



A framework of the factors affecting the evolution of performance measurement systems

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Abstract *The effectiveness of performance measurement is an issue of growing importance to industrialists and academics alike. Many organisations are investing considerable amounts of resource implementing measures that reflect all dimensions of their performance. Consideration is being given to what should be measured today, but little attention is being paid to the question of what should be measured tomorrow. Measurement systems should be dynamic. They have to be modified as circumstances change. Yet few organisations appear to have systematic processes in place for managing the evolution of their measurement systems and few researchers appear to have explored the question, what shapes the evolution of an organisation's measurement system? The research reported in this paper seeks to address this gap in the literature by presenting data that describes the forces that shape the evolution of the measurement systems used by different organisations.*

Introduction

Although it has long been recognised that performance measurement has an important role to play in the efficient and effective management of organisations, it remains a critical and much debated issue. Significant management time is being devoted to the questions – what and how should we measure – while substantial research effort, by academics from a wide variety of management disciplines, is being expended as we seek to enhance our understanding of the topic and related issues (Neely, 1999).

Survey data suggest that between 40 and 60 per cent of companies significantly changed their measurement systems between 1995 and 2000 (Frigo and Krumwiede, 1999). Most of these initiatives, however, appear to be static. Although many organisations have undertaken projects to design and implement better performance measures, little consideration appears to have been given to the way in which measures evolve following their implementation (Waggoner *et al.*, 1999). It is important that performance measurement systems be dynamic, so that performance measures remain relevant and continue to reflect the issues of importance to the business (Lynch and Cross, 1991).



In order to ensure that this relevance is maintained, organisations need a process in place to ensure that measures and measurement systems are reviewed and modified as the organisation's circumstances change (Dixon *et al.*, 1990). Yet few organisations appear to have systematic processes in place for managing the evolution of their measurement systems and few researchers appear to have explored the question – what shapes the evolution of an organisation's measurement system.

The research reported in this paper seeks to address this gap in the literature by presenting a framework that describes the forces that shape the evolution of the measurement systems used by different organisations.

Following this introduction the paper consists of a further six sections. The next section discusses the literature regarding the evolution of performance measurement systems, providing the context for the research. Descriptions of the research methodology, the case study findings and the resultant framework of factors affecting the evolution of performance measures are then presented. The subsequent discussion is followed by conclusions that are drawn in the final section.

Performance measurement literature

The problem of how organisations should assess their performance has been challenging management commentators and practitioners for many years. Financial measures have long been used to evaluate performance of commercial organisations. By the early 1980s, however, there was a growing realisation that, given the increased complexity of organisations and the markets in which they compete, it was no longer appropriate to use financial measures as the sole criteria for assessing success.

Following their review of the evolution of management accounting systems, Johnson and Kaplan highlighted many of the deficiencies in the way in which management accounting information is used to manage businesses (Johnson, 1983; Kaplan, 1984; Johnson and Kaplan, 1987). They highlighted the failure of financial performance measures to reflect changes in the competitive circumstances and strategies of modern organisations. While profit remains the overriding goal, it is considered an insufficient performance measure, as measures should reflect what organisations have to manage in order to profit (Bruns, 1998). Cost focused measurement systems provide a historical view, giving little indication of future performance and encouraging short termism (Bruns, 1998).

The shortcomings of traditional measurement systems have triggered a performance measurement revolution (Eccles, 1991; Neely, 1999). Attention in practitioner, consultancy and academic communities has turned to how organisations can replace their existing, traditionally cost based, measurement systems with ones that reflect their current objectives and environment. Many authors have focused attention on how organisations can design more appropriate measurement systems. Based on literature, consultancy experience and action research, numerous processes have been developed that organisations

can follow in order to design and implement performance measurement systems (Bourne *et al.*, 1999). Many frameworks, such as the balanced scorecard (Kaplan and Norton, 1992), the performance prism (Kennerley and Neely, 2000), the performance measurement matrix (Keegan *et al.*, 1989), the results and determinants framework (Fitzgerald *et al.*, 1991), and the SMART pyramid (Lynch and Cross, 1991) have been proposed that support these processes. The objective of such frameworks is to help organisations define a set of measures that reflects their objectives and assesses their performance appropriately. The frameworks are multidimensional, explicitly balancing financial and non-financial measures.

Furthermore, a wide range of criteria has also been developed, indicating the attributes of effective performance measures and measurement systems. These include the need for measures to relate directly to the organisation's mission and objectives, to reflect the company's external competitive environment, customer requirements and internal objectives (Globerson, 1985; Wisner and Fawcett, 1991; Maskell, 1989; Kaplan and Norton, 1993). Others make explicit the need for strategies, action and measures to be consistent (Lynch and Cross, 1991; Dixon *et al.*, 1990).

At the heart of the processes, frameworks and criteria discussed, as with much that has been written on the subject of performance measurement, is the premise that measures and measurement systems must reflect the context to which they are applied (Neely, 1999). Indeed as Johnson (1983) observed, the introduction of financial performance measures, such as cash flow and return on investment, reflected the changing marketplace in which organisations competed. At the turn of the century sole traders were giving way to owner managers who needed to assess the return on their investment in plant and premises.

The performance measurement revolution has prompted many organisations to implement new performance measurement systems, often at considerable expense. However, unlike the environment in which organisations operate, many measurement initiatives appear to be static. Senge (1992) argues that, in today's complex business world, organisations must be able to learn how to cope with continuous change in order to be successful. Eccles (1991) suggests that it will become increasingly necessary for all major businesses to evaluate and modify their performance measures in order to adapt to the rapidly changing and highly competitive business environment. Numerous authors espouse the need for reflection on measures to ensure that they are updated to reflect this continuous change (Meyer and Gupta, 1994; Ghalayini and Noble, 1996; Dixon *et al.*, 1990; Wisner and Fawcett, 1991). However, there has been little evidence of the extent or effectiveness with which this takes place. Moreover, the literature suggests that ineffective management of the evolution of measurement systems is causing a new measurement "crisis", with organisations implementing new measures to reflect new priorities but failing to discard measures reflecting old priorities resulting in uncorrelated and inconsistent measures (Meyer and Gupta, 1994). Furthermore, it is suggested

that organisations are drowning in the additional data that is now being collected and reported (Neely *et al.*, 2000). As with measurement systems introduced at the turn of the century, there is a danger that failure to manage effectively the way in which measurement systems change over time will cause new measurement systems to lose their relevance, prompting a new crisis and necessitating a further measurement revolution.

