



**PRIME MINISTER'S DEPARTMENT
DEPARTMENT OF STATISTICS, MALAYSIA**

Malaysia Handbook

Measuring Labour Productivity

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PREFACE

The publication *Measuring Labour Productivity* is an effort by the Malaysian Bureau of Labour Statistics (MBLS), Department of Statistics, Malaysia (DOSM) in producing a handbook that serves as a reference for those who want to understand the theory and methods of measuring labour productivity. Labour productivity refers to the efficiency and effectiveness of each employee to generate value added or overall output. It is measured by using the ratio of value added to the total hours worked or employment. The methodology used is guided by the recommendations of the System of National Accounts (SNA) 2008, The United Nations (UN) and The Organisation for Economic Co-operation and Development (OECD) Manual: *Measuring Productivity*.

This handbook's compilation is intended to help users gain a better understanding of the methodologies and procedures used in the production of Output against the use of Input(s) in order to meet the Malaysia Productivity Blueprint requirements. The statistics Labour Productivity can be used as an important indicator in measuring national productivity for the formulation, implementation and monitoring policy as well as performance of the economy. The handbook also serves as an essential reference to analysts, economists, academics, private sectors and individuals as well as a reference source for those who want to understand the methods of measuring labour productivity statistics.

This handbook is divided into nine chapters. The first chapter presents the introduction of labour productivity while the second chapter describes the sources of labour productivity indicators. Classifications and standards used are stated in the third chapter. The component of labour productivity, estimation procedures and calculation of labour productivity growth are presented throughout chapter four to chapter six in order to guide users on the compilation of labour productivity. Chapter seven presents 9 priority sub-sectors highlighted in Malaysia Productivity Blueprint. Guidance on data dissemination can be found in the eighth chapter while limitation and discussions are described in the final chapter to facilitate better understanding of the labour productivity statistics.

DOSM gratefully acknowledges all parties involved to prepare and publish this handbook. All comments and suggestions towards improving this handbook in the future are greatly appreciated.

MALAYSIAN BUREAU OF LABOUR STATISTICS

Department of Statistics Malaysia

March 2022

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TABLE OF CONTENTS

Preface	i
Acknowledgements and Contributors	ii
List of Tables, Exhibits, Boxes and Box Articles	iv
Glossary	v
Abbreviation	vii
1. Introduction	1
1.1. Background.....	1
1.2. Defining Labour Productivity.....	2
1.3. Objectives.....	3
1.4. Structure of Handbook.....	3
2. Sources of Labour for Productivity Indicators	4
3. Classifications and Standards	7
4. Component of Labour Productivity	9
5. Estimating Procedures	12
5.1. Employment Estimates.....	12
5.2. Total Hours Worked Estimates.....	12
5.3. Labour Productivity per Employment.....	13
5.4. Labour Productivity per Hour Worked.....	14
6. Calculation for Growth of Labour Productivity	15
6.1. Growth Year-on-Year for Quarterly Growth.....	15
6.2. Growth Quarter-on-Quarter.....	16
6.3. Annual Percentage Change.....	17
7. 9 Priority Sub-sectors	19
8. Data Dissemination	23
8.1. Quarterly Publication.....	23
8.2. Level of Dissemination.....	23
8.3. Statistical Release.....	24
8.4. Revision of Statistics.....	24
9. Limitation and Discussions	25
References	26

LIST OF TABLES, EXHIBITS, BOXES AND BOX ARTICLES

Table

Table 1:	Sources of Estimation for Labour Productivity Indicators	6
Table 2:	Malaysia Standard Industrial Classification 2008 Ver. 1.0	7
Table 3:	Formula for Components of Labour Productivity	11
Table 4:	Formula for Labour Productivity	14
Table 5:	Formula for Growth of Labour Productivity	18
Table 6:	Classification of 9 Priority Sub-sectors Using MSIC 2008 Ver. 1.0	20
Table 7:	Classification of Economic Activity Using MSIC 2008 Ver. 1.0	24

Exhibit

Exhibit 1:	Components of Labour Productivity	11
Exhibit 2:	9 Priority Sub-sectors	22

Box

Box 1:	Cobb-Douglas Production Function	2
Box 2:	Example for Labour Productivity per Employment	13
Box 3:	Example for Labour Productivity per Hour Worked	14
Box 4:	Example for Growth Year-on-Year for Quarterly Growth	15
Box 5:	Example for Growth Quarter-on-Quarter	16
Box 6:	Example for Annual Percentage Change	17

Box Article

Box Article 1:	Labour Productivity Situation in Malaysia	18
Box Article 2:	Labour Productivity of 9 Priority Sub-sectors	21

GLOSSARY

Agriculture

Agriculture comprises of activities of growing, breeding and rearing of animals and production of animal products, felling of trees and other plants, as well as capture fishery and aquaculture includes the use/utilisation of plants/vegetal and animal natural resources.

