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PROF. DR. MAISOM ABDULLAH

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PRODUCTIVITY DRIVEN GROWTH: Problems & Possibilities

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PRODUCTIVITY DRIVEN GROWTH : PROBLEMS & POSSIBILITIES

ABSTRACT

When Malaysia embarked on an industrial development path beginning with the Pioneer Industries Ordinance (1958) followed by the Investment Incentive Act (1968), the growth of the economy was fuelled by increasing utilization of factors of production, mainly capital and labour. Dependence on this "investment-driven growth" is manifested by the heavy dependence on industries which depend strongly on foreign investments including electronics and textiles.

Economists and other scholars are aware that high achieving and competitive economies such as Japan and Germany are productivity-driven rather than input-driven. Efforts to redirect the Malaysian industrial development towards a productivity-driven path were initiated in the 1980's through measurements and analysis of both partial and total factor productivity growth (TFPG). Major factors which will determine a productivity-led growth are identified as technological progress and innovation, quality management, human resource development, and improvements in quality of capital formation and investments. Malaysia is now ready to embark on a comprehensive path of productivity-driven growth as envisaged in the Productivity Master Plan (2000) and the implementation of consecutive 7th and 8th Malaysia Plans.

INTRODUCTION

In the late 1980's and during the first half of 1990's, experienced a rapid growth path by charting an enviable GDP growth of 8.3 percent in 1993, 9.2 percent in 1994 and 9.6 percent in 1995. Malaysia's sustained growth was impressive against the backdrop of the developed country's economic woes of sluggish growth and unemployment. Malaysia's sustained growth during this period was impressive and various international organizations and countries have billed her as one of the more dynamic developing countries (World Bank, 1994, World Development Forum, 1995.) The regional economic turmoil and financial crisis in the third quarter of 1997 however have left a crushing blow to the Malaysian and other Asian economies and is continuing to have negative and wide ranging implications even till this day. Many sectors face rising costs, decreasing demand, financial problems and deceleration in the growth of private investments.

In the past, the growth of the Malaysian economy was fuelled mainly by increasing utilization of the factors of production, mainly private investments and labour. This dependence on "investment-driven growth" manifested by out dependence on sectors such as electronics and textiles which accounted for nearly 60% of our exports in the 1990's.

During good times, when direct foreign investments were forthcoming liberally, we experienced rapid growth. However, the lesson of the third quarter of 1997, shows us that dependence of factor driven growth does not provide for a resilient economy. Countries which are fundamentally strong are more able to withstand the crisis.

Even though this fact was recognized even before the financial crisis, it has become more pertinent for our economy to be productivity-driven. Enhancement of a productivity-driven growth has become an imperative to accelerate the recovery process. The implementation process was laid out beginning with the Seventh Malaysia Plan (1997-2000) and the Productivity Master Plan (2000).

WHY PRODUCTIVITY?

It is often argued that productivity is the core of fundamentally strong economies. Solow, Abramovitz, and many great economists in the past and the influential management scientist, Michael Porter have strongly argued for productivity-driven growth versus input-driven growth. M. Porter succinctly argued that nations succeed in industries if their national circumstances provide an environment that supports improvement and innovation. Nations succeed in industries where their home based advantages are valuable and where their innovations, productivity and other fundamental factors foreshadow international needs. Success in international competition demands that firms translate domestic positions into international positions. Nations succeed in particular industries or industry segments because their home environment is the most dynamic and the most challenging, and stimulates firms to constantly upgrade themselves. Nations are most likely to succeed in industry segments where the determinants of factors conditions, demand conditions, related and supporting industries and firm strategy, structure and rivalry and infrastructure reinforce each other and become most favorable. The macroeconomic and social environment and government policy influences the level and

sophistication of the various determinants such as linkages and related industries, demand conditions, firm strategy and structure and rivalry, factor conditions and infrastructure. Positive firm strategies, structure and rivalry will in turn determine marketing strategies, technological improvements, and innovation and will enhance productivity. Similarly, good infrastructure and factor conditions such as skilled labour, energy and capital will influence the rate of productivity growth. Thus, Porter (1990), DRI McGraw Hill (1993) and many others argue that productivity is the core determinant of competitiveness of nations. For Malaysia who is aspiring to achieve an industrialized country status by year 2020 as espoused through her Vision 2020, productivity has become a major public policy issue. High productivity of Malaysian industries will be a decisive factor in determining Malaysia's ability to compete internationally.

