

CHAPTER ONE

THE PRODUCTIVITY FRAMEWORK

"Productivity is above all, a state of mind. It is an attitude that seeks the continuous improvement of what exists. It is a conviction that one can do better today than yesterday, and that tomorrow will be better than today. Furthermore, it requires constant efforts to adapt economic activities to ever-changing conditions, and the application of new theories and methods. It is a firm belief in the progress of humanity."

The Productivity Committee of the European Productivity Agency

Rome, 1959

1.1 The Productivity Scenario

The effort to boost productivity is part of the strategy by organisations to be competitive, as outlined in the Second Industrial Master Plan (IMP2).

The IMP2 introduces the concept of *Manufacturing ++*, aiming at the full integration of the manufacturing value chain. The *Manufacturing ++* strategy also emphasise the productivity-driven development of the total manufacturing value chain, focusing on the full integration of manufacturing operations through the value-chain in order to enhance industrial linkages, thereby increasing productivity and competitiveness (MITI, 1996).

In this context, the National Productivity Corporation (NPC) being the nation's premier productivity and quality (P&Q) institution, is aligning constantly its activities to that of the needs of the industries to enhance productivity and competitiveness. As such, a 2-year productivity campaign from 1997-1999 was launched to emphasise the importance of productivity. In addition, the introduction of the Productivity Award in 1999 by the NPC is to give recognition to industries of all economic sectors that have achieved a high productivity level and growth and to inculcate the importance of productivity measurement.

It is widely recognised that productivity is a major factor in many of the problems of public concern, such as economic growth, inflation, distribution of income, wage reform, and international competitiveness.

Productivity is basically the relationship between the quantity of output and the quantity of input used to produce a particular output. It is a measure of efficiency in the use of inputs or resources in relation to its output, i.e. goods and services. Mathematically:

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

This formula measures how much output is produced from a given unit of input or resource. In other words, it explains how well the organisation is making use of the particular input or resource. Input or resources refer to any tangible or intangible materials needed to produce a good or service. These include, but not limited to the following: land, labour, machine and equipment, energy, materials and management output i.e. goods and services are the outcome of production used for the benefit and satisfaction of human wants and needs.

It can also be interpreted as a combination of efficiency, doing things right, and effectiveness, doing the right things.

Considering the above equation in its simplicity, productivity can be increased if:

- i. output is increased;
- ii. reduced manpower or savings in overtime;
- iii. reduction in material waste;
- iv. reduction in machine and manpower idle time; and
- v. increase in technology capability and efficiency.

The fifth element is undoubtedly an interesting topic to be pursued. In this context, the current trend of organisations investing and implementing information technology (IT) substantially as their modus operandi, poses an interesting debate: whether there exist any relationship between IT and productivity, or just a phenomenon of "productivity paradox". There is no argument that IT in the form of computer and communication enabling tools has been an important element in enhancing competitiveness of economic activities and trade (NPC, 1999). Moreover, the adoption of IT would place organisations strategically at the helm of a borderless and virtual marketplace.

1.2 *Productivity Analysis in Malaysia*

A glance through at Malaysia's productivity performance in 1999, reveals that the productivity level increased to RM22,026, registering a productivity growth of 3.9%. This is an encouraging trend of economic improvement if compared to the productivity level of RM15,700 with a negative growth of 1.8% in 1998. Generally, productivity contributed 70% to the GDP growth of 5.6% while the unemployment contributed to 29%.

Looking at the Total Factor Productivity (TFP), for the period 1998-99, the average growth rate of the TFP for the country was 1.6%. Throughout this period, capital was the main source of growth contributing 52.8%, TFP contributed 22.1% and labour contributed 25.1% to the overall GDP growth. The main sources of TFP growth for the period were capital structure, education and training, demand intensity, economic restructuring, and technical progress.

With the emergence of the new economy, the focus on productivity-driven growth is still maintained to enhance organisation's competitiveness. In this context, it is imperative to incorporate the challenges of globalisation and advent of information technology (IT) for the following initiatives:

- i. continuous upgrading of the quality of the workforce;
- ii. enhancing productivity and quality systems;
- iii. higher technology systems;
- iv. strengthening infrastructural support system; and
- v. intensifying productivity promotion.