Average hours worked

Average hours worked is a measure of the total number of “hours actually worked” per employed person.

Construction

Construction is defined as new construction, alteration, repair and demolition. Installation of any machinery or equipment which is built-in at the time of the original construction is included, as well as installation of machinery or equipment after the original construction but which requires structural alteration in order to install.

Employment

All persons who, at any time during the reference week worked at least one hour for pay, profit or family gain as an employer, employee, own-account worker or unpaid family worker.

Employment hours worked

Employment hours worked refers to the overall number of employees at the end of the reference period excluding the employees who did not work during the reference period because of illness, injury, disability, bad weather, leave, labour dispute and social or religion reason.

Employment on leave

Employment on leave refers to the number of workers who did not work (because of illness, injury, disability, bad weather, leave, labour dispute and social or religious reasons) during the reference period.

Gross domestic product

The total value of production of all resident producing units of a country in a specified period, before deducting allowances for consumption of fixed capital. Gross domestic product is the total value of all goods and services produced in a certain period after deducting the cost of goods and services used up in the process of production. This value is before deducting the allowances for consumption of fixed capital i.e. the sum of value added of resident producer in producer's price plus import duties.

Indicators

Macroeconomic data that describes the condition of an economy which are used to determine whether an economy is prosperous and expanding or troubled and contracting.

Labour productivity

Labour productivity is a ratio of a volume measure of output to a volume measure of input use (hour worked or employment).

Labour productivity per employment

Labour productivity per employment is the ratio of value added to employment.

Labour productivity per hour worked

Labour productivity per hour worked is the ratio of value added to total hour worked.

Manufacturing

Refers to the physical or chemical transformation of materials or components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold out at wholesale or retail.

Mining and quarrying

Includes the extraction of minerals occurring naturally such as solids (coal and ores), liquids (petroleum) or gases (natural gas).

Services

Refers to outputs produced to order and which cannot be traded separately from their production. It comprises of industries related to Electricity, gas, steam & air conditioning supply; Water supply, sewerage, waste management & remediation activities, Wholesale & retail trade; Transportation & storage; Information & communication; Accommodation; Food & beverage; Finance; Real estate; Professional, scientific & technical; Administrative & support services; Education; Health & social work; Art, entertainment & recreation; and Personal services & other activities.

Single factor productivity

Single-factor productivity is synonymous to partial productivity measure. It relates output to one particular type of input.

Total hours worked

Refers to the aggregated number of hours actually worked during the period in employment.

Value added

The difference between output and intermediate consumption. It represents the added value of goods and services by economic activity. Hence, it is approximately equivalent to commercial profit, salaries & wages, depreciation and indirect taxes; plus, interest paid less interest received.

Whole economy

Includes all sectors Agriculture, Mining & quarrying, Manufacturing, Construction and Services.

ABBREVIATION

ABS	:	Australian Bureau of Statistics
AHW	:	Average hours worked
ARC	:	Advance release calendar
APC	:	Annual percentage change
CIDB	:	Construction Industry Development Board
COFOG	:	Classification of the Functions of Government
COICOP	:	Classification of Individual Consumption by Purposes
DOSM	:	Department of Statistics Malaysia
E&E	:	Electrical and electronics
F&B	:	Food & beverages
GDP	:	Gross domestic product
ILO	:	International Labour Organisation
ICLS	:	International Conference of Labour Statisticians
ISCO	:	International Standard Classification of Occupations
ICT	:	Information, communication and technology
ISIC	:	International Standard Industrial Classification of All Economic Activities
KILM	:	Key Indicators of The Labour Market
LFS	:	Labour force survey
LPE	:	Labour productivity per employment
LPHW	:	Labour productivity per hour worked
MASCO	:	Malaysian Standard Classification of Occupation
MBLS	:	Malaysian Bureau of Labour Statistics
MPB	:	Malaysia Productivity Blueprint
MPC	:	Malaysian Productivity Corporation
MSIC	:	Malaysia Standard Industrial Classification
NOPC	:	National Oversight Productivity Council
NPC	:	National Productivity Council