What is productivity?

Productivity measures the relationship between outputs (the amounts of goods and services produced) and inputs (the quantities of labour, capital, and material resources used to produce the outputs). When given amounts of inputs produce larger quantities of outputs, productivity has increased.

The most common measure of the relationship between outputs and inputs is the value of output per worker or per hour worked, which is commonly known as labour productivity. This is perhaps the most important measure of welfare or the standard of living. Increases in labour productivity however may not be due to improvements in the quality of labour but due to substitution effects. For example, an increase in labour productivity can result from the replacement of labour by capital. In this case, a fall in the productivity of capital is the counterpart of the productivity increase for the substituted factor, labour.

Thus total factor productivity (TFP) which attempts to take account the contribution of all inputs - the services of plant and equipment, energy, and other materials, as well as that of managers and their employees, is a better measure than labour productivity. TFP is thus the best expression of the efficiency of economic activity and the prospects for longer-term growth. TFP is more difficult to estimate but is especially useful in determining what is causing changes in labour productivity and the efficiency in industries and other sectors. Productivity thus relates output to all inputs to assess net savings in terms of real costs per unit of output. Productivity gains emerge from improvements in the techniques, technology and management of the production process as well as management - labour relations.

PROBLEMS AND ISSUES ON PRODUCTIVITY

Error in Measurement of Output and Inputs

One of the major problems regarding productivity is in its measurement. While the definition is quite straightforward, one is beset with various questions when we begin to quantify output, labour and capital inputs. When the study of productivity is widened as for example, productivity in higher institutions, measurements of output as well as inputs become a major problem. In the tourism sector for example, what constitute the output

for a hotel? A tourist resort? Is it simply the number of visitors? How then can we begin to compare the productivity of for example, Phuket in Thailand versus Tioman in Malaysia?

Empirical economic research similarly encounters this problem of measurement of the variables output and inputs or factors of production. Various empirical studies estimating productivity growth, decomposition of the determinants of productivity growth, effects of policy parameters on productivity growth, etc. vary in their methodologies as well as the definition of the variables as well as the shares of the inputs. These variations concerning output and inputs are true for both aggregate productivity and sectoral or industrial productivity.

In our more than a decade of research experience, data reliability is a major problem. Initially, we depend on data on manufacturing industries from the Department of Statistics, Malaysia. This data is more useful for national accounting, rather than productivity measurement. As such, we are not very comfortable with productivity estimates, especially for policy purposes.

Beginning in 1992, NPC had made various efforts to improve the quality of data for productivity measurements. In 1996, NPC had undertaken a major effort to come out with the quality Divisia Index data using skill indicators for labour, differentiating capital based on their utilisation. Productivity estimates based on this data set show a welcome improvement.

Sectoral or National Comparison of Productivity

If the measurements of the variables constituting productivity is different from one sector to another, how does one actually compare, for example the productivity of manufacturing sector versus the agricultural or tourism sector?

Conceptually, it will not be possible.

TOWARDS A PRODUCTIVITY - DRIVEN GROWTH ECONOMY: POSSIBILITIES

This section provides a review of the factors that are of principal importance for the longer-term evolution of productivity within an industry. These inter-related factors must be coherently addressed in order to ensure sustained productivity growth and competitiveness. The most important aspect in a program to enhance productivity is the provision by the government of a conducive macroeconomic environment and a market mechanism which will provide the incentives for firms to constantly upgrade themselves and remain competitive against their rivals. Government policies regarding productivity include the government involvement in research and development (R&D), innovation, legislation and regulations, public sector productivity and the relationship between the government and the private sectors.

Various economic and institutional factors will also affect the rate of productivity growth of particular industries. These include the size of market, the level of economic activity,

the mobility of resources, the degree of competition among the industries, the availability of material inputs, taxation policies, educational and training facilities, investment and capital formation, automation of production, managerial aspects, labour quality and product quality. Productivity enhancement is thus multi-dimensional encompassing various disciplines including economics, engineering, sociology, management, etc.