This raises a crucial question. Why do performance measurement systems fail to change as organisations change, rendering them irrelevant? This is an important question to answer if history is not to be repeated and organisations are to avoid the expense of another extensive overhaul of their measurement systems.

Wisner and Fawcett (1991) acknowledge the need for performance measures to be reviewed and changed to ensure that measures remain relevant in the last step of their nine step process. They highlight the need to “re-evaluate the appropriateness of the established performance measurement systems in view of the current competitive environment”. Bititci *et al.* (2000) identify the need for performance measurement systems to be dynamic to reflect changes in the internal and external environment; review and prioritise objectives as the environment changes; deploy changes in objectives and priorities; and ensure gains achieved through improvement programmes are maintained.

Dixon *et al.* (1990) and Bititci *et al.* (2000) propose audit tools that enable organisations to identify whether their existing measurement systems are appropriate given their environment and objectives.

Bititci *et al.* (2000) go on to posit that a dynamic performance measurement system should have:

- an external monitoring system, which continuously monitors developments and changes in the external environment;
- an internal monitoring system, which continuously monitors developments and changes in the internal environment and raises warning and action signals when certain performance limits and thresholds are reached;
- a review system, which uses the information provided by internal and external monitors and the objectives and priorities set by higher level systems, to decide internal objectives and priorities; and
- an internal deployment system to deploy the revised objectives and priorities to critical parts of the system.

Bourne *et al.* (2000) suggest measurement systems should be reviewed and revised at a number of different levels. They identify the need for review of targets and performance against them; individual measures as circumstances change; and the set of measures to ensure that they reflect the strategic direction.

Although the authors discussed above propose the need to review measures and suggest techniques for such review, there is little discussion of their

application in practice, investigation of how measures actually change or of the factors that affect how effectively and efficiently performance measurement systems change. With a few notable exceptions (Meyer and Gupta, 1994; Townley and Cooper, 1998; Bourne *et al.*, 2000), empirical investigation of the evolution of measurement systems over time remains a considerable gap in performance measurement research (Neely, 1999).

Meyer and Gupta (1994) observe that measures tend to lose their relevance and ability to discriminate between good and bad performance over time as performance objectives are achieved or as behaviour no longer reflects the performance objectives underpinning the measures. They observe that failure to effectively manage this change causes the introduction of new measures “that are weakly correlated to those currently in place” so that an organisation will have a diverse set of measures that do not measure the same thing.

Townley and Cooper (1998) undertook a longitudinal study of performance measurement in Alberta government in Canada. They observed that support for performance measurement can diminish over time. They observe that measurement initiatives can suffer from loss of initial enthusiasm, which is replaced by scepticism and disillusionment. They cited a number of causes of this including failure to manage the change appropriately, underestimating the effort required and lack of commitment to the change. They also identified that political issues and the involvement of employees affect success. Not only does their study identify factors affecting the success of performance measurement activities, but it also highlights the need for support of such activities within the organisation.

In a case study company, Bourne *et al.* (2000) observed that performance measures changed over time. They identified that changes were prompted by existing budgetary review processes, chance, intervention of the researchers and eventually by design, however they provide little insight into how this change by design took place.

Despite the limited discussion of evolution in the performance measurement literature, it is possible to draw lessons from a variety of other streams of literature that address issues relating to the management of change (Waggoner *et al.*, 1999).

Based on a review of the relevant literature, Waggoner *et al.* (1999) summarise the key forces driving and demanding change as: customers, information technology, the marketplace, legislation (public policy), new industries, nature of the work (e.g. outsourcing) and future uncertainty. However, many authors also identify barriers to change that have received little attention in the performance measurement literature.

Gabris (1986) identifies four categories of such barriers:

- (1) process burden, where processes such as performance measurement take employees away from their actual responsibilities;
- (2) internal capacity, where organisations lack the in-house capability to support an initiative;

- (3) credibility anxiety, where organisations suffer from an overload of management techniques; and
- (4) the “Georgia giant syndrome”, where management techniques work only under rigorous and closely supervised control conditions.

These factors can be considered to be the organisation’s readiness for change (Waggoner *et al.*, 1999). Furthermore, Kotter (1996) argues that willingness or urgency to change throughout the organisation is necessary for such change to be effective.

Greiner (1996) categorises inhibiting factors as institutional, pragmatic, technical and financial. Numerous authors (such as Scott, 1995 and Pettigrew and Whipp, 1991) also highlight that the political nature of organisations requires further consideration, one of a number of factors demonstrating the impact that corporate culture can have on evolutionary change (Tichy, 1983).

The literature reviewed highlights the importance of managing the evolution of performance measurement systems to ensure that they continue to reflect the environment and objectives of the organisation. The literature suggests that the factors affecting evolutionary change within organisations, and hence the evolution of performance measures, are many and complex. However, these issues can be grouped into two main themes:

- (1) drivers of change (those factors that cause change to be necessary); and
- (2) barriers to change (those factors that must be overcome if change is to be effective).

These issues are summarised in Figure 1.

The research reported in this paper seeks to investigate these drivers of, and barriers to, evolution as they apply to performance measurement systems.

Methodology

A multiple case study approach was used to investigate the way in which performance measures actually evolve within organisations. The research involved semi-structured interviews with a total of 25 managers from a range

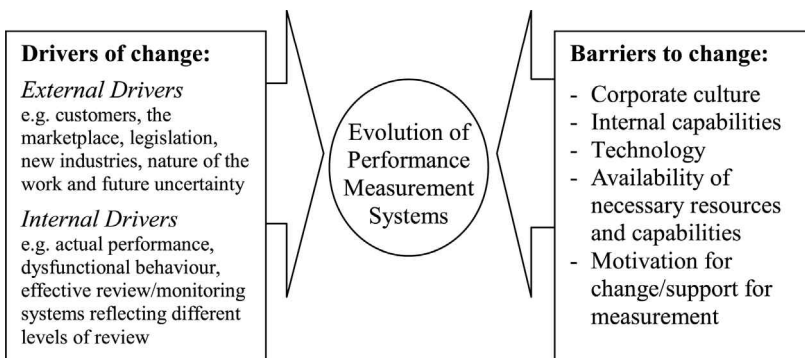


Figure 1.
Summary of factors
affecting evolution
drawn from the
literature

of management functions, from seven different organisations. The companies involved in the research were from the industries shown in Table I.

