



**Bititci, U. and Garengo, P. and Dörfler, V. and Mendibil, K. (2009)  
Performance measurement: questions for tomorrow. In: Advanced  
Production Management Systems, 1900-01-01. ,**

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# Performance Measurement: Questions for Tomorrow

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**Abstract.** Ever since Johnson and Kaplan (1987) published their seminal article performance measurement gained increasing popularity both in practice and research with over 3600 articles between 1994 and 1996. A précis of the literature on global and business trends predicts that the world is heading towards a networking era dominated by global autopoietic networks. A systematic review of the performance measurement literature concludes that although historically the performance measurement literature had tracked the global business trends our current state of knowledge on performance measurement is not complete and a number of fundamental questions remain unanswered, particularly in the context of future trends.

**Keywords:** Performance, measurement, research-agenda

## 1. Introduction

Ever since Johnson and Kaplan (1987) published their seminal book entitled *Relevance Lost – The Rise and Fall of Management Accounting*, performance measurement gained increasing popularity both in practice and research. In fact Neely (1999), having identified that between 1994 and 1996 over 3600 articles were published on performance measurement, has coined the phrase *the performance measurement revolution*.

Today, performance measurement and performance management practices are common place in all sectors of industry and commerce as well as the public sector, including government departments, quangos<sup>1</sup>, charities, NGOs<sup>2</sup> and so on. However, as we move further into the 21<sup>st</sup> century there is an increasing belief that the world as we know it is changing, both in a natural and business sense. Issues such as global warming, environmental considerations and the sustainability of our planet are becoming key concerns for everyone, from individual citizens, through small and multinational businesses to public servants and the politicians. Fuelled by rapidly developing technologies, increasing globalisation and dismantling of trade barriers we are also seeing rapid changes to how we are doing business. The big question is “Is performance measurement ready for the coming changes?”

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<sup>1</sup> Quasi-Autonomous Non-Governmental Organisation

<sup>2</sup> Non-Governmental Organization

The objective of this article is to examine the performance measurement literature from its early days of inception to modern times, in the context of the global and business trends, in order to identify gaps in our knowledge.

The article starts with a précis of the global and business trends we have witnessed over the 20<sup>th</sup> century and provides a prediction, based on literature, of what may lie ahead in the near future. A review of literature is then provided on performance measurement, starting from its inception- which dates back to the industrial revolution- to modern times. Our current state of knowledge on performance measurement is then discussed in the context of the predicted global and business trends to identify gaps in knowledge that leads to development of a research agenda for performance measurement. But first, the methodology employed to conduct this review is made explicit in the next section.

## **2. Evolution of the Performance Measurement Field**

The objective of this section is to provide a brief overview of the evolution of performance measurement literature in comparison to business trends so that we predict how performance measurement literature should be developing in the future. Although it is possible to go back much further in business history, we have chosen to start this review from the start of the Industrial Age, with Taylor (1911) because most modern management methods have evolved from practices adopted with industrialization of the world economy. Table 1 and 2 summarises our findings from an extensive review of the literature.

According to Table 1 business trends have evolved from a just-in-case era, through lean and agile eras. Today, we seem to be at the beginnings of the networking era.

What is predicted is that in the networking era is that competitive advantage will be defined through innovative value propositions (e.g. Davenport and Prusak, 2003) that offer a blend of commercial, social, political and environmental value (e.g. Senge et al., 1999) to a complex network of stakeholders (e.g. Hamel et al., 1989, Hamel and Prahalad, 1994). This complex network will involve a combination of very large and very small organisations – as Handy (2002b) called them, elephants and fleas. With these changes we are also seeing significant pressures on the current regulatory systems as small firms tend to do business on more informal basis, largely based on trust and relationships rather than seeking the protection of legal systems. A recent workshop<sup>3</sup> concluded that small organisations do not have the power, resources and the will to protect their interests (such as intellectual property) through legal mechanisms. Thus they tend to go into collaborative relationships on the basis of relationship and trust.