The Macroeconomic Environment and Role of Government for Productivity Growth

The central role of the government is to provide an environment that is conducive for firms to constantly upgrade themselves. To achieve productivity growth, an economy must be continually upgrading. Thus the role of government policy is to stimulate firms to upgrade their competitive advantage through more sophisticated technology. Government policy should also support firms to enter new industries where higher productivity can be achieved.

Creation of an environment conducive to increased productivity also requires effective control of inflation. When inflation rate varies in an uncertain and unpredictable manner, inflation constitutes a major impediment to planning and decision making by businesses. During inflationary or unstable periods, such as financial instability, variations in relative prices are widened. This may reduce the ability of the price system to provide correct information within the economic system. Government policies towards industrial development may be nullified due to conflicting signals as a result of inflation or exchange rate fluctuations. For example, when the overall price level is stable, the movements of prices for particular items give unmistakable signals; when the price of a good goes up, buyers immediately get the message that the product has become scarce and thus make the appropriate adjustment. With inflation or exchange rate going up however, the 'signal' contained in any price change is no longer clear. A price rise may not be because the product has become scarce, but may be due to adjustments to the overall rate of inflation.

When the price signals no longer provide clear information concerning relative prices, producers may make mistakes and resources may be misallocated. Incorrect or delayed perception concerning relative prices can result in delays in the adoption of more efficient methods of production. Current government exchange rate policies have provided some stability to the economy.

The Relationship Between The Private and Public Sector Roles

While it is generally considered to be primarily the private sector's task to promote productivity within an industry, the relationship between public and private sectors need to be conducive towards that effect. For, example, to improve firm's productivity, it is the entrepreneur's task to choose the optimal and most efficient methods, to increase the R&D within the firm, to ensure that labour productivity is given focus. The need for sharing and exchanging information and the formulation of policy guidelines are essential at all levels between the private and public sectors as impetus to productivity improvement.

In Malaysia, the government has encouraged the growth of this relationship over the years through the active participation of the private sector in industrial and productivity policy formulation. This include the formation of the Business Council with membership from both the government and private sectors, annual dialogues between government policy 'makers and the private sector in the Ministry of International Trade and Industry and the Ministry of Finance. The concept of Malaysia Incorporated and the National Economic Action Committee have shown positive signs especially in the control of the economy as well as productivity increases.

Government Involvement in R & D and Innovation

Innovation may be considered the most critical of the requisites for an effective productivity program. Investments and conducive environment and effective market mechanism, (though important factors), however may be considered as the means through which innovation can take place. Innovation on the other hand is itself the means towards increased and sustained productivity growth. Thus, a direct link is established between innovation, productivity and competitiveness of a nation.

Productivity and innovation are both concerned with adding value to resources and the process of production. This task may be carried out both at the level of management of production and the technology of production. Technological advances and development of new technologies result from gains in human knowledge through research and development (R&D).

Innovation denotes new/improved products, goods, materials, equipments, machines, processes, services and any other economically relevant changes emerging from the application of knowledge. Innovation benefits enterprises by enabling them to earn and accumulate resources for their development and expansion. It benefits a national economy through the creation of wealth and income.

According to Solow, in terms of its basic cost reduction and/or value added function, innovation or technological progress constitutes the hard core of productivity achievement. More than half of the overall growth in national or international product, measured in constant money terms, is attributable to technological innovation. The impact of technological innovations on productivity is seen along three lines. (i) Innovative improvements which bring about direct and incremental productivity gains, but which do not produce new technology; (ii) Innovations which serve to restructure existing products, processes and industries; and (iii) Innovations which result in the creation of completely new industries.

The impact of innovation on productivity along each of these lines is markedly different. In category (i), productivity gains emerge from the availability of superior tools, equipment and machines, and from improvements in the design of products and/or production machines. These gains are of an incremental nature and do not involve radical modifications in the nature of products and the technology of their production. The innovative improvements here serve to improve the parameters of plant performance such as speed, reliability, precision, safety, output quality, downtime for repair and maintenance, and

adaptation of facilities to changes in material inputs. Examples of such innovative improvements are: machine tools working to closer tolerances, improved refractoriness in furnaces, more process control and feedback systems, computerisation of physical operations, changes in the design and scale of equipment, computer aided design (CAD), computer aided manufacturing (CAM), flexible manufacturing systems (FMS).

