, many performance measurement systems in the UK and USA were heavily financially biased and it has been argued that systems which were specifically designed for external reporting were being inappropriately used to manage business enterprises (Hayes and Abernathy, 1980).

In an attempt to overcome these criticisms, performance measurement frameworks have been developed to encourage a more balanced view. For example, Keegan *et al.* (1989) propose a balance between internal and external measures and between financial and non-financial measures; Cross and Lynch (1988-1989) describe a pyramid of measures which integrates performance
through the hierarchy of the organisation; Fitzgerald et al. (1991) distinguish between the results and their determinants and Kaplan and Norton (1992) between the four perspectives of their “balanced scorecard”. These frameworks are therefore multi-dimensional, focusing more on non-financial information in an attempt to redress the balance. They are designed to provide a balance by including measures of external success as well as internal performance, and measures which are designed to give an early indication of future business performance as well as a record of what has been achieved in the past.

These new performance measurement frameworks may have answered the question “what types of measures should a company use?” but they did not provide specific advice to a company implementing a performance measurement system. To do this a management process was needed and there are a number of different approaches in the literature. For example:

- Bitton (1990) proposes an approach based on the GRAI methodology for enterprise modelling, breaking down the planning and control of manufacturing into discrete decision making units and then attaching appropriate performance measures to each decision;
- Dixon et al. (1990) use their performance measurement questionnaire (PMQ) to identify strengths and failings in the current performance measurement system and then propose a workshop to develop, revise and re-focus the set of performance measures;
- Kaplan and Norton’s (1993) approach for the development of the balanced scorecard was based around using interviews with members of the senior management team to surface differences in strategic priorities before resolving these differences through facilitated workshops; there are number of other similar consultancy processes (e.g. Vitale et al., 1994).
- Eccles and Pyburn (1992) described a facilitated process which makes managers’ thinking explicit through building a performance model linking changes in people’s knowledge and organisational processes, through performance in the market, to the financial performance of the business. A similar approach is now adopted for the development of the balanced scorecard (Kaplan and Norton, 1996).
- Neely et al. (1996) have developed a management process which is fully described in the workbook Getting the Measure of Your Business. This is described more fully later in this paper.

However, at the end of each of these management processes, participating managers have reached the stage of deciding what to measure but nothing has been implemented. The next section therefore develops a framework to assist with the understanding of the stages of implementation and embedding.
Phases in performance measurement system implementation
It is proposed here that the development of performance measurement systems can be divided into three main phases (see Figure 1). These are:

1. the design of the performance measures;
2. the implementation of the performance measures;
3. the use of the performance measures.

These are now described in turn.

From the literature, the design phase can be subdivided again into identifying the key objectives to be measured and designing the measures themselves. There is now a strong consensus amongst authors that measures should be derived from strategy (e.g. Mintzberg, 1982; Globerson, 1985; Sink, 1986; Fortuin, 1988; Keegan et al., 1989; Dixon et al., 1990; Bitton, 1990; Lynch and Cross, 1991; Maskell, 1989; Azzone et al., 1991; Wisner and Fawcett, 1991; Goold, 1991; Kaplan and Norton, 1992) and the literature is dominated by processes which answer the question “what should we measure?” The importance of designing measures in a way which encourages behaviour which will support the strategy is absent from all but two processes (Bitton, 1990, Neely et al., 1996) but the benefits of this approach are well documented (Neely et al., 1997).
Therefore, the two requirements of the design phase are identifying the key objectives to be measured and designing the measures.

For the purpose of categorisation, implementation is defined as the phase in which systems and procedures are put in place to collect and process the data that enable the measurements to be made regularly. This may involve computer programming to trap data already being used in the system and present them in a more meaningful form. It may involve initiating new procedures, so that information currently not recorded is captured and it may involve completely new initiatives, such as the setting up of a regular customer or employee survey.

The use of performance measures is split into two main subdivisions. First, as the measures are derived from strategy, the initial use to which they should be put is that of measuring the success of the implementation of that strategy (Vitale and Mavrinac, 1995; Kaplan and Norton, 1996). Second, the information and feedback from the measures should be used to challenge the assumptions and test the validity of the strategy (Eccles and Pyburn, 1992; Kaplan and Norton, 1996; Feurer and Chaharbaghi, 1995). In fact, authors have argued that they should be used for both purposes (Grady, 1991; Feurer and Chaharbaghi, 1995; Kaplan and Norton 1996). Therefore, “assessing the implementation of strategy” and “challenging the strategic assumptions” are the two main subdivisions of the use of the performance measures.