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<sup>3</sup> Workshop on SMEs and Intellectual Property, Organised by McClay, Murray and Spence, Glasgow, UK November 2007.

*Table 1. Business eras and key characteristics*

|   | <b>Just-in-Case Era</b>   | <b>Lean Era</b>                                     | <b>Agile Era</b>   | <b>Networking Era</b>  |
|---|---|---|--|--|
| <b>Approximate Timings</b>                | Early 1900s to mid 1970s  | Mid 1970s to late 1990s                             | Mid 1990s to late 2000s  | Mid 2000s to unknown   |
| <b>Scope, Rate and scale of change</b>    | Organisation, Slow and incremental  | Organisation Fast, predictable and incremental      | Supply Chain Turbulent, discontinuous and radical                            | Network Disruptive and transformational  |
| <b>Products</b>                           | Artefacts   | Artefacts supported by services                     | Services supported by artefacts  | Social and environmentally responsible services supported by artefacts           |
| <b>Dominant Means of Production</b>       | Infrastructure owned by the organisation                                    | Infrastructure and IP owned by the organisation.    | IP owned by the organisation. Personal knowledge of the knowledge-worker     | Knowledge and network connections owned by the networkers                        |
| <b>Competitive Forces</b>                 | Unclear mix of all factors dominated by costs                               | Focus and differentiation                           | Value propositions   | Being unique in different ways   |
| <b>Performance focus</b>                  | Efficiency  | Effectiveness and waste minimisation                | Competitiveness  | Triple bottom line in the context of the network                                 |
| <b>Work</b>                               | Manual work   | Manual work supported by knowledge work             | Knowledge work supported by manual work                                      | Net-work supported by knowledge and manual work                                  |
| <b>Management Competencies</b>            | Planning and production   | Scenario planning and change management             | Learning and intuition. Rapid response to changes                            | Global autopoietic networking real-time response.                                |
| <b>Scope of Management Responsibility</b> | Business as usual. Operational planning and correctly carrying out the task | Delivering the strategic objectives                 | Ad hoc projects; managing/leading temporary, trans-organizational teams      | Managing/leadings networks, people in multiple networks and networks of networks |
| <b>Organizing principle</b>               | Autocracy   | Bureaucracy   | Adhocracy  | Netocracy  |
| <b>Organisational Power</b>               | Few powerful individuals  | Organisational structure                            | Processes, process owners and process teams                                  | Individuals/small groups in multiple networks                                    |
| <b>People</b>                             | Labour-force seen as necessary evil   | Human resources seen as assets                      | Teams assets and investment  | Individuals and autopoietic teams as Innovators and Heuristics                   |
| <b>Regulatory system</b>                  | Contracts, laws and regulations   | Contracts, laws, regulations and industry standards | Contracts, laws, regulations, industry standards and accepted best practices | Trust, relationships and network standards                                       |
| <b>Relationships</b>                      | Inter-organisational and Adversarial  | Inter-organisational and Cooperative                | Inter / trans organisational and Collaborative                               | Trans organisational, Communities of practice                                    |
| <b>Market dominance</b>                   | Producer  | Cost-conscious customer                             | Value-conscious, loyal customer  | Disloyal, picky, curious, Impulse-customer                                       |

