Project Reports: Industry and Services

Study Meeting on the Development and Application of Productivity Measurement at Sectoral and Enterprise Levels

3–5 December 2002, SPRING, Singapore

INTRODUCTION

The APO has been addressing productivity measurement methodologies and standardization criteria since 1979 to enable members to measure meaningful changes in productivity and make useful comparisons across countries. Over the years, several workshops, surveys, and symposia have been organized by the APO to study and review techniques and approaches within member countries.

Clearly, approaches to productivity measurement cannot remain static but must undergo significant changes in line with the evolution of management thinking and shifts in productivity, economic, and social paradigms. In some sectors, such as the new knowledge-based economy, the concept of measurement remains vitally important, relevant, and often unresolved. Difficulties associated with designing, implementing, and using measures at both the macro and micro levels continue to be cited as barriers to progress.

Macro-level concerns have often centered on difficulties with the availability, quality, and reliability of data; the need to make consistent, meaningful comparisons of performance among member countries; and defining and meeting the needs of diverse productivity stakeholders. At the enterprise level, while concerns have also embraced data and stakeholder issues, initiatives have more recently focused on aligning measures with strategic directions and the proper interpretation of results so that actions resulting in productivity growth are taken. It is therefore relevant to discuss recent developments in the measurement of productivity, including the difficulties involved in specific sectors, while at the same time examining the needs of the users of measurement results.

Since measurement should be viewed as a means to an end rather than an end in itself, it follows that the present difficulties cannot be regarded as exclusively technical in nature. They have a strong social element insofar as having the right attitude toward measurement is clearly as important as having the right measures. Albert Einstein, aware of this social/technical nexus for different reasons, once remarked that "Perfection of means and confusion of goals seems, in my opinion, to characterize our age." Thus the objective of the study meeting held at the Singapore Standards, Productivity and Innovation Board (SPRING) from 3 to 5 December 2002 was to review the latest trends in sectoral productivity measurement methodologies and the application of measures in developing strategies at both sectoral and enterprise levels. The meeting set out to address the design of robust and technically sound measures and measurement systems in such a way that they capture the interest of decision-makers at all levels.

Fifteen participants from both the public and private sectors in 12 member countries examined conceptual and theoretical issues relating to productivity measurement at the sectoral level, the latest trends in sectoral productivity measurement approaches

and methodologies, and the application and linking of measures to strategy at the enterprise level. The program included presentations by resource persons from Australia, Japan, the Republic Korea, and Singapore.

SETTING DIRECTION FOR THE MEETING

Crafting a framework for conducting the meeting and formulating a workable strategy for acting on the outcomes required the careful orchestration of four activities:

- Creating a shared vision for the meeting;
- Identifying and summarizing the issues through a common understanding of current realities;
- Reaching conclusions; and
- Making strategic recommendations for follow-up action.

Using an interactive and participative process, the participants and resource persons created the following vision for the meeting:

> *To find effective means to ensure that productivity measurement is used in pursuit of organizational and societal goals through:*
>
> - *Raising awareness and capacity;*
> - *Improving data quality and reliability;*
> - *Linking measures to stakeholders' goals and needs;*
> - *Finding innovative ways to measure, especially in the new knowledge economy; and*
> - *Facilitating links between measures across countries, levels, sectors, etc.*

Initially, the current reality was defined under the following three headings:

- Major trends (political, social, technological, ecological, economic) that impinge upon measurement;
- Problems that affect measurement capability; and
- Structures, systems, technologies, and cultures that support or hinder the measurement process.

Once the vision had been set and a common understanding of current realities achieved, the meeting began the task of analyzing the issues and formulating conclusions and recommendations designed to bridge the gap between what is required and the present situation.

SUMMARY OF ISSUES

The issues below were identified at various stages of the proceedings. Some emerged during the definition of current realities and others flowed from the presentations made by resource persons and country representatives. Many were the outcome of the deliberations of the two discussion groups. The issues tended to represent the two perspectives determined for the study meeting, i.e., productivity measurement at the

sectoral and enterprise levels, and to be of two types, technical and social.