It should be noted that these phases of design, implementation and use are conceptual. This is the sequence of phases through which the performance measurement system should progress. However, the phases can overlap as different individual measures are implemented at different rates. Thus, some measures can be implemented before all the measures have been completely designed, and from the authors’ experience, it is often the case that there is an overlap between implementation and use.

Further, the process is not a simple linear progression from system design to the use of performance measures for challenging strategy. The performance measurement system requires developing and reviewing at a number of different levels as the situation changes. For example:

(1) The performance measurement system should include an effective mechanism for reviewing and revising targets and standards (Ghalayini and Noble, 1996).

(2) The performance measurement system should include a process for developing individual measures as performance and circumstances change (Maskell, 1989; Dixon et al., 1990; McMann and Nanni, 1994).

(3) The performance measurement system should include a process for periodically reviewing and revising the complete set of measures in use. This should be done to coincide with changes in either the competitive environment or strategic direction, (Wisner and Fawcett, 1991; Dixon et al., 1990; Lingle and Schiemann, 1996)
The performance measurement system should be used to challenge the strategic assumptions. Therefore, the framework developed here (see Figure 1) has two functions. First, it segments the phases of implementation, distinguishing between design, implementation and use of the performance measures. Second, it proposes that four additional processes are required to update the performance measurement system over time. These are subsequently referred to as the "updating processes".

This framework leads us to ask two questions respectively:

1. Is the distinction between the phases of design, implementation and use useful?
2. Are the four updating processes important for the continued health and validity of the performance measurement system?

These two questions are addressed as follows. First, the longitudinal case studies are used to describe the actual phases of design, implementation and use and the obstacles to progress are presented to illustrate differences between the phases. Second, a single case is used to illustrate the updating processes.

The longitudinal studies
This research was undertaken as part of the ongoing testing of the Neely et al. (1996) process. Initially, six manufacturing companies were selected with the specific objective of investigating how the process might be tailored for different circumstances and how the use of the measures becomes embedded in the business. However, only three companies (companies A, B and C) progressed from designing the measures through to successful implementation (see Bourne et al., 1999) and as a result, these were the three companies available for longitudinal study.

The three case studies began in the first quarter of 1996. The senior management teams of each company were facilitated through the process by two academic facilitators. The research was based on an "action research intervention" but used a structured methodology (see Bourne et al., 1999) which adopted Yin’s (1994) framework for case study research with the design of data collection instruments informed by the work of Pettigrew et al. (1989) and Platts (1994). Data were therefore collected on organisational context, the intervention process and the performance measurement content, with process data collection focusing on Platt’s (1994) 4 Ps (point of entry, project management, procedure and participation).

The findings presented here are from three sources: first, through direct involvement in the facilitation of the design process; second, by participant observation of the development of the performance measurement systems through attending the management meetings at which the performance measures were reviewed; and third, from conducting post process semi-structured interviews with the senior management teams of each of the companies.
Before analysing the cases, one important observation should be made. In all three cases, it took a considerable length of time to progress from design, through implementation to the measures being used (see Figure 2). In all three cases, the initial performance measurement system design was completed over a period of four months in four or five facilitated half-day workshops. However, it then took another 9 to 13 months before the performance measures reached the stage of being regularly measured, reviewed and displayed.

In the following sub-sections we start by describing the framework’s phases of design, implementation and use before going on to analyse the main obstacles to progress.

System design
The approach taken to the design of the performance measurement system followed the tools and procedures described in Neely et al. (1996). This involved two academic facilitators taking the senior management team of three companies through an analysis of their business over a period of four to five facilitated workshops using a series of specific tools. The tools help the team reassess their strategy by systematically identifying both customer and stakeholder needs before blending these to develop a new set of top level objectives for the business. In later parts of the process, the tools are used to help structure the design of new performance measures and as a framework to manage the review of the final set of performance measures. During the workshops the facilitator took the role of “process consultant” (Schein, 1969). Consequently, the resulting performance measures were developed by the management team from their analysis of their own business rather than being imposed by a third party “expert”.

System design closely followed the expected time scales for this phase. This is attributed to the highly structured approach used for the design phase, which
allowed the regular workshops to occur as planned. However, in Company C, the project was opposed by a senior manager, which slowed progress in the latter stages of design and early stages of measurement.