The interview structure was designed to investigate the key themes identified from the literature reviewed. As such the case studies sought to answer the following questions:

- What factors encourage the introduction of new measures, modification of existing measures and deletion of obsolete measures?
- What factors inhibit the introduction of new measures, modification of existing measures and deletion of obsolete measures?

The companies were selected on the basis of their considerable experience in the implementation and use of performance measures. Companies from different industry sectors and with a wide variety of competitive and organisational characteristics were deliberately chosen to introduce diversity into the sample. This enabled the identification of factors affecting evolution of measurement in a variety of different circumstances. Similarly, interviewing managers from a number of different departments ensured that consideration was given to the diversity of factors affecting evolution in different functional circumstances. As a result the findings of the case studies provide a broad understanding of the factors affecting the evolution of an organisation's performance measures.

Case study findings

There was general consensus among the managers interviewed of the need for performance measures to evolve over time, so that they reflect the changing circumstances and requirements of the organisation.

The group technical and quality director of company 7 stated that: "ensuring that performance measures continue to reflect the issues that are important to the organisation is important if measurement is to be useful and help management".

The consultancy sales manager of company 2 stated that: "the evolution of measures ensures that they increase in sophistication and change to reflect the changes in behaviour we want to achieve".

The systems analyst from company 6 indicated that: "evolution enables us to tackle soft issues and develop hard measures to reflect how well we are doing".

Company	Industry
1	Maintenance of transport infrastructure
2	Supplier of IT services
3	Supplier of stationary to retail and commercial sectors
4	Courier/global package delivery
5	Utility – energy generation and supply
6	Manufacturer of food packaging
7	Manufacturer and supplier of printing machinery

Table I.
Companies involved in
the research and their
industry

Although the need for performance measures to evolve over time was recognised, the evolution of measures was managed with varying degrees of success. Findings from each of the organisations are now discussed in turn.

Company 1

In the past, company 1 had been unable to manage effectively the evolution of performance measures. The lack of flexible information systems and inertia throughout the organisation were found to be the main barriers to the effective management of legacy measurement systems. The problems prompted a company-wide initiative to establish effective performance measurement, explicitly addressing problems that had previously been experienced. The managing director was the major driving force behind the initiative and extensive use was made of existing and accepted communication tools to ensure performance measurement had the appropriate credibility. As the human resources manager remarked: “Effective use of the measurement system is due to the managing director’s promotion of the need for and importance of measurement and his use of measurement to manage and communicate”.

The managing director highlighted the need for flexible systems “None of the commercial performance measurement software provided the required support – you must have a system that satisfies your requirements”. In-house information systems were developed to provide data collection, analysis and reporting systems giving flexibility not provided by systems available on the market. Addressing these issues, and integrating performance measurement into the strategy development and review process, provided the organisation with a measurement system that they believed would evolve with the business’s requirements.

Company 2

Although performance measurement systems had been implemented in company 2 for a number of years, failure to actually use new performance measures to manage the business was seen as major barrier to their deployment and hence evolution. Although senior management had backed the implementation of a balanced set of measures, the continued emphasis on financial performance measures prevented use of the balanced measurement system being embedded throughout the organisation. As in company 1, company 2 used experiences of ineffective measurement practices in the past to design a measurement system with the attributes that they considered necessary to maintain a relevant set of performance measures in the future. To ensure that their measures remained relevant, managers in company 2 explicitly included a review of measures in the periodic review of business processes.

The head of business process development highlighted the importance of having the appropriate systems to facilitate measurement activity and the evolution of measurement systems. “New systems have been designed from scratch to be flexible enabling measures to be changed easily. The system being Web-based enables worldwide access to all information allowing

information sharing. This facilitates benchmarking and the transfer of best practice. The global availability of the same reporting systems enables commonality of approach”.

Furthermore he highlighted that: “reporting needs to be efficient to reduce the resources required to administer measurement, allowing resources to be dedicated to acting on the results.” The system was designed to enable efficient and effective data collection and reporting, minimising the effort of measurement to ensure acceptance throughout the organisation.

According to the consultancy sales manager: “Benchmarking of performance against competitors (including those in new markets) has given a common understanding of the need to improve and where improvement should be focused. This has reduced any resistance to the change of performance measures as the need can be demonstrated.” This enabled the organisation to overcome some of the people issues that had limited the development of performance measurement activities in the past.

Company 3

The evolution of measures was not effectively managed in company 3. “The culture at [company 3] is a barrier to the implementation of a consistent approach to measurement across the whole company.” The *ad hoc* approach to performance measurement that was adopted led to inconsistency in approaches between different business units and geographical locations. The inconsistency in measurement practices limited the comparability of performance data, detrimentally affecting the credibility, and hence acceptance, of performance measures. Despite attempts to change measures to reflect changing business circumstances, managers were reluctant to use non-financial data to manage the business. “The overriding factor affecting the acceptance of performance measurement is that it become a business issue so that it occupies the minds of managers and measures are used to manage the business” (Manager – Stationary Office Supplier). This reflects the need for managers to actively use measures to manage the business. It was found that this would increase their desire to ensure measures changed to remain appropriate, as their performance would be assessed on them.

Inflexible IT systems were also found to be a major barrier to evolution. The European customer care manager specifically noted that: “it is not possible to change the structure and content of the performance reports produced by the mainframe IT system.”

Company 4

The use of performance measurement to manage the business was accepted in company 4. However, the tendency to report too much data and produce too many measurement reports acted as a significant barrier to evolution. The service recovery manager stated: “I spend too much time preparing reports for my manager to take to board meetings. It prevents me from reviewing and updating measures so that they remain current. Most of the reports are never

referred to, they are just a security blanket in case he is ever asked to produce the data.” In the past key individuals had stood in the way of the use of some measures. “This resistance was due to reluctance to provide a better understanding of actual performance for which they were responsible. Removal of the individuals has been the most successful way of eliminating the problem” (Service Recovery Manager).

