



A Guide to Productivity Measurement

SPRING
singapore

Enabling Enterprise

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PRODUCTIVITY



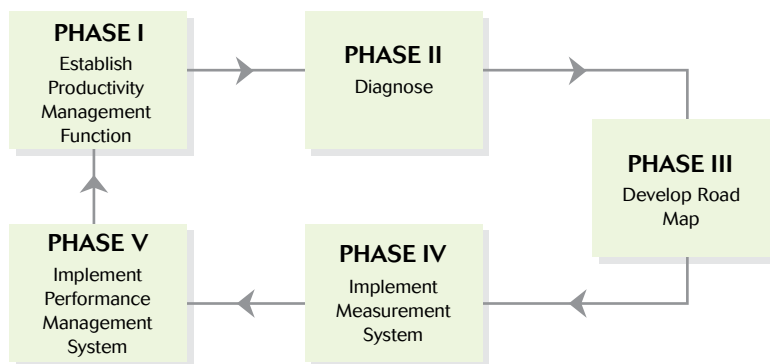
1 INTRODUCTION

Integrated Management of Productivity Activities

Productivity is critical for the long-term competitiveness and profitability of organisations. It can be effectively raised if it is managed holistically and systematically. The Integrated Management of Productivity Activities (IMPACT) framework provides a guide to how this can be done.

Figure 1.1 shows an overview of the IMPACT framework. Details of the framework can be found in *A Guide to Integrated Management of Productivity Activities (IMPACT)*, published by SPRING Singapore. The guide is available on the Productivity@Work website at www.enterpriseone.gov.sg.

Figure 1.1 : IMPACT Framework



Measurement System: A Critical Component of IMPACT

This guide focuses on Phase IV – Implement Measurement System – of the IMPACT framework.

The guide introduces you to productivity measurement concepts and provides steps on how to set up a measurement system and the practical applications of productivity measurement.

2 WHY MEASURE?

Productivity measurement is a prerequisite for improving productivity. As Peter Drucker, who is widely regarded as the pioneer of modern management theory, said:

**“Without productivity objectives, a business does not have direction.
Without productivity measurement, a business does not have control.”**

Measurement plays an important role in your management of productivity. It helps to determine if your organisation is progressing well. It also provides information on how effectively and efficiently your organisation manages its resources.

IMPACT FRAMEWORK

PHASE I

Establish
Productivity
Management
Function

PHASE II

Diagnose

PHASE III

Develop Road
Map

PHASE IV
Implement
Measurement
System

PHASE V

Implement
Performance
Management
System

USES OF MEASURES IN PRODUCTIVITY MANAGEMENT



Set goals and create awareness

- Set overall productivity goals for your organisation
- Raise awareness and garner commitment from employees



Know where you are now

- Assess your organisation's current performance
- Identify gaps and areas for improvement



Plan the journey to your destination

- Set targets and formulate strategies
- Implement specific actions



Monitor and reinforce performance

- Monitor and review plans
- Account to various stakeholders
- Link effort and reward to motivate employees

3 HOW TO MEASURE

Productivity is the relationship between the quantity of output and the quantity of input used to generate that output. It is basically a measure of the effectiveness and efficiency of your organisation in generating output with the resources available.

Productivity is defined as a ratio of output to input:

$$\text{PRODUCTIVITY} = \frac{\text{OUTPUT}}{\text{INPUT}}$$

Essentially, productivity measurement is the identification and estimation of the appropriate output and input measures.

Measures of Output

Output could be in the form of goods produced or services rendered. Output may be expressed in:

- Physical quantity
- Financial value

Physical Quantity

At the operational level, where products or services are homogeneous, output can be measured in physical units (e.g. number of customers served, number of books printed). Such measures reflect the physical effectiveness and efficiency of a process, and are not affected by price fluctuations.

Financial Value

At the organisation level, output is seldom uniform. It is usually measured in financial value, such as the following:

- Sales
- Production value (i.e. sales minus change in inventory level)
- Value added

Measures of Input

Input comprises the resources used to produce output. The most common forms of input are labour and capital.

Labour

Labour refers to all categories of employees in an organisation. It includes working directors, proprietors, partners, unpaid family workers and part-time workers.

Labour can be measured in three ways:

Number of hours worked

This measure reflects the actual amount of input used. It excludes hours paid but not worked (e.g. holidays, paid leave).

Number of workers engaged

This measure is more commonly used, as data on hours worked may not be readily available. Part-timers are converted into their full-time equivalent. An average figure for a period is used, as the number of workers may fluctuate over time.

Cost of labour

Labour costs include salaries, bonuses, allowances and benefits paid to employees.