Sectoral-level Issues

a. As in Malaysia in 2000, data issues were again raised as a significant factor inhibiting the development and application of productivity measurement. The issues raised most frequently referred to availability and usually represented questions of quality and timeliness. Particular difficulties were expressed with respect to the availability of capital stock data and when trying to make intersectoral and international comparisons. Some participants attributed the problems to changes (over time) in the terminology and the accounting conventions being used, while others felt that there was a lack of incentives for people to supply data and that this affected both quality and availability. A feature of the current reality is that data were seen as inadequate at all levels insofar as information was inconsistent and difficult to collect.

b. Allied with the data issues were questions regarding actual measurement. Quantification and measurement of the capital input proved difficult for some participating countries. There was also acceptance that, particularly in the service sector and new economy, the measurement of total factor productivity (TFP) necessitated making adjustments for quality changes. Similarly, weaknesses were being revealed in tools such as the translog production function, albeit in this case insufficient to render it ineffective.

c. What was clear was that the results of productivity measurement are not being properly used for decision-making at the sectoral/macroeconomic level. The meeting believed that, for this to happen, ownership of the measurement effort and the measurement systems supporting it would be crucial. Clearly this was not occurring since it requires coordination and networking among the stakeholder groups and, despite the increasing need for measurement, the present situation is characterized more by a lack of cooperation. It was considered that this may have arisen from insufficient productivity awareness and/or a failure to appreciate the role productivity plays in achieving an array of social and economic goals. This was coupled with the fact that the major productivity stakeholders tend to see and define productivity differently and more from their individual perspectives rather than taking a holistic view. The business community, for example, often sees productivity as a means to increase profits, while governments are more inclined to see the impacts in terms of economic growth or employment. Poor distribution of wealth was also cited as a hindrance to widespread ownership of productivity measurement endeavors, and the cost plus arrangement typical within regulated monopolistic environments provides little incentive to improve, and therefore measure, productivity. In addition, in those instances where measurement is used, some participants felt that traditional government conservatism resisted the introduction and adoption of newer, more effective measurement approaches.

d. The capacity and competence (skills, abilities, and knowledge) of people to undertake measurement exercises at the sectoral/macroeconomic level was considered inadequate, signaling a need for training at all levels. As noted below, this issue was not confined to measurement at the sectoral level.

Enterprise-level Issues

a. Data consistency was an issue at enterprise level, more visibly manifest at the collection stage and when trying to make comparisons. The problem was attributed, at least in part, to productivity measurement not being a component of information strategy and therefore little or no effort was being made to provide the type of information needed. It was believed that a similar situation probably occurs at the sectoral level.

b. While some serious attempts were being made to link measured results with improvement efforts, it has been reported in the literature that, despite such initiatives, productivity (as measured) had not improved. A similar situation was described to the meeting with respect to measuring TFP and the unsatisfactory outcome was frustrating the introduction of productivity gain-sharing programs. The issue becomes one of assessing whether the improvement initiatives had failed (and thus the measurement was robust) or whether the measurement system was inadequate (and thus improvement may well have occurred and was not being detected). In this regard it was stated that, if action is required, then the manner in which the results are portrayed is also important.

c. A lack of vision and interest in productivity measurement was reported among top management. Such negative attitudes and low commitment (especially among CEOs) have tended to discourage measurement. The consequence is that measurement is not being properly employed to enhance decision making. Cultural and political environments (always powerful in affecting workplace milieus) have not always been conducive to the use of measurement. Typically, as at the macro level, there was a lack of cooperation among productivity stakeholders.

d. Generally, there was a poor understanding of productivity measurement as it applies to the new economy. Knowledge work is different and increasing in both relative and absolute terms. As a consequence, work is becoming increasingly complex along with employees' value systems (even in the public sector), and knowledge work does not respond to traditional measurement approaches. This calls for a culture of continuous learning.

e. Inadequate measurement skills and knowledge exist within both enterprises and NPOs, calling for training interventions at the grassroots level.

f. Attempts at benchmarking were being frustrated for two reasons. First, organizations are not always willing to share data and information, and second, comparisons that ignore differences in the strategies being employed are considered dangerous.

The above issue statements typically represent the majority viewpoint. Individual contributors and individual member countries may not all have had the same experiences. For example, there were instances where productivity measures were already providing input to national planning and policy formulation processes, and other instances where productivity continues to be a component of price determination. At the same time, attempts are already being made to decompose measures in such a way that they can testify to the impact and efficacy of those policies after implementation. In addressing the macro-level data question, at least one member country has legislation in place in an attempt to unify the statistical database.