The availability of people with the appropriate skills to analyse and redefine measures was also identified as an issue. This was particularly the case when individuals responsible for measurement left departments or the company all together. It was recognised that measurement practices could be developed further by planning skills development and ensuring that the appropriate skills were maintained in the areas they were required.

Company 4 also provided an example of the effect of the design of measures on their use. While discussing the graphical representation of one measure, the field service manager explained: “nobody uses this measure as they don’t understand it. I would explain it to you but I don’t understand it either”. As a result the measure was not seen as relevant and was not used.

Company 5

Extensive performance measurement implementation had been undertaken in company 5. However, as in company 2, although senior management had initiated the implementation of new measures, they failed to use the resultant performance measurement data, in favour of traditional financial performance measures. “The previous CEO paid lip service to the scorecard but only really focussed on the financials, hence this is where all attention was focused” (Head of Strategic Planning). As a result the new measures were not considered to be important at other levels of the organisation and they were not effectively used. Measurement reverted to financial measurement and the process of evolution was stifled. This clearly demonstrated the need for top level support for measurement and the need for a change in mindset of management so that measures are used to manage the business.

Company 6

Company 6 provided the best example of managing the evolution of measurement systems. The primary factor facilitating evolution was the availability of resources dedicated to measurement and the management of performance measures. “The availability of a dedicated employee who is responsible for the review of measures enables gaps to be identified and the need to change existing measures as well as identifying performance measures” (Sales Order Manager).

The dedicated systems analyst ensured that measures were reviewed and that action was taken to improve performance and ensure that measures were changed to remain relevant. In addition, “having split responsibility and budget from operations and the IT department enables me to develop systems that would not be justified under either department individually”. This ensured

that systems were flexible enough to change as required. The availability of a manager dedicated to measurement, who had credibility within all areas of the business stimulated measurement activity and helped overcome barriers to the acceptance and evolution of measurement, such as inflexible payroll structures and high staff turnover.

Company 6 highlighted the need to create the appropriate environment in which the use of performance measures is most effective. Weekly meetings to review performance were open and honest discussions of performance, including new issues requiring measurement and identifying new areas of performance on which to focus improvement attention. "It is important to recruit and retain employees who are open to new ideas and are willing and able to implement new performance measures." "Use of neutral measures, that focus on improvement and do not apportion blame, help acceptance and adoption of measures."

Company 7

The lack of a formal review process was considered to be the main reason that the evolution of performance measures was not managed in company 7 ("There is no process to review measures and identify whether or not they are appropriate. That is a major factor affecting whether measures change in line with organisational circumstances"). Within company 7 the leadership of the managing director was clearly the main driver of measurement activity. "The ability and energy of the managing director drive measures and measurement. He prompts other board members to review measures and ensure that they are relevant and appropriate to the business and reflect what is important."

The availability of management time to reflect on measures was also considered to be a major constraint. The group technical and quality director identified that: "In previous years we have had too many measures. We need to focus on fewer important objectives". He also noted that the frequency with which measures are reviewed is dependent on the availability of management time. Similarly the availability of management skills is also a key determinant of the ability to review and modify measures. This will affect when inappropriate measures are identified and the ability to change measures to make them appropriate". He identified the need for systems that could accommodate a hierarchy of measures, reporting the few important measures, but enabling analysis of the many underlying measures of the drivers of performance.

Table II summarises the key factors that facilitate and inhibit the evolution of performance measurement systems in each of the case study companies.

Evidence from the case study companies demonstrates the need for companies to change their performance measures as the organisation's circumstances change. The group technical and quality director in company 7 pointed out: "If people don't think measures are relevant they won't use them, so they won't evolve". This clearly demonstrates that in order for an organisation to have performance measures that evolve over time, they must

Company	Facilitators of evolution	Barriers to evolution
1	<p>Senior management driving measurement activities</p> <p>Development of in-house IT systems</p> <p>Use of accepted communication media to communicate, generate feedback and involve all employees</p> <p>Integration of measurement with strategy development and review</p> <p>Consistent approach to measurement</p>	<p>Off the shelf systems insufficiently flexible</p> <p>Availability of skills to effectively collect and analyse data</p>
2	<p>New Web-based system developed</p> <p>In-house systems provide required flexibility</p> <p>Measurement included in business process review</p> <p>Alignment of rewards to measures</p> <p>Need for measures to evolve considered important</p> <p>Common understanding of objectives and the need to improve</p>	<p>Senior management inertia</p> <p>Measures not used to manage the business</p> <p>Time consuming and costly data collection</p>
3	<p>Enthusiastic champion of measurement</p> <p>Contact with external research bodies to keep up to date with developments in measurement practices</p> <p>Make measurement a business issue – manage with measures</p>	<p>Management inertia</p> <p>Inflexible IT/finance systems</p> <p>Incompatibility of measures/inconsistent approach</p> <p>Culture – <i>ad hoc</i> measurement, no integrated approach or PM function</p>
4	<p>Enthusiastic champion to kick off “measurement revolution”</p> <p>The need for succession planning identified</p>	<p>Individual inertia/resistance to measurement</p> <p>Time wasted producing reports</p> <p>Ability to quantify performance</p> <p>Measures lacking credibility</p>
5	<p>Top level management support is critical</p> <p>User involvement in designing measures</p> <p>Alignment of rewards</p>	<p>Measurement not used to manage the business (need new mind set)</p> <p>Accounting systems focus</p> <p>Inconsistent approach to measurement (due to changes in ownership and management)</p> <p>Lack of flexible systems to collect and analyse data</p>

(continued)

Table II.

Company	Facilitators of evolution	Barriers to evolution
6	<p>Dedicated PM resource (review of measures to ensure action is taken, IT and operational responsibility, credible sponsor) Integrated approach to measurement Open and honest process for reviewing measurement Centres of practice established to share knowledge Involvement of those being measured/local ownership of measures Measures linked to individual objectives Measurement not owned by finance Alignment of personal rewards Away day to review measures</p>	<p>Cross-functional ownership of measures/performance Staff/skill retention – loss of skills to analyse data and redefine measures Payroll and union systems Incompatible systems/measurement in different locations/business units</p>
7	<p>Top management support for measurement The need for improved electronic reporting including hierarchy of measures and drill down facilities identified</p>	<p>No review process in place Management time main constraint to reviewing measures Too many measures/lack of focus Incompatible measures – barrier to effective use Measures, actions and rewards not always aligned</p>

have a set of performance measures that is effectively used throughout the organisation. Companies 3 and 5 were prevented from maintaining a relevant set of measures by senior management, who continued to use financial measures to manage the business, despite the availability of a more balanced set of measures.