Capital

Capital refers to physical assets such as machinery and equipment, land and buildings, and inventories that are used by the organisation in the production of goods or provision of services. Capital can be measured in physical quantity (e.g. number of machine hours) or in financial value, net of depreciation to account for the reduced efficiency of older assets.

Intermediate Input

Major categories of intermediate input include materials, energy and business services. Such input can be measured in physical units (e.g. kilogrammes, kilowatt per hour) or financial units (e.g. cost of energy and materials purchased).

Productivity Indicators

Productivity indicators measure the effectiveness and efficiency of a given input in the generation of output. Labour productivity and capital productivity are examples of productivity indicators.

Labour Productivity

Labour productivity, defined as value added per worker, is the most common measure of productivity. It reflects the effectiveness and efficiency of labour in the production and sale of the output.

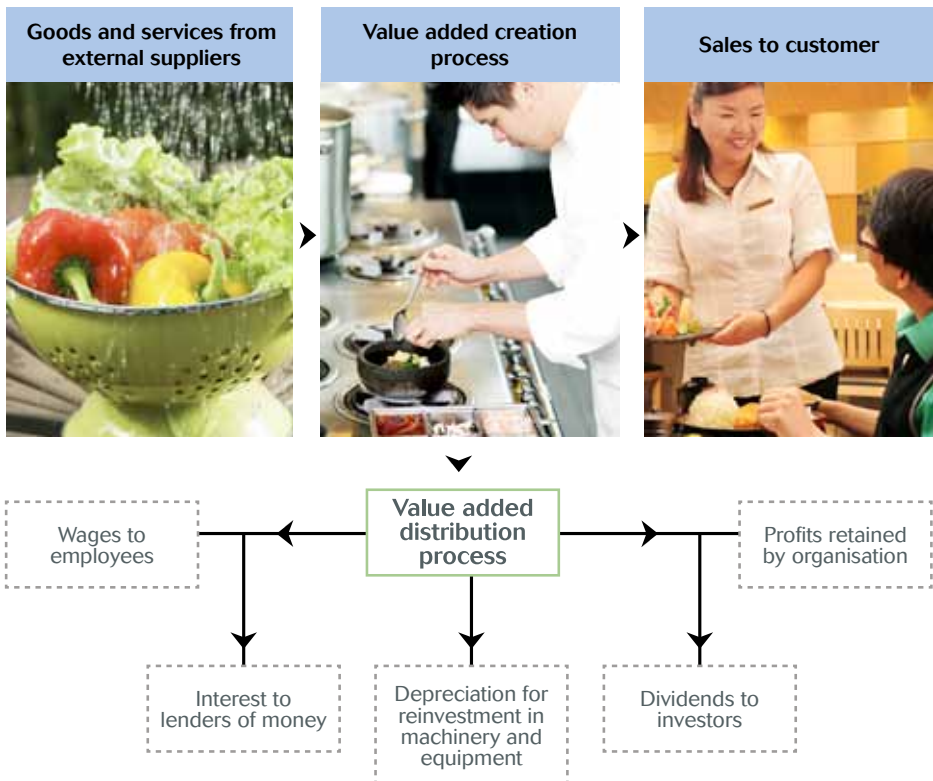
Capital Productivity

Capital productivity measures the effectiveness and efficiency of capital in the generation of output. It is defined as value added per dollar of capital. Capital productivity results from improvements in the machinery and equipment used, as well as the skills of the labour using the capital, processes, etc.

4 WHAT IS VALUE ADDED?

Value added is commonly used as a measure of output. It represents the wealth created through the organisation's production process or provision of services. Value added measures the difference between sales and the cost of materials and services incurred to generate the sales.

The resulting wealth is generated by the combined efforts of those who work in the organisation (employees) and those who provide the capital (employers and investors). Value added is thus distributed as wages to employees, depreciation for reinvestment in machinery and equipment, interest to lenders of money, dividends to investors and profits to the organisation.



Why Use Value Added?

Value added is a better measure of output for the following reasons:

It measures the real output of an organisation

Sales measures the dollar value of the output generated by the organisation. Value added, on the other hand, shows the net wealth created by the organisation. It is the difference between sales (what the customer pays to the organisation for the products or services) and purchases (what the organisation pays to suppliers for materials and services to generate the sales). Value added excludes supplies that are not a result of the organisation's efforts. It provides a customer-centric perspective and focuses on the real value created by the organisation.

It is practical

Value added is measured in financial units, which allows the aggregation of different output.

It is easy to calculate

Value added can be easily derived from an organisation's profit and loss statement. There is no need to set up a separate data collection system.

It is an effective communication and motivation tool

Value added provides a common bond between employers and employees to achieve the goal of increasing the economic pie shared by both parties. The higher the value created by the collective effort, the greater is the wealth distributed to those who have contributed to it.