Innovations in category (ii) result in new production processes and / or improved products. They serve to substantially restructure existing businesses and industries, although they do not usually lead to the creation of new and different industries. Some examples of innovation in this category are: dry copying through xerography, digital transistor and the entire field of electronics, glass making through float glass process, beneficiation of low grade ores, coal gasification, steel making through introduction of oxygen, instant photography, high yielding varieties of seeds, printed circuits, and the field of microminiaturized products. As a discipline, engineering and other sciences are of critical importance.

Innovations in category (iii) are exceedingly radical in their nature, scope and impact. They give rise to entirely new types of industries: digital computer industries, jet travel, television, rocketry, bio-technology, space technology, lasers, and the whole new field of robotics.

Determinants of Productivity and Innovation

Productivity and innovation are the outcome of a set of factors conducive to their growth. They are inter-related in multilateral ways. They may be classified into three categories: Government policies encouraging and facilitating technological innovation and growth of productivity; managerial competence and organisational practices facilitating productivity and innovation; and the motivation, commitment and competence of organisational personnel at all levels regarding the goals of efficiency, effectiveness and inventiveness in production.

The factors grouped under each of the above categories are analytically independent. The basis of their distinctiveness lies in their respective levels of operation. They are however closely inter-related in a mutually supportive manner at the level of a nation's system of production. The factors encompassed under each category may now be delineated as follows.

Government policies define the macro-level conditions necessary for encouraging the growth of productivity and innovation within a nation. They include:

1. Provision of adequate facilities for the education and training of high-level technical and scientific manpower
2. Provision of adequate facilities for research and development (R&D) in institutions of higher learning and industries, and provision of adequate opportunities for R&D work to innovators and inventors.
3. Fiscal incentives to enterprises for R & D work to innovators and inventors.

4. Fiscal incentives to enterprises for modernisation of plants and machinery.
5. Import of technology for improving the productivity of capital labour and, and providing access to this technology to all productive units interested in benefiting from the technological up gradation of their production facilities.
6. Promotion of application and use of indigenous technical developments by domestic producers and strengthening the process of technology transfer from laboratories to the production floor/field.
7. Encouragement of R & D cooperation between industrial units; beport, telecommunications, etc., for facilitating the flow of men, materials, messages, products and transactions, across the nation.
8. Control of monopolies and unfair trade practices that may negate the urge for technical advancement.
9. Facilitation of competitiveness amongst enterprises for encouraging their productive efficiency.
10. Availability of financial resources and venture capital for introduction of new products and/or processes
11. Encouragement of inventors and innovators through financial rewards, public recognition and protection of their interests.
12. Availability of a central, comprehensive and easily accessible information facility for latest information on technical innovations, advances, cost factors and state of the art in major industries in different parts of the globe.
13. Development of adequate infrastructural facilities, viz., power transport, telecommunications, etc., for facilitating the flow of men, materials, messages, products and transactions, across the nation.
14. Promotion of an ethos of cooperation between managements, and employees, and restraining the disruptive tactics of some unions on the one hand, and exploitation of workers by employers on the other.

The list is not meant to be exhaustive. It is only meant to delineate the set of necessary conditions in providing supportive national climate for the growth of productivity and innovation.

The importance of technology and innovation has been recognised by the Malaysian government and concerted efforts are currently being addressed towards this effect through the formulation of the National Plan of Action for Industrial Technology Development in 1990, the incorporation of the Malaysian Technology Development Corporation in March 1992, the establishment of the Malaysian Technology Park and the upgrading of the Malaysian Industrial and Standards Research Institute (SIRIM), and the National Productivity Plan 2000.