Given that the availability and effective use of measures is a pre-requisite to their evolution, a key question that remains is how do companies know when they should change the measures they use. Each of the case study companies approached this problem in different ways, however each company also encountered considerable barriers to effective evolution of measures. As a result no organisation demonstrated a complete solution to the problem of managing the evolution of their measurement system. Analysis of the barriers that the case study organisations encountered, and approaches that different organisations used to overcome them, provide significant insight into the way that the evolution of measurement systems can be managed.

Barriers to and facilitators of evolution

The previous section presents the main findings of the case studies undertaken and Table II summarises the main barriers and facilitators of the evolution of performance measurement systems found within the companies studied. As presented, the findings provide an insight into the factors affecting the evolution of measures in each of the individual organisations. However, to draw generic lessons from the data collected it is necessary to identify common problems encountered by the organisations studied and solutions to these problems found in other organisations.

Some of the organisations, notably companies 2 and 7, identified the need for management processes to ensure the review of performance measurement is prompted and that measures are changed as appropriate.

Companies 1 and 2 overcame such problems by incorporating measurement into regular strategy and business process reviews. In company 1, considerable attention was focused on measurement as a key tool to support the achievement of strategic objectives. As a result measures were a fundamental part of the annual strategy review. Meanwhile in company 2, each business process had clearly defined performance measures. As a result, the process audits assessed the effectiveness of measurement and prompted remedial action as necessary.

These comparisons suggest that absence of an effective process is a commonly encountered barrier to the evolution of measurement systems. Effective processes enable identification of changes in circumstances that necessitate changes in measures and ensure that measures are appropriate.

Companies 4 and 6 both highlight the lack of the appropriate skills as a barrier to identifying the measures that need to be changed and to the modification of measures. Historically, high staff turnover had significantly affected the ability of company 6 to retain the skills required to analyse performance data, identify whether measures remain appropriate and design

new measures when necessary. The availability of management time to reflect on measures was also found to be a constraint on evolution (companies 4 and 7).

In order to overcome these issues, company 6 devoted dedicated resources to measurement, thereby giving individuals the responsibility for ensuring that measurement remained appropriate to the organisation's circumstances. This dedicated resource acted as support for measurement activities, including use of measures, analysis of data and ensuring that measures reflected the requirements of users. The resource acted as a focal point for the development and maintenance of internal measurement skills including the development of appropriate information systems.

The lack of the necessary skills and human resources (people) is the second barrier to evolution to be identified from the findings. The necessary skills include: the ability to identify when measures are no longer appropriate to measure the organisation's performance; and the ability to refine measures to reflect the organisation's new circumstances.

The lack of flexibility of information systems, especially accounting systems, was considered to be a barrier to the evolution of measures by a number of companies (companies 1, 2, 5 and 6). Company 6 indicated that the implementation of an ERP system resulted in loss of functionality that had been developed to aid analysis of performance measurement data. Although there are many software products designed to support performance measurement on the market, company 1 in particular found "off the shelf systems" to be insufficiently flexible, limiting the ability to modify of measures.

Companies 1, 2 and 6 identified the need to design data collection and reporting systems so that they facilitate the identification of inappropriate measurement and enable the change of data collection, analysis and reporting tools. In company 1 this was included in a strategic information system developed in-house. Company 2 developed a Web-based system that enabled consistent and flexible measurement on a global scale, while company 6 ensured that their dedicated measurement personnel had both operations and information systems responsibilities, ensuring that systems were developed to reflect the requirements of operational measurement.

Inflexible systems are the third barrier to evolution to be drawn from the findings.

The acceptance of measurement throughout the organisation was identified as a key prerequisite of evolution in each of the companies studied. This was linked to the importance placed on maintaining an effective and efficient measurement system, including the benefit derived from measurement activities in relation to the effort required. In each case, establishing a culture that embraced the use of performance measurement to manage the business was crucial. Without such a culture measurement was considered to be a non-value adding activity which was to be endured, rather than a tool to support business decision making.

Company 1 used existing communication media to establish such a culture throughout the organisation. Use of statutory safety reports and briefings

ensured that all employees received business performance information, while mechanisms were put in place to encourage, collect and respond to queries from all employees regarding information reported. By demonstrating that this was an open and honest process, an average of 300 questions and suggestions per month were generated from a work force of approximately 600, demonstrating that measures were actually being understood and used. Similarly, management meetings in company 6 included open discussion of the relevance of performance measures and the way in which they could be modified and improved to increase their utility. In both cases, developing an open and honest culture in which measurement was used to support improvement rather than a tool to punish individuals was considered crucial to use maintenance of relevant performance measures.

Thus the data suggests that culture that is inappropriate to the use (and change of measures) is the fourth key barrier that was identified.

This further analysis of the data identifies four key themes commonly observed within the case study organisations. These are demonstrated through the examples discussed. Table III presents the findings from the case studies structured around four themes that emerge from the data collected. This demonstrates that these themes comprehensively cover all of the case study data as presented in Table II.

Framework of factors affecting the evolution of performance measurement systems

It is evident from the summary of the interviews shown in Table III that the evolution of measurement systems is a complex phenomenon to study. At the most fundamental level the research reported in this paper has identified that before a measurement system can evolve it has to be used actively (use). It is worth noting at this point that a performance measurement system itself consists of several components, including:

- Individual measures that quantify the efficiency and effectiveness of actions.
- A set of measures that combine to assess the performance of an organisation as a whole.
- A supporting infrastructure that enables data to be acquired, collated, sorted, analysed, interpreted and disseminated (Neely, 1998).