It is applicable to both manufacturing and service industries

Value added is calculated in the same way for both the manufacturing and service industries. Unlike physical indicators, value added can measure the output of service industries which is often intangible.

How to Calculate Value Added

Value added can be calculated using either the Subtraction Method or the Addition Method.

Subtraction Method

The Subtraction Method emphasises the creation of value added. It measures the difference between sales and the cost of goods and services purchased to generate the sales.

Value added = Sales – Cost of purchased goods and services

Component	Significance
Sales	<p>Refers to revenue earned from products sold or services rendered by the organisation. It excludes miscellaneous and other non-operating income.</p> <p>In manufacturing, not all goods sold are produced in the same period. The change in inventory level should be subtracted from sales for a better reflection of the value of output produced during that period.</p>
Purchased goods and services	Purchases include raw materials, supplies, utilities and services (e.g. insurance, security, professional services) bought from external suppliers.

Addition Method

The Addition Method emphasises the distribution of value added to those who have contributed to the creation of value added.

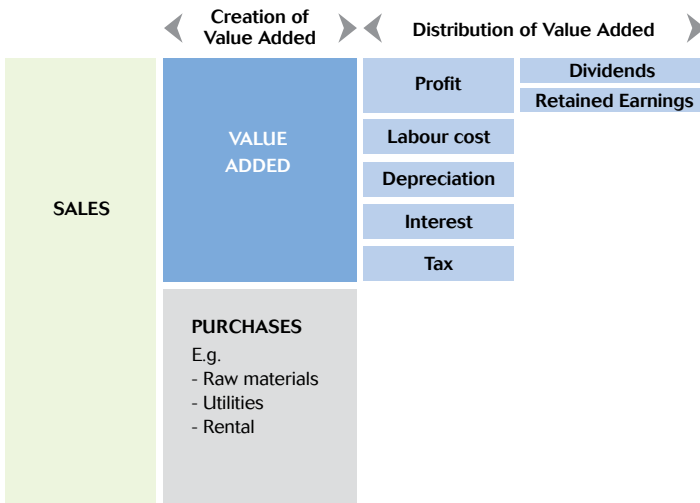
Value added = Labour cost to employees + Interest to lenders of money + Depreciation for reinvestment in machinery and equipment + Profits retained by the organisation + Other distributed costs (e.g. tax)

Component	Significance
Labour cost	Wages and salaries, commissions, bonuses, allowances, benefits and employers' contribution to CPF and pension funds.
Interest	Interest expense incurred for borrowing.
Depreciation	Value of fixed assets attributed across its useful life. Includes amortisation of intangible assets.
Profit	Refers to operating profit before tax. Non-operating income and expenses are excluded.
Tax	Refers to indirect taxes, excise duties and levies.

Value added does not arise as a result of paying out wages, interest charges, taxes, accounting for depreciation and generating profits. On the contrary, it is the creation of value added that allows such amounts to be paid or set aside. An increase in salaries alone will not increase value added as there will be a corresponding decrease in profits.

Figure 4.1 underlines the point that the creation and distribution of value added are two sides of the same equation. Hence, both the Addition and Subtraction methods should generate the same result. They are often used together to validate that value added has been calculated accurately.

Figure 4.1 : Creation and Distribution of Value Added



Value Added Statement

Figure 4.2 shows an example of a value added statement, and underlines how the information can be easily obtained from a profit and loss statement.

Figure 4.2 : Profit and Loss Statement and Value Added Statement

Profit and loss statement		Value added statement	
	\$		\$
Sales	450,000	Sales	450,000
Less: Cost of sales		Less: Change in inventory level	
Opening stock	200,000	Opening stock	(200,000)
Purchases	300,000	Closing stock	120,000
Less: Closing stock	(120,000)	Gross output	370,000
	<u>380,000</u>		
Gross profit	70,000	Less: Purchase of goods and services	
Non-operating income	10,000	Purchases of stock	(300,000)
		Services and administrative expenses	(27,700)
Less: Operating expenses		Value added	<u>42,300</u>
Advertising and marketing	5,000		
Audit fees	8,000	Distribution of value added:	
Depreciation	2,000	Staff costs and other benefits	45,000
Directors' fees	5,000	Depreciation	2,000
Rental	8,000	Interest	2,000
Repairs and maintenance	500	Tax	300
Staff costs	36,000	Profit before tax	2,000
Staff welfare and development	4,000	Less: Non-operating income	(10,000)
Foreign worker levy	300	Add: Non-operating expenses	1,000
Interest	2,000		
Office and other supplies	800	Value added	<u>42,300</u>
Utilities	3,200		
Transport, postage & communications	2,000		
Other operating expenses	200		
Total operating expenses	<u>77,000</u>		
Non-operating expenses	<u>1,000</u>		
Profit before tax	2,000		
Income tax expense	(130)		
Profit after tax	<u>1,870</u>		

Profitability and Productivity

Organisations commonly regard profits as a key measure of their success. Using profits as a measure may seem to imply that the organisation will benefit more if costs such as salaries and depreciation for capital reinvestment are reduced. However, lowering salaries to increase profits tends to lead to conflicts in the relationship between employees and management. Minimising capital investment often has a negative impact on the efficiency of operations, and eventually affects profits. Therefore, increasing profits by reducing such expenses is only a short-term measure.