CONCLUSIONS AND RECOMMENDATIONS

Sectoral-level Conclusions

a. There is a need to standardize measurement approaches by:
   • Arriving at some common measurement strategies that can be used across member countries;
   • Investigating methods of institutionalizing measurement systems; and
   • Developing a basic methodology with quality adjustments.

b. Measurement guidelines need to be drawn up by (for example) adopting the APO recommended technology, with sectoral comparisons between countries. This could start with manufacturing, followed by the service sector at a more detailed level.

c. After taking account of its weaknesses, use of the translog index can continue.

d. Awareness and cooperation levels among stakeholders need to increase dramatically. In some member countries appropriate bodies exist but they are still either not working together or not working effectively.

Sectoral-level Recommendations for Action

a. Promote cooperation and coordination between different statistical and other agencies providing data in each country to obtain reliable data and ensure continuous improvement. This could be done by engaging agencies in forums involving a broad range of stakeholders. An advocacy program that articulates the needs of stakeholders would be useful in this regard. Furthermore, the agencies collecting data should be trained to appreciate the type to be collected to improve usability. Adopting a policy of guaranteeing that the data collected will only be used for government planning purposes can encourage participation. One member country reported success in this area by involving the government early in the process of productivity measurement endeavors and by demonstrating the links between productivity and other economic imperatives such as economic growth and international competitiveness.
   NPOs will have to play an important role in bringing together all the above, although the major responsibility lies with national governments. The APO could assist by encouraging governments to act and by helping with any technical problems that might arise.

b. Set up a productivity network to obtain all the required information (NPOs).

c. Apply internationally accepted norms for collecting data in all member countries and train practitioners in a common approach (national governments and NPOs).

d. Use stock exchanges as a source of productivity and productivity-related data. The APO could look for commonalities and review opportunities for standardization.

e. As a means of increasing awareness among productivity stakeholders (national governments and NPOs):

• Set targets or goals among sectors at national level and report the current level of performance;
• Draw up a master plan covering how to reach the set targets; and
• Include productivity targets in national development plans.

Enterprise-level Conclusions

a. A body of knowledge on productivity measurement is needed with an expert group possessing profound knowledge within each NPO.

b. A training of trainers program needs to be designed and implemented. Each trainer should be subject to an internationally recognized certification process and provided with a standard productivity measurement toolkit.

c. The current methods of exchanging information at national and international levels is unacceptable and some form of data exchange should be set up that provides for:
• Benchmarking; and
• Best practices and case studies.

d. The use of national-level productivity awards should be encouraged.

e. Productivity certification at enterprise level should be introduced and eventually monitored by a global body akin to the ISO, which performs a similar role in quality monitoring.

f. Issues arising from the new economy need to be addressed with a productivity measurement model and a methodology that are specific to that environment. Some innovative ways to define service-sector output reported to the meeting may be of benefit in this area.

Enterprise-level Recommendations for Action (NPOs)

a. Create an expert group within each NPO in the area of productivity measurement.

b. Identify model companies for measurement.

c. Create awareness at executive (CEO) level of the link between productivity and long-term profitability.

d. Train selected groups at enterprise level in productivity measurement. Such groups should include, among others, both financial and MIS professionals.

e. Network with industry associations in the areas of productivity data collection and benchmarking.

f. Network with technical and management institutions to develop productivity modules in educational and training curricula.

g. Initiate exploratory studies on productivity and productivity measurement in (for example) one sector of the new economy.

Enterprise-level Recommendations for Action (APO)

a. Prepare a productivity measurement body-of-knowledge document.

b. Prepare a productivity measurement trainer of trainers' training program that includes a measurement toolkit.

c. Influence governments to accelerate NPO funding and to provide funding for national-level productivity awards.

d. Standardize productivity measurement terms for global data exchange and create a data exchange forum.

e. Work toward a global certification body for productivity.

f. Initiate exploratory studies on productivity and measurement in the new economy.