Assuming that these elements exist and the measurement system is actually used then evolution of the measurement system is possible. Typically, this starts with a trigger, which can be either internal or external in nature. Companies 1 and 5 both provide examples of an external trigger, with significant changes in their consumer markets following deregulation. These changes significantly affected the assumptions underpinning the companies' objectives and competitive priorities, necessitating realignment of measures. In Company 6, monthly management meetings and an away day provide

Table III.
Recategorised
summary of case study
findings

	Facilitators of evolution	Barriers to evolution
Process	<p>Integration of measurement with strategy development and review (company 1)</p> <p>Integration of measurement with business process review (2)</p> <p>PM "function" the focal point of measurement activity (6)</p> <p>Forum to discuss appropriateness of measures (6)</p> <p>Implementation of common definitions/metrics (3, 7)</p> <p>Consistent approach to measurement across all areas of the business (1)</p> <p>Away day to measures (6)</p> <p>Involvement of external bodies (3)</p> <p>User involvement in measurement (5)</p>	<p>Lack of proactive review process (7)</p> <p>Inconsistent approach to measurement over time (5)</p> <p>between locations/business units (3, 6, 7)</p> <p>no integrated measurement function (3)</p> <p>Insufficient time to review measures:</p> <p>lack of management time (4, 7)</p> <p>too much data reported (4, 7)</p> <p>The need to trend measures limits ability change (7)</p> <p>Lack of data analysis (5, 6)</p>
People	<p>Maintain PM capability (6)</p> <p>Dedicated PM resource (6)</p> <p>facilitation of use of measures (6)</p> <p>ensure action is taken (1, 2, 6)</p> <p>prompt review of measures (6)</p> <p>credible sponsor (1, 6, 7)</p> <p>IT and operational responsibilities (6)</p> <p>Skills/succession planning (4)</p> <p>Involvement of those being measured/local ownership of measures (6)</p> <p>Community of users of measures (6)</p>	<p>Lack of appropriate skills:</p> <p>to identify appropriate measures (4, 6, 7)</p> <p>to design measures/quantify performance (4)</p> <p>to collect accurate data (1)</p> <p>to analyse data (6)</p> <p>High staff turnover (6)</p> <p>Lack of management time (4, 7)</p> <p>Ownership of cross-functional (6)</p>
Systems	<p>Develop in-house/customised IT systems (1, 2):</p> <p>flexible (1, 2)</p> <p>Web-based (2)</p> <p>electronic reporting (7)</p> <p>hierarchy of measures (7)</p> <p>linked to strategy deployment/business process review (1, 2)</p> <p>Maintain internal systems development capabilities (1, 2, 6)</p> <p>Integration of operations and IT (budgets, responsibility, etc.) (6)</p>	<p>Inflexible legacy systems:</p> <p>data collection (4, 5)</p> <p>reporting (4, 5)</p> <p>Inflexible ERP systems – loss of functionality (6)</p> <p>Inappropriate "off the shelf" systems (1)</p>

(continued)

Facilitators of evolution	Barriers to evolution
<p>Culture</p> <p>The need for evolution considered to be important (2, 6, 7)</p> <p>Communication:</p> <ul style="list-style-type: none"> use of accepted medium (1) feedback all actions (1) engage all employees (1) <p>Measurement integrity is encouraged:</p> <ul style="list-style-type: none"> open and honest discussion of performance (6) no blame culture (6) <p>discouragement of “gaming behaviour” (6)</p> <p>Ongoing senior management support/champion for measurement (all companies):</p> <ul style="list-style-type: none"> continued focus on measurement (1, 6) identify and remove barriers to use/change of measures (1, 6) <p>Establish common understanding of objectives (2)</p> <p>Integration/alignment of reward systems (2)</p> <p>Measurement not owned by finance (6)</p> <p>Alignment of measures and rewards (2, 5, 6)</p>	<p>Senior management inertia (2, 3)</p> <p>Individual inertia/resistance to measurement (4)</p> <p><i>Ad hoc</i> approach to measurement (3)</p> <p>Lack of alignment of actions with measures (7)</p> <p>In appropriate use of measures/measures not used to manage the business (2, 5)</p> <p>Rigid remuneration and union systems (6)</p>

examples of internal triggers which prompted review of the relevance of current measures given changes in circumstances. Other such triggers were also identified that prompted the realisation that measures were inappropriately designed for their purpose, that use of measures prompted inappropriate behaviour or that circumstances, such as competitive requirements, changed. Once the trigger has been received then the first stage in the evolution of the measurement system is to reflect on the performance measurement system and identify whether it remains appropriate given changing organisational circumstances. This stage of the evolutionary process is known as reflect (reflect) and the research identified several barriers that prevent it from occurring in organisations, most crucially those associated with process, people, infrastructure and culture:

- *Absence of an effective process.* Company 7 highlighted the lack of an effective process as the main barrier to reflection, while in both companies 4 and 7 there was insufficient management time set aside to reflect on performance measures.
- *Lack of the necessary skills and human resources.* Companies 1, 4, 6 and 7 each identified a lack of appropriate skills to analyse data and identify inappropriate measures. Company 6 specifically highlighted that high staff turnover caused problems in retaining people with the skills necessary to identify which measures are inappropriate. Company 4 also highlighted that the lack of succession planning was a barrier to reflection.
- *Inflexible systems.* These were identified as barriers to reflection. In particular, company 6 found ERP system implementation led to lost analysis functionality required to investigate performance trends and causes of performance variances.
- *Inappropriate culture.* Companies 4 and 6 both highlighted individuals who were resistant to reflection on and change to measures as they did not want measures to more effectively reflect specific dimensions of performance for which they were responsible. Lack of alignment of measures with rewards was also found to be a barrier to reflection in company 7. Alignment of measures with rewards ensures that those being measured have an incentive to reflect on measures and prompt their evolution.

During the reflection stage, each of the constituent parts of the performance measurement system should be critically appraised and reviewed to ensure that they remain appropriate to the requirements of the organisation. Many tools and techniques have been developed to help organisations design performance measures and measurement systems. Several of these tools can be applied to reflect on the content of an organisation's current performance measurement system. For example, the performance measurement record sheet (Neely *et al.*, 1996) lists the characteristics of a performance measure, any of

which might be affected by changes in the organisation’s circumstances. Many of the performance measurement frameworks that have been proposed (Kennerley and Neely, 2000) might also support reflection on the relevance of the set of measures used by the organisation. Furthermore, tools such as the Performance Measurement Questionnaire (Dixon *et al.*, 1990) are specifically designed to help an organisation to identify the appropriateness of their measurement system.