Implementation of measures
Implementation of the individual performance measures can be viewed as a simple process of data collection, collation, sorting and distribution. All these tasks are mechanistic in nature requiring either new manual procedures to be implemented or computer programmes to be written to provide the information automatically. Although manual methods can be used for individual investigations, performance measurement systems requiring regular reporting are best automated. The computer systems in each of the three companies had an impact on the implementation of the performance measures and this is discussed further below.

Use of the measures
The framework distinguished between “use of measures to assess the implementation of strategy” and “use of measures to challenge strategic assumptions”. Here we will focus on the former use of performance measures leaving the challenging of strategic assumptions for consideration as part of the updating processes.

Implementation of the individual measures does not create a performance measurement system. Measuring is only one part of using the measures. A forum is needed to review the measures and ideally to agree action. To do this a regular meeting is required, attended by the directors and managers who have responsibility for the performance being measured.

In all three companies the forum for the review was similar. The meetings were held monthly and attended by the managing director and his directors or senior functional managers. Each meeting reviewed the majority of the measures on overhead projector slides, progress was discussed and action agreed where necessary. In companies B and C, review of the measures was grafted on to an existing monthly management meeting (although in company B, the measures did become the main focus of this management meeting within the year) whereas in company A the review was undertaken in a specific performance measurement meeting from the start.

These performance measurement reviews took time to develop. Besides the difficulties with computer systems, causing information on certain measures to be unavailable, it took time to adjust to this format. Part of this was attributed to resistance to the measurement process (see below), but delays could have resulted from inadequate tools and procedures for managing this transition.

Obstacles to implementation
An analysis of the case study results and post process interviews revealed that there were three main obstacles to the full implementation of the performance measures. These were:
(1) resistance to measurement, occurring during design and use phases;
(2) computer systems issues, occurring during implementation of the measures;
(3) top management commitment being distracted, occurring between the design and implementation phases.

These are now described in turn.

Resistance to measurement has been noted in the past (Deming, 1986) but is rarely commented upon in the performance measurement literature. Resistance is often difficult to observe as those resisting take care to conceal their actions. Resistance to the design phases was observed in company C and cited in company B as a reason for slow progress in implementing and using the measures. These two aspects are now described.

In company C, one long serving member of the senior management team was outspoken in his resistance to the whole project. He voiced his views regularly in the meetings, directly questioned the industrial competence of the facilitators in a workshop and on one occasion was talked down in front of the whole group when his interruptions got out of hand. He had discussions with the managing director about his concerns and objections both at work and "down the pub", but his resistance persisted to the extent that he called an unofficial meeting of his staff to get their support in resisting the project. It is arguable that with such a vocal objector, others who held similar views might well go unnoticed. Similarly, their resistance might be concealed until they observed the outcome of this situation. The situation was handled delicately by the managing director, who did not want to lose a good member of staff or be seen to be acting too precipitously, but this undoubtedly slowed the implementation of the project. Eventually, following another unrelated incident, the senior manager had his contract of employment terminated. The project was then observed to quickly move ahead. The change in pace was attributed to this action, which sent a clear message that the senior management were commitment to the project.

During interviews after the project, a general resistance to measurement was identified by the managing director of company B as the main reason for slow progress. He commented:

There were two real problems with implementing the measures. The first was getting the management to feel happy with the measures. It is easy to feel threatened by them and they needed to be persuaded that it was good for the business and not a threatening activity. The measures should help them and not hinder them in their task. . . . this was the main obstacle.

As stated previously, resistance is often difficult to observe, especially by a researcher visiting relatively infrequently, even if over an extended period. On reflection, the implementation of a new performance measurement system can be seen as "changing the rules of the game" or redistributing power in the organisation. Individuals and groups may see this as not being in their best interest and actively or passively resist the implementation.
As previously stated, the computer systems had an impact on the implementation of the performance measures.

Company C’s main computer system was not on site, but based at its head office. Although the system itself was ageing, one feature was of great assistance in developing the performance measures. The system included a report generator which allowed the operating managers at company C to download selected information directly into spreadsheets on their local personal computers. As a result, data access posed no difficulty and the manipulation of the data for display purposes was done using the spreadsheet’s standard graphical facilities.