*Table 2. Evolution of the performance measurement field*

|                                   | <b>Budgetary control</b>  | <b>Productivity management</b>  | <b>Integrated performance measurement</b>  | <b>Integrated performance management</b>  | <b>Performance measurement &amp; management in SMEs</b>   | <b>Inter-enterprise performance management</b>  | <b>Environmental &amp; social performance</b>   |
|-----------------------------------|---|---|--|---|---|---|---|
| <b>Approx. Dates</b>              | Late 1800s – late 1950s   | Late 1930s - to late 1980s  | Late 1980s – late 1990s  | Late 1990s – to date  | 1990s to date   | Late 1990 to date   | Late 1990 to date   |
| <b>Primary Focus</b>              | <ul style="list-style-type: none"> <li>• Budgetary control.</li> <li>• Performance against budget</li> </ul>  | <ul style="list-style-type: none"> <li>• Waste minimisation</li> </ul>  | <ul style="list-style-type: none"> <li>• PM models &amp; frameworks</li> <li>• PM as a system</li> </ul>   | <ul style="list-style-type: none"> <li>• How best to implement and use PM to manage organisational performance</li> </ul>   | <ul style="list-style-type: none"> <li>• How best to implement and use PM to manage SME performance</li> </ul>  | <ul style="list-style-type: none"> <li>• Supply chains</li> <li>• Collaborative and virtual enterprises</li> </ul>  | <ul style="list-style-type: none"> <li>• Environmental , social and corporate responsibility</li> </ul>   |
| <b>Principle areas of concern</b> | <ul style="list-style-type: none"> <li>• Budgeting</li> </ul>   | <ul style="list-style-type: none"> <li>• Productivity improvement through industrial engineering methods</li> </ul>   | <ul style="list-style-type: none"> <li>• What to measure</li> <li>• How to integrate a number of multi dimensional measures</li> <li>• How to integrate financial, operational and people oriented measures</li> </ul> | <ul style="list-style-type: none"> <li>• Implementation issues</li> <li>• ICT systems</li> <li>• People and organisational aspects - teaming, individual and managerial perspectives</li> <li>• Change management</li> <li>• Culture, management styles and PM</li> </ul> | <ul style="list-style-type: none"> <li>• What makes SMEs different?</li> <li>• Adoption of PMS models in SMEs</li> <li>• SME management capabilities</li> </ul> | <ul style="list-style-type: none"> <li>• Coordination of operations along supply chains</li> <li>• Visibility of performance to customers and suppliers</li> <li>• Strategic conflicts amongst collaborative enterprises</li> </ul> | <ul style="list-style-type: none"> <li>• Green measures</li> <li>• Social measures</li> <li>• Integration of environmental and social measures in to the corporate and supply chain performance measurement frameworks</li> </ul> |
| <b>Context</b>                    | <ul style="list-style-type: none"> <li>• Cost accounting</li> <li>• Budgetary monitoring &amp; control</li> <li>• Executive decision support</li> </ul> | <ul style="list-style-type: none"> <li>• Management accounting</li> <li>• Operational monitoring &amp; control</li> <li>• Operational decision support</li> </ul> | <ul style="list-style-type: none"> <li>• Integrated and balanced monitoring &amp; control</li> <li>• Supporting trade-off decisions</li> <li>• Identifying improvement opportunities</li> </ul>                        | <ul style="list-style-type: none"> <li>• Embedding performance measurement and management culture</li> <li>• Habitual use of PM at all levels</li> <li>• Executive and operational decision support</li> </ul>  | <ul style="list-style-type: none"> <li>• Limited adoption of performance measurement in SMEs</li> </ul>   | <ul style="list-style-type: none"> <li>• Measurement and reporting of performance in supply chains and collaborative networks</li> </ul>  | <ul style="list-style-type: none"> <li>• Measurement and reporting of environmental and social performance in corporate and supply chain context</li> </ul>   |

Here, as the focus is starting to shift from competition to collaboration, we are starting to see a new type of work emerging that is different from both the manual-work and knowledge-work. This new type of work, *net-work*, involves highly specialised organisations collaborating around the world (Wenger, 1999, Wenger and Snyder, 2000) to create value for markets and customers at a rate and speed never seen before-with emphasis on ecological and social values, to produce multi-science/technology products and services. In these networked organisations the primary function of people becomes knowledge-based-intuitive-creative-problem-solving (i.e. people as heuristics). At the same time, customers are becoming increasingly complicated too: They are ever more disloyal, i.e. ready to leave their present providers for a better offer anytime, although probably this is only more apparent as it is easier to do this than ever before. They are picky with idiosyncratic and strange expectations, they actually do not only leave for a better offer but also out of curiosity, to try something else. They also act on impulse to what they see and are offered.