Reflecting on the measurement system will enable required changes to be identified and will in turn trigger modifications (modify). In addition external triggers, such as changes in legislative or regulatory requirements, and/or changes in ownership can lead to the imposition of new performance measures, which will also prompt the modification stage. In turn the modification stage will result in changes to the constituent elements of the measurement system. Once these changes have been enacted then the modified measurement system can be said to have been deployed (deploy) and hence the cycle of evolution can start again. This entire evolutionary cycle is illustrated in Figure 2, which contains a framework of the factors affecting the evolution of measurement systems.

The key to this discussion is to recognise that the case study data collected demonstrates that to manage effectively the evolution of performance measures, an organisation must consider several inter-related issues:

- (1) The active use of the performance measurement system is a pre-requisite to any evolution.
- (2) The performance measurement system itself consists of three inter-related elements (individual measures, the set of measures and the

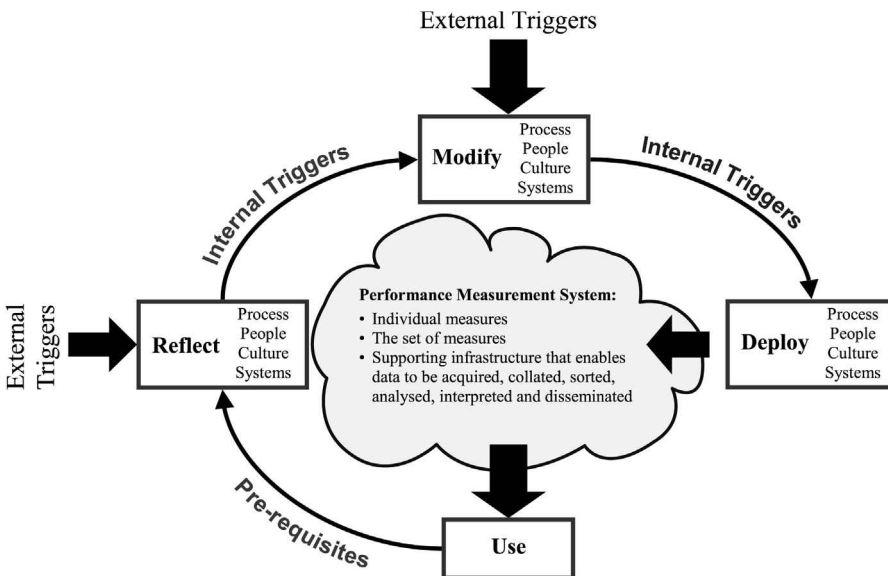


Figure 2. Framework of factors affecting the evolution of performance measurement systems

enabling infrastructure). Each of these elements must be considered during the evolution of the performance measurement system.

- (3) There are four stages of evolution – use, reflect, modify and deploy. These form a continuous cycle.
- (4) Barriers exist that will prevent the evolutionary cycle from operating. These barriers can be overcome if the evolutionary cycle is underpinned by enabling factors – broadly categorised under the headings: people, process, people, infrastructure and culture. Specifically, a well designed measurement system will be accompanied by an explicitly designed evolutionary cycle with clear triggers and:
 - process – existence of a process for reviewing, modifying and deploying measures;
 - people – the availability of the required skills to use, reflect on, modify and deploy measures;
 - infrastructure – the availability of flexible systems that enable the collection, analysis and reporting of appropriate data;
 - culture – the existence of a measurement culture within the organisation ensuring that the value of measurement, and importance of maintaining relevant and appropriate measures, are appreciated.

Discussion

The literature and case study data presented clearly show first, the importance of managing measurement systems so that they change over time and second, the complex range of interrelated factors that affect the evolution of performance measurement systems. The literature highlights many of the issues affecting the management of change within organisations. This paper discusses many of these issues in the context of case study data relating to performance measurement system evolution.

A considerable amount has been written about the design and implementation of measurement systems and a number of writers have identified the need to reflect on measures to ensure that they remain relevant as the organisation changes. The research findings echo the themes identified in the literature concerning the external and internal drivers of change affecting organisations and the need for organisations to have effective processes in place to identify these changes and when they necessitate changes to measurement systems. However, there is little discussion in the literature of what to do once that reflection has taken place. The data collected clearly show that the process of managing the evolution of measurement systems consists of a number of stages that have to date received little attention. In addition to reflection, consideration should be given to how measures are to be modified and how modified measures are to be deployed without embarking on a wholesale performance measurement system redesign project.

It is also clear that for measurement systems to evolve effectively there are key capabilities that an organisation must have in place (i.e. effective processes; appropriate skills and human resources; appropriate culture; and flexible systems). The research demonstrates how lessons from different strands of literature such as the need for the appropriate resources (Greiner, 1996) and capabilities (Gabris, 1986); the appropriate culture (Tichy, 1983); willingness to change (Kotter, 1996); and relevant processes (Bourne *et al.*, 2000; Bititci *et al.*, 2000) can be drawn together into a structured framework.

The data indicates that organisations should consider these capabilities at each stage of the evolutionary cycle, as they are fundamental to effective evolution. However, little consideration is given to these capabilities in the literature concerning the design and implementation of measurement systems. It is the development and maintenance of these capabilities within an organisation that will determine whether its measurement systems evolve effectively. As such, reviewing the availability of these capabilities is an important stage in the management of measurement systems over time. This reflects the need to review and update measurement systems at three different levels, i.e. the individual measure; the set of measures; and the supporting infrastructure, and shows that these capabilities are an integral part of that supporting infrastructure.

The framework presented provides a structured view of the factors affecting the evolution of performance measures and measurement systems. It conceptualises a very complex combination of factors affecting the evolution of measurement systems into a manageable form.

Conclusions

Although the issue of development of effective performance measures has received considerable attention from both academic and practitioner communities, neither has satisfactorily addressed the issue of how performance measures should evolve over time in order to remain relevant.

The research reported in this paper provides an understanding of how measurement systems can be managed so that a dynamic and relevant set of performance measures can be maintained, reflecting an organisation's changing requirements. It provides an understanding of the factors, both internal and external to the organisation, that facilitate and inhibit the introduction of new measures, the modification of existing measures and deletion of obsolete measures. These factors are presented in a framework that illustrates the process, people, infrastructure and culture capabilities that an organisation must demonstrate in order to manage the evolution of measures. The paper discusses many issues of relevance to the growing literature in the field of performance measurement while providing organisations with a practical tool to help them establish an effective performance measurement system. Ensuring that evolution of measurement systems is effectively managed over time is important if another measurement crisis and revolution is to be avoided.