The only viable way to increasing profits in a sustainable manner is to increase the economic pie or value added through higher productivity. This can be done with better cooperation from employees, higher investment in capital, and optimal use of capital.



In return for your employees' efforts, your organisation should share the additional wealth generated in the form of higher wages and improved benefits. This will reinforce and encourage them to further improve their performance.

To sum up, productivity is key to sustaining profits in the long run.

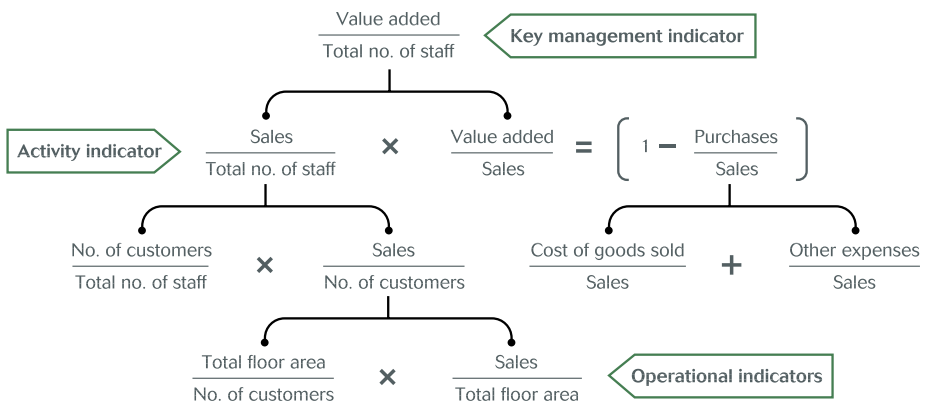
5 AN INTEGRATED APPROACH TO PRODUCTIVITY MEASUREMENT

As manpower is the key resource in many organisations, labour productivity (or value added per worker) is often used as the overall measurement for productivity. However, a single indicator does not provide a complete picture of your organisation’s productivity performance. Rather, an integrated approach to productivity measurement should be adopted.

What is an Integrated Approach to Productivity Measurement?

In an integrated approach to productivity measurement, the various dimensions of an organisation’s operations are linked to show how each of them affects overall performance. Figure 5.1 shows an example of a family of interlinked measures used by a retailer.

Figure 5.1 : Example of an Integrated Approach to Productivity Measurement



The key management indicators at the top are broad indicators that relate to the organisation’s goals. Such indicators are usually financial, value added-based ratios that provide management with information on productivity and profitability. They are then broken down into activity and operational indicators.

Activity indicators provide a snapshot of costs, activity levels and resource utilisation rates, which are particularly useful for middle and higher management.

Operational indicators are usually physical ratios that address the operational aspects that need to be monitored and controlled.

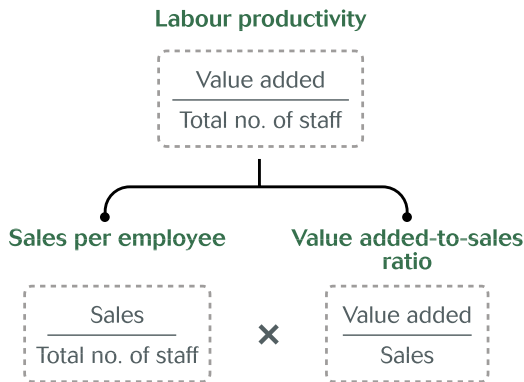
Why Adopt an Integrated Approach?

An integrated approach to productivity measurement:

- Provides a comprehensive picture of the organisation’s performance
- Highlights the relationships among different ratios and units, and allows the organisation to analyse the factors contributing to its productivity performance
- Helps diagnose problem areas and suggests appropriate corrective actions
- Enables the organisation to monitor its performance over time and against the performance of other organisations

Using the example shown in Figure 5.2, labour productivity (value added per worker) may be broken down into two ratios – sales per employee and value added-to-sales ratio – for a better understanding of the factors that affect it.