Company B, on the other hand, were in the process of upgrading their software and implementing a new database. As the system was new, managers did not know how to access the data. This problem was compounded by the discovery that the report writer software could corrupt the information on the database. Consequently, a decision was made to restrict the use of the report writer to the IT staff and the implementation of the measures was delayed whilst the reports were written.

Company A also had a new computer system which was not performing as expected, but the company was not large enough to employ full time IT professionals. Inability to access the data was the initial excuse made by managers who had not calculated their measures. In company A, the problem was overcome by manually calculating the measures from existing reports and then entering the results into a spreadsheet to produce the measures in graphical form.

On reflection, it could be argued that these three cases not only illustrate the impact of computer systems on the implementation of the performance measures, but also how the cost of measurement affected the solutions chosen. Company A’s solution of manually calculating the measures was only possible because it produced a relatively low volume of industrial products. The measures could be quickly calculated by hand each month. Company B, on the other hand, produced a higher volume of lower value industrial components and was reliant on the computer system as the volumes were too high to be efficiently calculated by hand regularly. Company B had to wait for the software modifications to be completed before implementing the measures. Finally, company C produced very high volumes of consumables and the authors believe it would have been unable to continue with implementing the performance measures if it had been in the position of either of the other two companies.

The distraction of other events was also identified as an obstacle. In company A, senior management’s commitment waned at a critical stage in the project. The company had recently had a change of owners and this precipitated the senior management team being allowed to implement their restructuring plan to reduce the overheads of the company. The plan had been previously blocked by the old owners. Consequently, for a period of six months, management attention was focused elsewhere, as this project took priority, and the performance measurement project probably only survived as the direct
result of the researchers contacting the company to obtain further case study data. By this time, the restructuring was complete and the managing director was keen to re-establish the performance measures and move the implementation forward.

Senior management commitment is considered essential by many for the successful implementation of change (Frizelle, 1991; Kotter, 1995; Conner, 1998). Given the length of time required for the implementation of the performance measures observed above, it is not surprising that senior management find other more pressing priorities. The consequence in company A was a delay to the project implementation. It can be argued that in other situations with similar circumstances the project would have stopped altogether.

**Updating processes**

In the previous section, the three phases of design, implementing and use of a performance measurement systems were described together with three main obstacles which were identified as hindering progress. In this section, the focus moves from the initial development of the performance measurement system to the updating processes proposed in the framework.

Here, the importance of these four updating processes is assessed through focusing on one case study. Company A is chosen as it is the most advanced in terms of its updating activities.

**Updating processes in company A**

Figure 3 shows the initial balanced scorecard of performance measures implemented by the senior management team as a result of undertaking the performance measurement process, and Figure 4 shows the balanced scorecard in March 2000. Both figures have been annotated to highlight measures deleted

---

**Figure 3.**
Company A’s balanced scorecard at 25 June 1997
Performance measurement systems

(D), measures replaced (R), changes in target (T) and changes in the definition of the measure (M). Table I shows these changes in more detail, categorised by the first three levels of change identified in the framework.

Table I highlights two different aspects of the updating of the performance measures. First, the measures evolved (denoted by an E in Table I) through the management team reflecting on their use of the measures. Second, targets, measures and the set of measures changed as a result of the review process (denoted by a P). These happened as part of the annual budgeting process, by chance (September 1997, see below), as the result of an opportunity to test an audit process (September 1998) and eventually by design (January 2000).

Challenging strategy in company A

The second use of performance measurement cited in the literature and incorporated in the framework was “challenging the strategic assumptions”.

In company A, the set of measures (see Figure 3) was developed using the performance measurement design process and agreed by the senior management team. They therefore believed that the measures fitted their strategy. This fit was actually put to the test when a more explicit version of the strategy was developed independently to the performance measurement process through “challenge mapping” (a process similar to that proposed by Eccles and Pyburn (1992) which creates a cause and effect map of challenges to be overcome in order to achieve the strategic goal of the business). When the authors discovered the challenge map, they intervened as they were concerned that the existing measures might no longer be aligned with the new strategy. The form of the intervention was a reconciliation between the new “challenges” and the old measures.