References

- Bititci, U.S., Turner, T. and Begemann, C. (2000), "Dynamics of performance measurement systems", *International Journal of Operations & Production Management*, Vol. 20 No. 6, pp. 692-704.
- Bourne, M., Neely, A., Mills, J. and Platts, K. (1999), "Performance measurement system implementation: an investigation of failures", *Proceedings of the 6th International Conference of The European Operations Management Association*, Venice, 7-8 June, pp. 749-56.
- Bourne, M., Mills, J., Wilcox, M., Neely, A. and Platts, K. (2000), "Designing, implementing and updating performance measurement systems", *International Journal of Operations & Production Management*, Vol. 20 No. 7, pp. 754-71.
- Bruns, W. (1998), "Profit as a performance measure: powerful concept, insufficient measure", *Performance Measurement – Theory and Practice: The First International Conference on Performance Measurement*, Cambridge, 14-17, July.
- Dixon, J.R., Nanni, A.J. and Vollmann, T.E. (1990), *The New Performance Challenge – Measuring Operations for World-Class Competition*, Dow Jones-Irwin, Homewood, IL.
- Eccles, R.G. (1991), "The performance measurement manifesto", *Harvard Business Review*, January-February, pp. 131-7.
- Fitzgerald, L., Johnston, R., Brignall, T.J., Silvestro, R. and Voss, C. (1991), *Performance Measurement in Service Businesses*, The Chartered Institute of Management Accountants, London.
- Frijo, M.L. and Krumwiede, K.R. (1999), "Balanced scorecards: a rising trend in strategic performance measurement", *Journal of Strategic Performance Measurement*, Vol. 3 No. 1, pp. 42-4.
- Gabris, G.T. (1986), "Recognizing management techniques dysfunctions: how management tools often create more problems than they solve", in Halachmi, A. and Holzer, M. (Eds), *Competent Government: Theory and Practice*, Chatelaine Press, Burk, VA, pp. 3-19.
- Ghalayini, A.M. and Noble, J.S. (1996), "The changing basis of performance measurement", *International Journal of Operations & Production Management*, Vol. 16 No. 8, pp. 63-80.
- Globerson, S. (1985), "Issues in developing a performance criteria system for an organisation", *International Journal of Production Research*, Vol. 23 No. 4, pp. 639-46.
- Greiner, J. (1996), "Positioning performance measurement for the twenty-first century", in Halachmi, A. and Bouckaert, G. (Eds), *Organizational Performance and Measurement in the Public Sector*, Quorum Books, London, pp. 11-50.
- Johnson, H.T. (1983), "The search for gain in markets and firms: a review of the historical emergence of management accounting systems", *Accounting, Organizations and Society*, Vol. 2 No. 3, pp. 139-46.
- Johnson, H.T. and Kaplan, R.S. (1987), *Relevance Lost – The Rise and Fall of Management Accounting*, Harvard Business School Press, Boston, MA.
- Kaplan, R.S. (1984), "The evolution of management accounting", *The Accounting Review*, Vol. 59 No. 3, pp. 390-418.
- Kaplan, R.S. and Norton, D.P. (1992), "The balanced scorecard – measures that drive performance", *Harvard Business Review*, January/February, pp. 71-9.
- Kaplan, R.S. and Norton, D.P. (1993), "Putting the balanced scorecard to work", *Harvard Business Review*, September/October, pp. 134-47.
- Keegan, D.P., Eiler, R.G. and Jones, C.R. (1989), "Are your performance measures obsolete?", *Management Accounting (US)*, Vol. 70 No. 12, pp. 45-50.

- Kennerley, M.P. and Neely, A.D. (2000), "Performance measurement frameworks – a review", *Proceedings of the 2nd International Conference on Performance Measurement*, Cambridge, pp. 291-8.
- Kotter, J.P. (1996), *Leading Change*, Harvard Business School Press, Boston, MA.
- Lynch, R.L. and Cross, K.F. (1991), *Measure Up – The Essential Guide to Measuring Business Performance*, Mandarin, London.
- Maskell, B. (1989), "Performance measures for world class manufacturing", *Management Accounting (UK)*, May, pp. 32-3.
- Meyer, M.W. and Gupta, V. (1994), "The performance paradox", in Straw, B.M. and Cummings, L.L. (Eds), *Research in Organizational Behaviour*, Vol. 16, JAI Press, Greenwich, CT, pp. 309-69.
- Neely, A. (1998), *Measuring Business Performance – Why, What and How*, Economist Books, London.
- Neely, A.D. (1999), "The performance measurement revolution: why now and where next", *International Journal of Operations and Production Management*, Vol. 19 No. 2, pp. 205-28.
- Neely, A.D., Kennerley, M.P. and Adams, C.A. (2000), *The New Measurement Crisis: The Performance Prism as a Solution*, Cranfield School of Management, Cranfield.
- Neely, A.D., Mills, J.F., Gregory, M.J., Richards, A.H., Platts, K.W. and Bourne, M.C.S. (1996), *Getting the Measure of Your Business*, Findlay Publications, Horton Kirby.
- Pettigrew, A. and Whipp, R. (1991), *Managing Change for Competitive Success*, Blackwell, Oxford.
- Scott, W.R. (1995), *Institutions and Organizations: Theory and Research*, Sage Publications, London.
- Senge, P.N. (1992), *The Fifth Discipline: The Art and Practice of the Learning Organization*, Century Business Press, London.
- Tichy, N.M. (1983), *Managing Strategic Change: Technical, Political, and Cultural Dynamics*, John Wiley & Sons, New York, NY.
- Townley, B. and Cooper, D. (1998), "Performance measures: rationalization and resistance", *Proceedings of Performance Measurement – Theory and Practice: the First International Conference on Performance Measurement*, Cambridge, 14-17, July, pp. 238-46.
- Waggoner, D.B., Neely, A.D. and Kennerley, M.P. (1999), "The forces that shape organisational performance measurement systems: an interdisciplinary review", *International Journal of Production Economics*, Vol. 60-61, pp. 53-60.
- Wisner, J.D. and Fawcett, S.E. (1991), "Linking firm strategy to operating decisions through performance measurement", *Production and Inventory Management Journal*, Third Quarter, pp. 5-11.