Figure 5.2 : Analysis of Labour Productivity

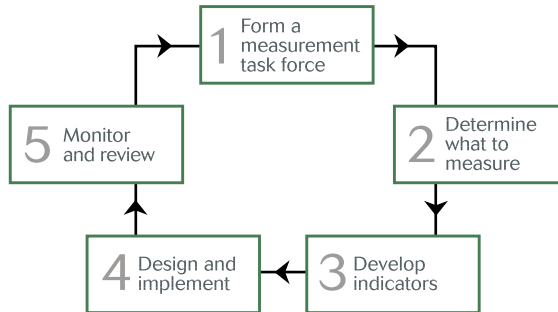


A decline in labour productivity could be due to a lower sales per employee ratio as a result of a new competitor, or a lower value added-to-sales ratio as a result of an increase in product costs. The analysis helps management to better decide on the appropriate action to take in order to improve productivity.

How to Develop an Integrated Productivity Measurement System

Figure 5.3 illustrates the steps for developing an integrated productivity measurement system. The structure of the measurement system varies, depending on the needs and operations of the organisation.

Figure 5.3 : Steps to Develop a Productivity Measurement System



Step 1: Form a Measurement Task Force

Productivity measurement is an integral part of productivity management. A dedicated task force should be formed to develop a productivity measurement system. The task force could be led by a member of senior management or a productivity manager, with representatives from different departments and levels who have good knowledge of the organisation's operations and processes.

Various stakeholders, such as customers and suppliers, should be engaged or consulted to obtain buy-in and to ensure that their needs are taken into consideration. Employees should also be involved in the design and implementation of productivity measures to give them a sense of ownership in the process.

Step 2: Determine What to Measure

“ Not everything that counts can be counted, and not everything that can be counted counts.”

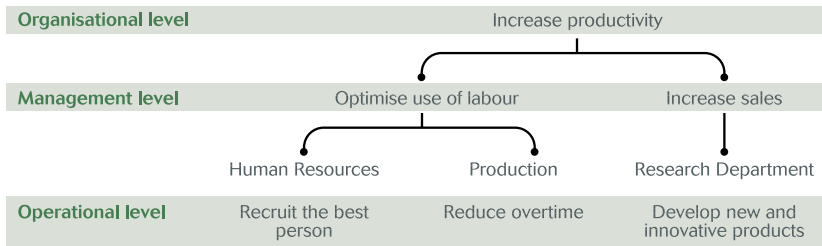
- Albert Einstein

The productivity measurement task force should first define the objectives of measurement.

At the management level, the objectives are based on the organisation’s overall productivity goals and key productivity levers. Productivity levers are areas or actions that an organisation can focus on to improve productivity significantly. Examples include obtaining higher value from products through service excellence and optimisation of labour through effective deployment of manpower.

Objectives at the organisational and management levels are cascaded down to the objectives of specific functions and individuals. Figure 5.4 shows examples of objectives of the various functions and their relationship with the organisation’s productivity goals.

Figure 5.4 : Examples of Productivity Goals and Objectives



Step 3: Develop Indicators

The following should be considered in developing productivity measures:

Indicators should measure something significant

Only elements that have a significant impact on the organisation’s performance and its key productivity levers should be measured.

Indicators should be meaningful and action-oriented

Indicators must be relevant to the organisation’s objectives and operations. They should explain the pattern of performance and signal a course of action.

Component parts of the indicators should be reasonably related

The output (numerator) and the input (denominator) should correspond with each other.

Indicators used by the industry or benchmarked organisations

Tracking indicators used by other organisations in the same industry or organisations that you have benchmarked against helps to facilitate future comparisons of your organisation’s performance against others.

Reliability of data

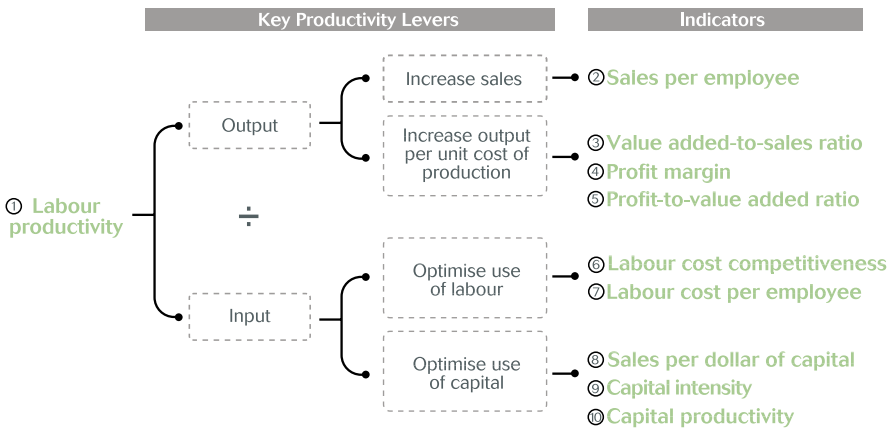
Data should be reliable and consistent. The indicators should provide an accurate reflection of what they are supposed to measure.