According to Bard and Söderqvist (2002) the organizing principle is fast moving towards netocracy with flexible, flat and ever emerging trans-organisational networks. Today we are experiencing the birth of the *Networking era* where small organisations, and even individuals, are forming and reforming global collaborative networks to deliver innovative value propositions to global markets and customers. Working in this fashion, these collaborative networks are able to compete with and indeed threaten the dominance of large corporations (e.g. Linux v Microsoft). In the Networking era organisational performance will remain a function of internally facing (i.e. financial), customer facing and society facing measures, called the Triple Bottom Line (Elkington, 1999), but the unit of analysis will be significantly different, i.e. the network.

According to Table 2 the performance measurement literature evolved largely by following the global business and social trends as summarised in Table 1. It seem that performance measurement emerged from the need for budgetary control and evolved in to a method for measuring and managing productivity in to today's contemporary integrated performance measurement and management system.

#### 4. Discussion

Tables 1 and 2 collectively summarise how the performance measurement field developed in relation to global business and social trends. In reviewing this literature we attempted to analyse the literature presented in order to answer two questions "*How did the performance measurement literature develop in the context of global and business trends?*" and "*Where should the literature go from here?*".

Not surprisingly, the performance measurement literature appears to have developed by tracking and responding to global and business trends where various models, frameworks and theories emerged and were developed through Meredith's (1993) Description-Explanation-Implementation/Testing cycle. During the Just-in-Case Era as the increasing need for productivity was recognised the Budgetary Control Era gave way to Productivity Management Era as advances were made in this field. With the onset of the Lean Era, as organisations started to focus on value along their business processes, we have witnessed the emergence of the Performance Measurement Era providing guidance on what to measure, what adds value and what does not. These developments led to the emergence of early performance measurement models and frameworks identified earlier in the paper, such as SMART (Cross and Lynch 1988-1989), Performance Measurement Matrix (Keegan et al 1989), BSC (Kaplan and Norton, 1992 and 1996), Cambridge Performance Measurement Systems Design Process (Neely et al, 1996), IPMS (Bititci and Carrie 1998) and so on.

As the Lean Era gives way to the Agile Era, performance measurement research seems to start recognising the increasingly dynamic nature of the environment and proposes second generation performance measurement frameworks (Ghalayini et al, 1997, Bititci, 2000). These frameworks that recognise the need for coping with an increasing rate of change in the operating environment, including Integrated, Dynamic Performance Measurement System (Ghalayini et al, 1997) Performance Prism (Neely and Adams, 2001).

Tracking the evolution of performance measurement literature, we have also noticed the increasing levels of divergence and multidisciplinary of the literature with contributions from various cognate fields and viewpoints. Whilst we believe that this multidisciplinary and divergence is a positive trend,

adding richness to the body of knowledge in the field, it must be equally confusing and frustrating from a practitioner's point of view, who is likely to be looking for a simple all encompassing answer. This led us to ask the question ***“is there a need for a unifying theory for performance measurement?... if there is when would be the appropriate point in time for this convergence to take place?”***

It seems that, as the maturity of our understanding in the field of performance measurement grew, the development of models offering guidance in what to measure and how to measure gave way to a concern on how to make best use of these measures to manage the performance of the organisation. This development was driven from two related sources. Firstly, the recognition of the dynamic nature of the organisations operating environment that led to the need to understand how performance measurement systems can be used and how they could evolve to adapt to the changing operating environment. Secondly, as the availability of the empirical data on the application and use of performance measurement systems became available, people, behavioural and cultural issues relating to how these measurement systems were used to manage the performance of an organisation started to emerge. Although many authors recognise and confirm the interplay between success and failure of performance measurement initiatives and the organisational culture as well as management style, to date there is little longitudinal empirical data that makes these dependencies explicit. ***It seems that there is a need for longitudinal empirical studies that explores the relationship between the dynamic operating environment; Evolution of performance measures; Evolution of performance management and Evolution of organisational culture to create a better understanding of how one effects the other***. We particularly need to better understand ***when to use performance measures and when not to***.