1.3 The Framework

Nevertheless, it is necessary to look into the productivity framework so as to understand the concept of productivity. The concern for a long-term sustainable growth would determine the future standard of living and also improvements in national competitiveness. Generally, higher long-term productivity growth is associated with growth in capital intensity and growth in TFP.

Capital Intensity (CI) measures the physical capital expansion allocated to each employee. This measure indicates whether an organisation adopts a capital-intensive or labour-intensive policy. Higher CI provides the advantages of capital, quality, volume and speed to increase output and hence help improve productivity.

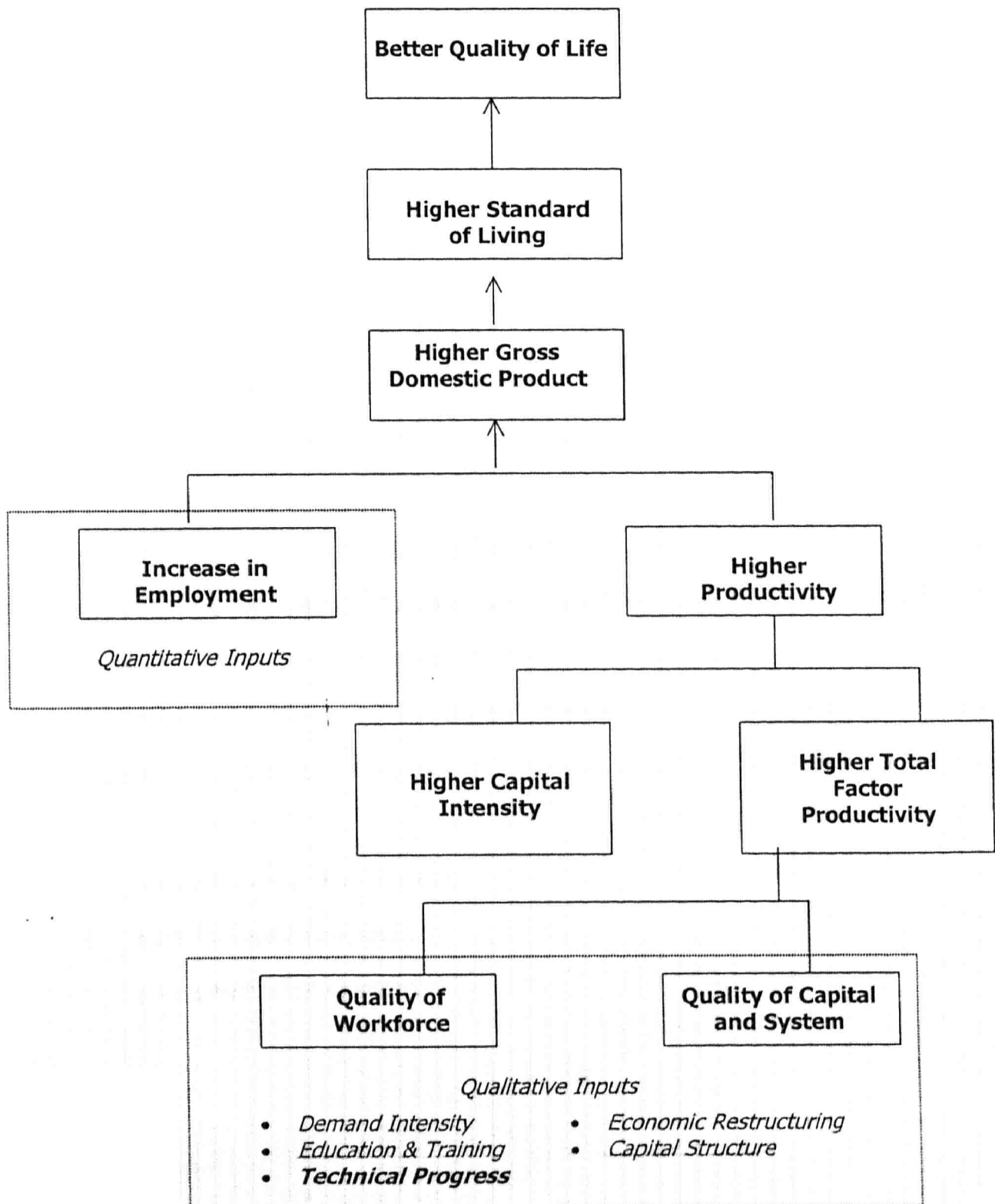
TFP measures the efficiency of the utilisation of both capital and human resources. It is also regarded as a measure of the degree of technological advancement associated with economic growth. Higher TFP growth indicates efficient utilisation and management of resources, materials and inputs necessary for the production of goods and services.