Practicality

Indicators should be easily understood by employees and practical to obtain.

There are 10 key management indicators commonly used to gauge an organisation's overall productivity performance. They measure the performance of key productivity levels as shown in Figure 5.5.

Figure 5.5 : Key Management Indicators



Details of the 10 indicators and other common productivity indicators used by the manufacturing and service sectors are given in the Annex. The productivity indicators listed are not restricted to the usual output per unit of input ratios. They include other performance indicators that measure the efficiency and effectiveness of the operations.

Step 4: Design and Implement

After selecting the appropriate indicators, the productivity measurement task force should:

- Establish accountabilities and responsibilities for the provision and use of data
- Link the indicators and determine how the performance of various departments affects the organisation's overall performance
- Decide how the indicators may be used in productivity improvement plans.

The next step is to establish a system, using appropriate technology, to collect, analyse and report the performance of the indicators, taking into account the needs of the employees providing and using the data.

An effective productivity measurement system should be an integral part of your organisation's daily operations and management information system. It should be flexible and adaptable to changing requirements.

Adequate training should be provided to staff to ensure a common understanding of the objectives and measures used, how the system works and how the measures relate to their work.

Step 5: Monitor and Review

“The only man I know who behaves sensibly is my tailor: he takes my measurements anew each time he sees me. The rest go on with their old measurements and expect me to fit them.”

- *George Bernard Shaw*

Productivity measurement is not a one-off project. The productivity measurement task force should review the effectiveness of the measurement system periodically and solicit feedback from users to further enhance the system and ensure its relevance.

6 WHAT DO YOU DO WITH PRODUCTIVITY MEASURES?

Productivity measures allow you to monitor the performance of your organisation and compare it against some standard to identify areas for improvement and actions to be taken. They also serve as a useful communication tool to motivate employees and reinforce performance.

Productivity Level and Growth

Organisations should monitor and analyse their productivity performance in terms of the *productivity level* measured by the various productivity indicators. Productivity levels reflect how efficiently and effectively an organisation's resources are used. Comparisons of productivity levels must be made between similar entities, such as two companies within the same industry.

In addition, organisations must track their *productivity growth*, which is an indicator of the change in productivity level over time. Productivity growth indicates dynamism and the potential for achieving higher productivity levels in the future. It is expressed as a percentage.

Comparison of Performance

“ Without a standard there is no logical basis for making a decision or taking action.”

- Joseph M. Juran

To know how well your organisation is faring, you may compare and evaluate its productivity performance against targets or past performance.

A comparison can also be made against your competitors using the Inter-Firm Comparison (IFC) tool, as well as against benchmarks and best-in-class performers for further improvement.

Inter-Firm Comparison

Inter-Firm Comparison (IFC) studies involve comparisons of a common set of key productivity indicators identified for organisations in the same line of business. The identities of the

organisations are not revealed to maintain confidentiality. Data provided by the organisations are aggregated and presented in terms of percentage changes, indices and ratios.

Organisations may also compare their productivity performance against the industry average. Industry data for the manufacturing sector are available from statistics published by the Economic Development Board in its annual Report on the Census of Manufacturing Activities. Services sector data are available from the Economic Surveys Series published by the Singapore Department of Statistics. Industries are classified by the Singapore Standard Industrial Classification (SSIC), which is based on the basic principles used in international statistical standards to facilitate comparison with other countries.

Benchmarking

Benchmarking is a systematic process of comparing processes and performance against others, to improve business practices.

Benchmarking may be performed internally by comparing similar operations or functions within an organisation, or externally against other organisations. These could include competitors or organisations with exemplary practices in other industries. Table 6.1 shows the common types of benchmarking used by organisations.

Table 6.1 : Types of Benchmarking

Type	Definition
Internal	Compare similar activities within an organisation.
Competitive	Compare against direct competitors within the same industry.
Functional / Process	Compare against other organisations identified to be leaders of that particular function or process. Such organisations need not be from the same industry.
Generic	Compare against organisations recognised as having world-class products, services or processes.

Unlike IFC, which focuses on comparing indicators, benchmarking compares indicators and processes or functions that are critical to an organisation's competitive advantage. Based on the benchmarking findings, organisations can put in place specific action plans to adapt and implement the best practices to improve their performance.

Use of Productivity Measures to Guide and Change Behaviour

Productivity Measures as a Communication Tool

Productivity measures may be used by management as a communication tool to direct employees' efforts towards the common goal of improving productivity. The measures provide information on current performance, goals, and what it takes for the employees to reach them.

Productivity Measures to Motivate and Reinforce Performance

Productivity measures quantify and facilitate an objective assessment of employees' performance. They provide information on performance gaps and help to identify the training needs of employees.