The literature on performance measurement seems to recognise the trends towards networking and seems to regularly call for research into performance measurement in supply chains and collaborative organisations covering issues such as inter-organisational agreement on performance measurement; managing the entire supply chain beyond the single dyadic relationship; green supply chain management and green performance measurement; product stewardship, design for life cycle along the supply chain and so on. Having recognised these issues, there is also some evidence in the literature of some progress towards, at least, some of these issues. However, most of the research presented is either theoretical in nature or based on simple supply chain case studies. There is very little grounded empirical research that explores the performance measurement and management related issues faced by collaborative organisations. ***As yet we do not truly understand the performance measurement and management challenges in collaborative enterprises***.

Although the research issues identified in the literature are valid for today, we do not believe that they ask the correct medium to long-term questions. It seems that as we move further into the Networking Era, the importance of performance measurement as we know it today will diminish and be replaced with a form of performance evaluation within the network. Today, performance measurement is based around business structures, units, processes and workflows measuring efficiency and effectiveness of actions using variables such as cost, quality and time. For example, all of the performance measurement frameworks identified earlier in the paper (such as SMART, IPMS, BSC, Performance Prism and so on) are focused on performance measurement in a single organisation and rely on defined business structures and processes. Similarly other inter-organisational performance measurement frameworks (Gunasekaran et al 2001 and 2004, Bernhard et al 2006, etc) focus on extended processes and attempt to measure the effectiveness and efficiency of inter-organisational actions and workflows. Although Marr and Neely (2001) carried out an empirical study to study the organisational performance measurement in the emerging digital age their study was limited to single organisations, including bricks-and-mortar, clicks-and-mortar and dot.coms. In fact Holmberg, 2000 wrote that most organizations are unable or unwilling to measure and manage performance collaboratively with partners. According to the literature, in the Networking Era performance of an organisation or individual will be judged according to their contribution and the network/community they belong to, where factors such as trust, relationship and ingenuity will become important dimensions of performance evaluation. Whilst health-check, communicate, compel progress and comply with non-negotiables will still be valid objectives for performance measurement (Neely et al, 2000), the context will be different. It is likely that performance will propagate through networks in ways unknown earlier, creating synergies at some nodes (interfaces) or destroying existing synergies at others. Today's frameworks and models for performance measurement may not be able to deal with this level of complexity and dynamism. Thus the research challenges we identified here include... ***“What is the difference between performance measurement as we know it today and performance evaluation as it***

*seems to be emerging in contemporary networks?... Do we need performance measures to manage networks?... Are the current performance measurement and management frameworks appropriate or adequate for dealing with the challenges of the Networking Era?... or do we need to create new frameworks and models for performance evaluation in networks?... what will be the interplay between network politics and performance measurement?... how would power relationships effect how performance is evaluated in a network?... will there be different network typologies?... if so will their performance measurement and management needs differ?...how can performance be planned in trans-organisational, autopoietic networks?... do we need to revise the definition of traditional concepts, such as productivity, in the light of autopoietic networks?"*

Literature clearly recognises the importance of R&D, innovation and management of knowledge and intellectual property to future competitiveness of an organisation. They also clearly state that measurement and benchmarking, although difficult, are vital for driving continuous innovation and creativity. Today, the measurement of innovation and creativity remains an open research challenge which is widely discussed. However, according to the review conducted, a feature of the networking era is the trend towards knowledge being increasingly available through open sources with little guidance on how to measure and protect knowledge and intellectual property in this completely new and unfamiliar territory. The question here is *"do we need to measure, manage and protect knowledge in this open-source environment?... and, if so, how?"*. The literature makes it clear that, in order to operate in this open source environment, we would be increasingly relying on trust and relationships rather than protection of formal contracts, laws and regulations. This leads us to pose a follow up question *"would performance evaluation provide an adequate measure/indication of trust?... or is there a need for more specific measures of trust?... if so what would these be?"*