Although productivity is generally achieved through greater use of capital (capital deepening or higher capital intensity), TFP refers to the additional output generated through enhancement in efficiency arising from advancements in worker education, skills and expertise, acquisition of efficient management techniques and know-how, improvements in the organization, gains from specialization, introduction of new

technology and innovation, enhancement and greater use of IT as well as the shift towards higher added value processes and industries (Abdullah and Goh, 2001).

The productivity framework (Diagram 1) recognises IT investment and utilisation, a source of Technical Progress, as major determinants of growth, namely the total factor productivity (TFP) growth. Explicitly, investments in IT constitute quality of capital that would yield immediate output and increase efficiency. On the other end, effective and efficient utilisation of IT is a composition of the technical progress that would partly contribute towards an effective management system.

Diagram 1: The Productivity Framework



1.4 Scope of Study

The research paper would attempt to analyse linkages between IT and productivity at firm level in Malaysia as organisations have evidently undertaken rigorous parts in IT activities. Essentially, the study would analyse several variables in a qualitative dimension:

- i. investments in different types of IT
 - such as infrastructure, software, and hardware; and
- ii. measures of organisational performance
 - in terms of informational investment, and cost reduction;

Nevertheless, the study is constrained by the fact that the contribution of IT to productivity improvement is rather difficult to measure directly. There are claims that IT does not have any direct effect on productivity, it works through increasing the organisation's effectiveness and efficiency. In this context, this paper would try to enlarge the breadth of the study by incorporating several other dimensions of productivity measures, such as:

- i. product/service development;
- ii. technical efficiency; and
- iii. productivity management.

1.5 *Research Approach and Methodology*

The approach to be taken for the purpose of this study is both primary and secondary in nature. The primary study would be in the form of a detailed case study, selecting one company from manufacturing and service sectors respectively, so as to compare the investment returns of IT between these two sectors at large. As for the secondary study, data and information gathered from the NPC surveys on IT applications in the Malaysian manufacturing sector (1995, 1997, 1999) and the service sector (1996, 1998) would be utilised to comprehend the IT scenario in general.

The productivity analysis that would be used to measure productivity performance would consider the six productivity indicators:

i) Labour Productivity

Added Value per Employee reflects the amount of wealth created by the company, relative to the number of employees it has. It is influenced by management efficiency, work attitudes, price effects, and demand for products. A high ratio indicates the favourable effects of labour factor in the wealth creation process.

ii) Capital Intensity

Fixed Asset per Employee indicates whether a company adopts a capital-intensive or labour-intensive policy. A high ratio indicates high capital intensity.

iii) Capital Productivity

Added Value per Fixed Asset indicates the degree of utilisation of tangible fixed assets. A high ratio indicates the efficiency of asset utilisation.

iv) Process Efficiency

This ratio measures how efficient the business utilise its own resources namely labour, plant and machinery, and capital to generate added value and minimise the bought-in materials and services. It indicates the efficiency and effectiveness of the process, which is normally affected by production techniques used, technological innovation, managerial and labour skills. A high ratio indicates an efficient and effective process system and vice-versa.

v) Competitiveness

Competitiveness in terms of labour cost indicates the comparability of the industry in producing products or services at the lowest possible labour cost. There are four competitiveness ratios involved, of which two ratios are considered:

- a. labour cost per employee which measures the average remuneration per employee. A high ratio means high returns to individual workers and vice-versa; and
- b. unit labour cost which indicates the proportion of labour cost to total output. A high ratio indicates high labour, due to labour scarcity and lack of skilled labour, or poor labour mix.