To motivate and reinforce productivity performance, productivity measures may be used to recognise and reward performance. This can be done by giving out awards to individuals or teams based on their contributions to productivity efforts.

In addition, productivity measures play a key role in productivity gainsharing schemes. Based on a formula agreed upon by both management and the employees, a proportion of the value added or wealth created by the organisation is distributed to employees in the form of a bonus or incentive payout. Productivity gainsharing promotes teamwork and fosters a culture of continuous productivity improvement.

Employees should have a clear understanding of how they are being appraised and the type of behaviour and performance that is recognised by the organisation.

7 CONCLUSION

Productivity measurement is an important means to an end. It provides valuable information on how an organisation is performing, where it would like to be, and how it can achieve its goals.

Productivity measures are only useful if they reflect the goals and objectives of the organisation, and used to bring about action and productivity improvements. This requires commitment from senior management, teamwork and participation from all employees.

“ Data becomes information only when it is viewed in an idea or context. “

- *Edward de Bono*

ANNEX

Common Productivity Indicators

Some indicators are commonly used by management to measure the overall productivity performance of an organisation. The indicators are shown in Table 1 in relation to the key productivity levers and objectives of measurement.

The indicators should be analysed by taking into account the organisation's operation, and the performance of other indicators.

Table 1 : 10 Key Management Indicators

	Indicator	Unit	Formula	What It Measures	Significance of a Lower Indicator	Significance of a Higher Indicator
	Productivity					
1	Labour productivity	\$	$\frac{\text{Value added}}{\text{Number of employees}^1}$	Efficiency and effectiveness of employees in the generation of value added	Poor management of labour and/ or other factors which affect the efficiency and effectiveness of labour	Efficient and effective utilisation and management of labour and other factors to generate value added
	Increase Sales					
2	Sales per employee	\$	$\frac{\text{Sales}}{\text{Number of employees}^1}$	Efficiency and effectiveness of marketing strategy	Inefficient or poor marketing	Efficient or good marketing strategy

Note

¹ Employees refer to all categories of employees, including working directors / proprietors/ partners, unpaid family workers and part-time workers. Part-time workers should be converted to their full-time equivalent.

Table 1 : 10 Key Management Indicators (Cont'd)

	Indicator	Unit	Formula	What It Measures	Significance of a Lower Indicator	Significance of a Higher Indicator
Increase Output Per Unit Cost of Production						
3	Value added-to-sales ratio	%	$\frac{\text{Value added}}{\text{Sales}}$	Proportion of sales created by the organisation over and above purchased materials and services	Inefficiency in the use of purchases, unfavourable prices for products and purchases, or poor control of stocks	Efficiency in use of purchases, favourable price differentials between products and purchases, or good control of stocks
4	Profit margin	%	$\frac{\text{Operating profit}}{\text{Sales}}$	Proportion of sales left to the organisation after deducting all costs	Costs are too high and are eroding profits	Ability to generate high returns from a given amount of sales
5	Profit-to-value added ratio	%	$\frac{\text{Operating profit}}{\text{Value added}}$	Operating profit allocated to the providers of capital as a proportion of value added	Low sales and/ or high costs, which need to be rectified. However, it may just reflect labour-intensiveness.	Ability to generate high sales and/ or low costs. A favourable situation provided that employees are remunerated adequately
Optimise Use of Labour						
6	Labour cost competitiveness	Times	$\frac{\text{Value added}}{\text{Labour cost}}$	Efficiency and effectiveness of the organisation in terms of its labour cost	Low levels of efficiency and effectiveness, or high wage rates not matched by efficiency and effectiveness	High efficiency and effectiveness accompanied by reasonable wage rates
7	Labour cost per employee	\$	$\frac{\text{Labour costs}}{\text{Number of employees}^1}$	Average remuneration per employee	Low remuneration to individual employees	High remuneration to individual employees

Note

¹ Employees refer to all categories of employees, including working directors / proprietors/ partners, unpaid family workers and part-time workers. Part-time workers should be converted to their full-time equivalent.

Table 1 : 10 Key Management Indicators (Cont'd)

	Indicator	Unit	Formula	What It Measures	Significance of a Lower Indicator	Significance of a Higher Indicator
Optimise Use of Capital						
8	Sales per dollar of capital	Times	$\frac{\text{Sales}}{\text{Fixed assets}^2}$	Efficiency and effectiveness of fixed assets in the generation of sales	Inefficient use of capital or poor marketing	Efficient capital utilisation or good marketing
9	Capital intensity	\$	$\frac{\text{Fixed assets}^2}{\text{Number of employees}^1}$	Extent to which an organisation is capital-intensive	Labour-intensive	Capital-intensive
10	Capital productivity	Times	$\frac{\text{Value added}}{\text{Fixed assets}^2}$	Efficiency and effectiveness of fixed assets in the generation of value added	Inefficient asset utilisation or over-investment in fixed assets	Efficient utilisation of fixed assets

Notes

¹ Employees refer to all categories of employees, including working directors / proprietors/ partners, unpaid family workers and part-time workers. Part-time workers should be converted to their full-time equivalent.