General Remarks and Impressions of the Meeting (Resource Persons)

A clear first impression of the meeting was the enthusiasm of member countries for collecting data for the purpose of constructing productivity indicators and for making full use of them to formulate economic/industrial policy. However, given the diversity of economic and social backgrounds within member countries, considerable care needs to be taken in the interpretation of the results of measurement. Using TFP to support policy making, for example, needs to take into account both the level (national, industry, enterprise) at which observation of results occurs and the context in which interpretation is made. Improving productivity at the enterprise level does not automatically imply that the nation has benefited. Simple derivations of policy implications from TFP results are therefore undesirable. Practitioners must pay more attention to the consistency between methods, goals, and implications.

A review of the country papers that were presented suggested that macro-level practitioners seemed to be more in control of the measurement methodologies, i.e., the quantitative aspects, but tentative about how the results of measurement should be used. At the same time, micro-level practitioners were clearer on what needed to be measured and why, i.e., the qualitative aspects, but struggled more with the appropriate measurement methodologies. This suggests that sectoral practitioners might usefully develop knowledge and expertise in the area of user identification and orientation (surveys of application and use). Development areas for those operating at the enterprise level might be databases, measurement construction (metrics/ratios), and a review of the context in which results are interpreted.

Common ground at both sectoral and enterprise levels was undoubtedly found in the proliferation of data difficulties, questionable top management commitment and attitudes, and the debilitating effects of misalignment of goals (including the links between productivity and other social and economic imperatives), representing a rich mixture of social and technical factors. The need to address both was stressed by one delegate with the following comment: "Positive attitudes to measurement are irrelevant if data are unreliable for any reason."

ANNEX

Various attachments to this report

ANNEXES

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Program Schedule

Tuesday, 3 December 2002 (Day 1)

Morning	Opening remarks and welcoming of participants: APO representatives Mr. Lee Kia Yoke and Mr. Wong Wai Meng Visioning Session facilitated by Mr. John Parsons
	Session I: Presentation on *Structural Changes and Productivity Growth in Singapore: The Quality Effects of Age and Education* by Dr. Shandre M. Thangavelu, NUS
	Session II: Presentation on *Means & Ends–Productivity and Performance Measurements to Ensure Co-operation between Practitioners and Decision-makers* by Mr. John Parsons, Resource Alternatives Australia
Afternoon	Presentation on *Measuring Total Factor Productivity for Korean Telecom and Its Implications for Other Countries* by Prof. Taehee Lee, Korea Country paper presentations Briefing on groupings and issues for group discussions

Wednesday, 4 December 2002 (Day 2)

Morning	Session III: Presentation on *Has Singapore Manufacturing Been Overly Reliant on Capital Deepening? Fresh Evidence from the Divisia and Malmquist Indexes* by Assistant Prof. Randolph Tan Session IV: Presentation on *New Definition of Service Output and Its Application to TFP Analysis in the Retail and Car Insurance Sectors* by Dr. Takanobu Nakajima, Japan
	Country paper presentations
Afternoon	Country paper presentations
	Evaluation and summary
	Group discussions: *Sectoral-level Measurement and Application* facilitated by Prof. Taehee Lee and Dr. Takanobu Nakajima *Enterprise-level Measurement and Application* facilitated by Mr. John Parsons.

Thursday, 5 December 2002 (Day 3)

Morning	Group feedback presentations
	Summary session: APO Resource Persons
	Farewell lunch and certificate presentation.

Individual Vision Statements

Strategy

- Excellent productivity
- Make people results oriented
- Excellence of measurement by all stakeholders
- Networking between all stakeholders
- Backing for measurement information planning in both public and private sectors
- Identification of more reliable data items
- Meaningful data for decision-making

Methods, awareness, dissemination

- Process for acceptable performance standards
- Awareness of common benefits at grassroots level
- Build capacity for measurement
- How to use measurement technology
- Unfettered flow of productivity to delight all stakeholders
- Increase knowledge that is accessible to everyone

Services/intangibles

- Effective measures for the service sector
- Measurement of intangibles
- New methods for the service sector

Sectoral and sector–enterprise links

- Measurement across countries
- Good measurement at sectoral level
- Translation of measures from sectoral to enterprise level
- Compare sector, period, country implications
- Reconciliation of sectoral and enterprise productivity measures