In the networking era, as described earlier in the paper, together with the open source environment also raises issues over management of rewards. The traditional performance measurement theory stipulates that performance measures for the organisation, processes, teams and individuals needs to be integrated and aligned where the performance measures for teams and individuals are used for reward and recognition purposes. In the context of networking where the community of practice evaluates a members performance it is not clear how this performance will be rewarded. The open-source environment creates similar challenges where it is not clear who the creator or owner of new knowledge may be, rather the network will own the knowledge. This line of thinking has led us to ask the following two questions... *"how can we manage reward in an autopoietic network?... and how can we manage reward in an open-source environment?"*

In order to answer the questions posed above, it may be appropriate to conduct research in existing networks or communities of practice with different profiles. For example, EBay, the online market place, can be considered a network or a community of practice that continually evaluates its members' performance. Similarly, there are several academic networks where a members performance is informally evaluated according to the contribution they make as well as the network they belong to. Studies comparing performance measurement and management issues and practices between on line communities, academic communities and business networks may yield some insights towards answering the above question.

Furthermore, the literature on performance measurement of SMEs seems to accept the fact that the take up of performance measurement practices amongst SMEs are likely to remain low due to contextual differences of SMEs. Whilst this may be an acceptable situation today, the global and business trends point us towards the Networking Era where individuals and organisations will be operating as parts of networks and the performance of an organisation or individual will be evaluated by the network. Consequently, continuing from the previous research challenges, *in the networking era what are the particular challenges for SMEs with respect to performance measurement and management?... and would the new challenges compound the current difficulties SMEs have with performance measurement?... or would the new era alleviate some of these challenges?*

Today, many performance measurement and management practices are supported by ICT platforms specifically designed and developed the way we currently think performance should be measured and managed. Although we did not include the specific software platforms in our literature review, they all attempt to provide support to make performance measurement and management practices more efficient and effective. In fact there is some evidence that performance measurement systems without ICT support are likely to be short-lived (Bourne et al, 2000; Marr and Neely, 2002, Kennerley and



Neely, 2003; Nudurupati and Bititci, 2005). Many of the ICT platforms that are available to support performance measurement and management practices are either stand alone applications or they are integrated within major Enterprise applications. Consequently their focus is very much performance measurement and management in a single enterprise with some support towards sharing performance information with external parties such as customers and suppliers. We believe that if the emergence of the networking era requires fundamental changes to the way we approach performance measurement and management, it is likely that these current ICT applications would be inadequate to support the performance measurement and management needs of future autopoietic networks. Here the question is *“are current ICT platforms capable of supporting the performance measurement and management needs of autopoietic networks?... if not, how should they be designed, developed and configured?”*

## **5. Conclusions**

In this paper, having reviewed and tracked the evolution of the performance measurement field in the context of global and business trends we can conclude that in general the performance measurement field seems to have developed in response to global and business trends. The researchers seem to study and describe issues faced in practice and study practitioners' responses to these issues leading to better understanding and explanation of the causal relationships. This improved understanding, in turn, led to development of frameworks and models that were adopted and implemented in practice, in effect testing these models and frameworks which in turn led to identification of further issues and so Meredith's (1993) Description-Explanation-Implementation/Testing cycle continues.

Although the review of performance management literature identified several research agendas being proposed, these were largely dealing with contemporary issues, which are valid in their own right, but we were unable to identify other works that attempted to predict future reality with a view to developing a medium to long term research agenda for performance measurement. In reviewing the evolution of performance measurement literature against the global and business trends predicted we have identified the medium to long term research agenda presented in Table 4 below, which we believe is additional to research agendas proposed in other publications in this field.

## **6. References**

Altogether 184 different references were used in this paper. This in itself requires eight pages. For this reason it was not possible to include all the references used in the paper but these are available from <http://www.strath.ac.uk/siom/research/researchpapers/> .