Managerial Improvements

Managerial competence and organisational practices subsume the determinative factors of productivity and innovation at the enterprise level. The set of factors under this category may be listed as follows:

1. Optimal location, capacity and layout of the plant
2. Full utilisation of production capacity by developing the competitiveness of products in terms of quality and price
3. Rationalisation of work flow.
4. Effective personnel policies for the recruitment, training, assignment and promotion of persons on the basis of ability, merit and performance.
5. Optimal scheduling of work and materials handling.
6. Optimal planning of inventory levels, production facilities and plant maintenance
7. Effective control over costs and quality
8. Involvement of employees in the identification and solution of work problems through devices like quality circles and productivity teams.
9. Formulation, initiation and implementation of productivity improvement measures with the involvement of employees.
10. Regular monitoring of market and technical environment for timely information about new developments in production technology, possibilities of innovation and market changes.
11. Up gradation of work skills of organisation personnel through periodic programmes of creative training.
12. Modernisation of plant and machinery through internal R & D work and/or adoption of new technology from other sources.
13. Development of new/improved products through internal R & D work and/or import and assimilation of new technology
14. Treatment of employees as members of the organisation who have a vital interest in the success of the organisation, and providing them opportunities for growth, autonomy, and higher earnings, on the basis of their productive performance.

Labour Productivity

Factors in the third category refer to micro-level conditions necessary for productivity at the level of individuals. They comprise education, skills, training, experience, motivation, loyalty, morale and commitment of organisation personnel. Factors which influence labour productivity to a large extent depend on the underlying philosophy and personnel policies of management. But they also 'depend in a crucial manner on the values and norms of a nation's work culture. Motivation, commitment and loyalty are not purchasable commodities. At the same time, they constitute the basis of all endeavours towards the growth of productivity and innovation. Efforts in human resource development and use of information technology is currently the norm in Malaysia.

Investment and Capital Formation

Expansion of the nation's capital stock is essential both for productivity growth in general and for innovation in particular.

Investment and capital are considered as principal factors of productivity growth in industries. Their impact can be examined in different ways reflecting the different kinds of links which they have with other production factors. Thus, it is not only the amount o

f investment or stock of capital but more importantly the capital-labour ratio (capital-intensity), the capital-intensity), the capital-output ratio, the rate of utilisation of capital and the efficiency in the use of capital.

Elsewhere, we show the relationship between capital/labour ratio (capital intensity), value added per worker (labour productivity) and capital to value added ratio for the different business cycles. There is a strong correlation between capital intensity and labour productivity indices. Light or labour-intensive industries, are characterised by low labour productivity. On the other hand, labour productivity is high in heavy and medium industries. It is also noted that labour productivity indices are increasing faster in heavy and medium industries. For example, in Iron & Steel, Non-metallic Mineral and Industrial Chemicals industries, labour productivity index increased by more than 50 points.

On the other hand, in labour-intensive industries such as Footwear, the index of labour productivity has in fact declined. This is because capital-labour ratio in these industries has also declined, implying that very little capital has been injected into these industries. Heavy industries however are experiencing lower, though increasing, TFP growth compared to the light industries. This analysis points out that TFP growth in Malaysia cannot simply be explained by capital-labour and capital-output ratios. A more plausible explanation is that industries with large injections of new capital such as Iron & Steel, Non-metallic Mineral Products & Non-Ferrous Metal Product industries are experiencing rapidly increasing in both labour and capital productivities. Hence, we find that although these heavy industries are ranked with low TFP, they are nevertheless experiencing a faster rate of increase in TFP growth.

On the other hand, industries with declining capital injections are showing signs of slower rates of growth of TFP. This implies that factors such as capital obsolescence, and ageing of capital stock which influence the efficiency of capital are important determinants of TFP growth. New vintages of capital are often associated with the latest and best techniques of production. the results of this analysis may have implications for the means by which productivity growth can be encouraged through investment incentives. Restructuring of industry should be promoted through policies aimed at encouraging the retirement of inefficient plants and injection of new plants and machinery.

Productivity growth can be influenced by the quality of investment undertaken, i.e. the extent to which it embodies the latest technology. Currently, industry is faced with rapid advances in the area of automated production. Policies, therefore, should be aimed at improving quality of the capital stock. Often, such policies operate by providing information on new technology, products and markets, so that industry can keep pace with international developments.

CONCLUSION

Although our economy suffered badly due to the financial crisis in 1997, we are recovering from a 0.4% rate of growth in 2001 to an expected growth of 3.0% in 2002. While the focus of our policies must necessarily be towards ensuring that the Malaysian economy remains resilient, programs towards achieving higher productivity growth must continue for long term sustained growth.

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