The strategy was to profitably grow through acquiring market share and becoming the dominant supplier in specific markets. Market share (which was

Figure 4.
Company A’s balanced scorecard at 13 March 2000
<table>
<thead>
<tr>
<th>Type of change</th>
<th>Reason for change</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing targets</td>
<td>Updated automatically as part of budgeting process</td>
<td>“Profitability”, “invoiced sales” and “order intake”</td>
</tr>
<tr>
<td></td>
<td>Increased when performance approached the target and the management team agreed that a more challenging target would be beneficial</td>
<td>“On-time delivery” and “sales activity”</td>
</tr>
<tr>
<td></td>
<td>Made more challenging to meet a business need</td>
<td>Appraisal time scales were cut to increase the speed of rolling out the company objectives</td>
</tr>
<tr>
<td></td>
<td>Made more challenging based on external information</td>
<td>The “value added per-employee” target was increased as a result of a benchmarking exercise and changed at a formal review in January 2000</td>
</tr>
<tr>
<td>Developing measures</td>
<td>Deleted when they were not considered worth the effort</td>
<td>“Lost orders” and “time spent on research”</td>
</tr>
<tr>
<td></td>
<td>Deleted when measures were found not to track the objective</td>
<td>Reducing the size of supplier base was an objective and the proxy measure developed was the “number of cheques drawn” each month. This was found not to reflect the number of active supplier accounts</td>
</tr>
<tr>
<td></td>
<td>Replaced when they were no longer seen as critical</td>
<td>“Cash flow” – replaced by “value added per employee” – the managing director’s choice after the strategy review in September 1997</td>
</tr>
<tr>
<td></td>
<td>Replaced as the tactical emphasis changed</td>
<td>“New customer enquiries” were replaced by “new customer quotations” as emphasis moved from managing the generation of the enquiries to managing the follow up activities</td>
</tr>
<tr>
<td></td>
<td>Replaced as processes improved</td>
<td>“Order forecasting” went through several phases of evolution as attempts were made to make this measure meaningful. “R&amp;D slippage” became “Stage gates on-time” as the result of a time to market process re-engineering exercise</td>
</tr>
<tr>
<td></td>
<td>Modified as the scope of the measures were increased either because of perceived problem or reviewing measures</td>
<td>“Order quality” originally only measured the quality of unit orders but was extended to include spares; “on-time delivery” was extended to include systems after audit; “forecast accuracy” revised as result of review</td>
</tr>
<tr>
<td>Reviewing measures</td>
<td>Following prompting after “challenge mapping exercise” – September 1997</td>
<td>Strategy reviewed but initially the measures were not. An intervention was made to rectify this and check the measures against the strategy. As a result, the measures were unchanged but added to the challenge map</td>
</tr>
<tr>
<td></td>
<td>Following an opportunity to test the reference model audit (Bititci et al., 1998) – September 1998</td>
<td>Highlighted problems with systems business measurement, product development, sales activity; and supplier measures</td>
</tr>
</tbody>
</table>
|                | Following the managing director reading an early draft of this framework – January 2000 | Changes to targets (“value added per employee” and “order forecast”); changes to measure definition (“order forecast”); addition of new measures (“training needs met” and “rework”)

Table I.
Updating company A’s performance measurement system
assessed but not capable of being measured accurately) was seen as the key to reducing price competition, reducing costs through higher volumes and hence realising higher profitability. At the outset, it was believed that achieving high levels of operating excellence on key variables (the specific measures – on-time delivery, customer complaints, warranty returns) combined with focused sales activity would achieve this. A key measure of the success of this strategy was seen as increasing value added per employee.

Throughout the period from September 1997 to March 2000, value added per employee was virtually constant, indicating that the strategy was not working. During the same period improvements occurred in on-time delivery, order quality and warranty returns of the main products, indicating that some progress was being made in operating excellence, and customer satisfaction surveys showed that although performance was only perceived as “good” it was better than the competition on the important dimensions. The sales activity measures showed that despite significant effort, creating a market in industries not using the product and winning new customers from competitors was not occurring as quickly as expected.

Consequently, over time, discussions of performance and reflections on progress challenged the basic assumption that operating excellence alone was going to deliver the strategic aims.

Discussion and conclusions
The case data presented here suggest that the task of implementing and using a performance measurement system is far from complete at the end of the design phase and there are obstacles to further progress. The 9 to 13 month timescale required in these case study companies has been attributed to problems with IT infrastructure, resistance to measurement and management being distracted by other events. One research goal should be to reduce these time scales to ensure that companies realise the benefits of performance measurement earlier, and in doing so, reduce the chance of the project being overtaken by other events.