² Fixed assets should be stated at net book value, and exclude work-in-progress.

Tables 2 and 3 show other productivity indicators commonly used by the manufacturing and services sector (e.g. retail, food services and hospitality) to supplement the 10 key management indicators. The indicators listed are not restricted to the usual output per unit of input ratios. They include other performance indicators that measure the efficiency and effectiveness of the operations.

Table 2: Common Indicators for the Manufacturing Sector

Key Productivity Lever	Indicator	Formula	What It Measures
Increase sales	1	Delivery-on-time	$\frac{\text{No. of orders delivered on time}}{\text{Total no. of orders delivered}}$ Efficiency in delivering orders
	2	Return Material Authorisation (RMA) Turn Around Time (TAT)	Time taken to handle RMA request (time taken from when RMA request is received to the time when RMA is resolved) Efficiency in handling and resolving customer requests, and level of customer service
	3	Innovation or idea conversion rate	$\frac{\text{No. of suggestions implemented}}{\text{Total no. of suggestions}}$ Rate at which new ideas are assessed and implemented successfully through improvement initiatives
Increase output per unit cost of production	4	Cost-to-sales ratio	$\frac{\text{Cost of goods sold}}{\text{Sales}}$ Cost efficiency of producing goods relative to sales
	5	Defect rate	$\frac{\text{No. of defects}}{\text{Total no. of goods produced}}$ Effectiveness of quality control and system
Optimise use of labour	6	Capability or flexibility of workforce	$\frac{\text{No. of roles or jobs per worker}}{\text{Total no. of roles or jobs}}$ Ability of workforce to multi-task, and flexibility of the organisation to deploy its manpower

Table 2: Common Indicators for the Manufacturing Sector (Cont'd)

Key Productivity Lever		Indicator	Formula	What It Measures
Optimise use of labour	7	Employee variable pay-provision	$\frac{\text{Amount of performance-related rewards}}{\text{Sales}}$	Facilitates strategic decision-making related to variable pay levels
	8	Product yield per employee	$\frac{\text{No. of good output}}{\text{No. of employees}}$	Effectiveness of manufacturing process and productivity of employee
Optimise use of capital	9	Manufacturing cycle time or throughput time	Time taken to produce a product	Efficiency and effectiveness of manufacturing process
	10	Overall equipment effectiveness	Availability x Performance x Quality	Effectiveness of equipment in manufacturing a product

Table 3: Common Indicators for the Services Sector

Key Productivity Lever		Indicator	Formula	What It Measures
Increase sales	1	Sales per customer	$\frac{\text{Sales}}{\text{No. of customers served}}$	Efficiency and effectiveness of marketing strategy
	2	Waiting time per meal or customer served	Time taken from the point that customer enters to the point an order is filled	Efficiency in service delivery and level of customer service
	3	Compliment to complaint ratio	$\frac{\text{No. of compliments}}{\text{No. of complaints}}$	Level of customer service

Table 3: Common Indicators for the Services Sector (Cont'd)

Key Productivity Lever		Indicator	Formula	What It Measures
Increase output per unit cost of production	4	Cost per customer	$\frac{\text{Operating expenses}}{\text{No. of customers served}}$	Cost effectiveness in service delivery
	5	Inventory turnover ratio	$\frac{\text{Cost of sales}}{\text{Average inventory held during period}}$	Effectiveness of inventory management
Optimise use of labour	6	Employee to customer ratio	$\frac{\text{No. of employees or servers}}{\text{No. of customers}}$	Service quality and employee efficiency in service delivery
	7	Investment in training per employee	$\frac{\text{Amount of training expenses}}{\text{No. of employees}}$	Level of investment in training. This can also be measured in terms of the number of training hours per employee.
Optimise use of capital	8	Equipment efficiency	$\frac{\text{No. of jobs done}}{\text{Total working hours}}$	Efficiency and effectiveness of equipment such as dishwasher and baking equipment for restaurants, and bed-frame lifting system for hotels.
	9	Income or expenses per square metre	$\frac{\text{Income or expenses}}{\text{Total floor area}}$	Efficiency of space utilisation
	10	Customer-to-seat ratio	$\frac{\text{No. of customers}}{\text{Total no. of seats}}$	Efficiency of space utilisation

For more information on productivity and self-help tools, visit the Productivity@Work website at www.enterpriseone.gov.sg

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