The design of a performance measurement system is principally a cognitive exercise, translating views of customer and other stakeholder needs into business objectives and appropriate performance measures. There is now a growing literature on this specific topic and the consistency of the progress through the workshops during this study suggests that this process is becoming understood.

Implementation is primarily a mechanistic exercise and should be susceptible to being managed by classic project management tools. The speed of progress should be increased by earlier involvement of IT specialists, application of data retrieval and manipulation tools and allocation of resource.

The development of the use of the measures is a different problem. This is a phase of development lightly researched and few tools and techniques are currently available. Being a “soft” problem in change management terms (McCalman and Paton, 1992), the solution requires more than the simple application of project management techniques. Implementing a performance
measurement system redistributes access to information which can be seen as threatening to senior managers whose power base is altered, therefore it is probably not surprising that resistance to performance measurement was observed. Skills also need to be developed in critiquing and learning from the performance measures in a group. These changes naturally take time as besides development of the group learning skills, the rate of change itself (Conner, 1998) and having time to let go of the old regime before embracing the new (Marris, 1974), are also important factors.

The conclusion reached here is that the framework’s phases of design, implementation and use of the performance measurement system are useful. First, they allow the whole to be split into phases which require different approaches. Second, from an academic viewpoint, they highlight the lack of research in the latter two phases, the implementation and use of performance measures.

Besides the three phases, the framework prescribed that there are four processes required to review and update the performance measurement system. The case study showed that the targets and measures can evolve naturally during the use of the measures but, if unchecked, this evolution may lead to the performance measures diverging from strategy. The case also showed an example where the strategy was reviewed without considering the consequences for the performance measures. Again, if this type of activity continued unchecked, there is the danger that the old performance measures will conflict with new strategy.

In management accounting, the annual budgeting process is designed to align individual financial measures with the profit plan for the coming year. Given that the whole basis for performance measurement is that improvements in non-financial measures drive financial performance (Kaplan and Norton, 1996), it must be inappropriate to update financial targets without updating the non-financial performance measures at the same time, but this is what occurred in company A in the two years prior to the January 2000 review.

The conclusion reached here is that if strategy and measures are to remain in alignment, processes are required to regularly review the measures against the strategy. The categorisation of reviewing the targets, measures and set of measures proved useful for the management team and resulted in the widest single change to the measurement system since its initial design. This suggests that a regular performance measurement review process is required that focuses on the key aspects of targets, measure definitions and the set of measures.

Finally, the case example presented showed how over time the use of the performance measures started to question the strategic assumption being made. The questioning was guided by the fact that the management had identified a measure of success and key indicators which tracked implementation of the strategy. This suggests that the more precisely the strategy and its underpinning assumptions are defined, the greater the chance of identifying problems in execution or mistaken assumptions. This leads us to the conclusion that creating the mental model suggested by Eccles and Pyburn
(1992) is the first step in creating a testable strategy. The second step is to
develop a process which compares the model with the results of the
performance measurement system, so creating the situation where the strategy
is really tested. But this can only be done if the measures are constantly
updated and refined as proposed by the other three updating processes.
Therefore, the validity of the model is dependent on all four updating processes
being used.

References
No. 3, pp. 77-85.
measurement system”, Control, April, pp. 9-13.
Bitton, M. (1990), “Méthode de conception et d’implantation de systèmes de mesure de
performances pour organisations industrielles”, Thèse d’ automatique, Université de
Bordeaux I.
Bourne, M.C.S., Mills, J.F., Bicheno, J., Hamblin, D. J., Wilcox, M., Neely, A.D. and Platts, K.W.
(1999), “Performance measurement system design: testing a process approach in
manufacturing companies”, International Journal of Business Performance Measurement,
Vol. 1 No. 2, pp. 154-70.
Conner, D.R. (1998), Managing at the Speed of Change: How Resilient Managers Succeed and
Prosper Where Others Fail, John Wiley & Sons, Chichester.
Deming, W.E. (1986), Out of Crisis, Massachusetts Institute of Technology, Centre for Advanced
Engineering Study, Cambridge, MA.
Operations for World-class Competition, Business One Irwin, Homewood, IL.
Management Accounting (US), October, pp. 41-4.
Measurement in Service Businesses, The Chartered Institute of Management Accountants,
London.
Production and Inventory Management Journal, 2nd Quarter, pp. 52-6.