OECD	:	The Organisation for Economic Co-operation and Development
ONS	:	Office for National Statistics
QOQ	:	Quarter-on-quarter
SNA	:	System of National Accounts
THW	:	Total hours worked
UN	:	United Nations
UNSD	:	United Nations Statistics Division
VA	:	Value added
YOY	:	Year-on-year

1 INTRODUCTION

1.1 Background

Labour productivity has been acknowledged as an imperative economic indicator related to economic growth, competitiveness, and living standard of an economy. According to the Office for National Statistics (ONS), United Kingdom, productivity has an increasing role in formulating and assessing government policy¹. Interest in productivity trends has also been enhanced by other factors, including the public interest in the impact of technology and innovation on economic growth and concern over domestic labour's share of that growth.

In Malaysia, National Productivity Council (NPC) was formed to steer the implementation of productivity at the national level². The NPC is chaired by the Honourable Prime Minister and the Chief Statistician has been entrusted to be the NPC's member as Ex-Officio. In addition, National Oversight Productivity Council (NOPC) chaired by Minister of International Trade and Industry was established in 2015 and is one of the government's initiatives to monitor the execution of productivity agenda at sectoral level. The forming of this council indicates of how significant productivity statistics are in economic development.

Prior to 2017, labour productivity was published annually by the Malaysian Productivity Corporation (MPC) whereby the source of the data used is solely based on the Annual Labour Force Report. Concomitant to the requirements of Malaysia Productivity Blueprint (MPB), timely and comprehensive labour market statistics is crucial for labour productivity measurement and formulation of labour market policy. Therefore, inclusive and periodic statistics are pertinent to address the country's productivity issues. Befitting with the establishment of Malaysian Bureau of Labour Statistics (MBLS) under purview of Department of Statistics Malaysia (DOSM) to strengthen labour market statistics, labour productivity measures by kind of economic activity was compiled and published since 2017. Currently, labour productivity statistics are published quarterly from the period of first quarter of 2015.

Paul Krugman (2006) stated that productivity is not everything, but it is nearly everything in the long run. In order to raise the standard of living, a country relies mainly on its ability to raise output per employment. Measuring productivity helps in analysing economy and assists in public and private policymaking. In addition, it drives economic growth by generating new economic opportunities, ensuring people's wellbeing and prosperity. Additionally, it encourages the transition of economic activities from labour to knowledge and innovation based to generate new sources of revenue.

¹Office for National Statistics, The ONS Productivity Handbook: A Statistical Overview and Guide

²Malaysia Productivity Corporation, 2017 Annual Report

1.2 Defining Labour Productivity

Productivity is commonly defined as a ratio between the output volume and the volume of inputs. In other words, it measures how efficiently production inputs, such as labour and capital, are being used in an economy to produce a given level of output³. Based on Oxford Learner's Dictionary, productivity refers to the rate at which a worker, a company or a country produces goods, and the amount produced, compared with how much time, work and money are needed to produce them. Generally, in economics, factors of production such as land, labour, capital and entrepreneurship are used to produce output.

Based on The Cobb-Douglas production function, there is a relationship between inputs, namely physical capital and labour with the amount of output produced. From the production function, it can be assumed that output produced depends directly on labour and capital. In addition, effect of input changes, efficiencies and turnout of production can be computed through this function. However, in terms of single factor productivity measurement, capital input is considered as constant variable.

Box 1: Cobb-Douglas Production Function

The basic form of the Cobb-Douglas production function:

$$Q(L, K) = AL^{\beta}K^{\alpha}$$

where:

- Q is the quantity produced from the inputs L and K
- L is the amount of labour expended, which is typically expressed in hours
- K is the amount of physical capital input, such as the number of hours for a particular machine, operation, or perhaps factory
- A is total factor productivity
- α and β are output elasticity is the change in the output that results from a change in either labour or physical capital.

Source: The Cobb Douglas Production Function: Definition, Formula & Example

According to the International Labour Organisation (ILO), labour productivity represents the total volume of output produced per unit labour. The output was measured in terms of gross domestic product (GDP) while labour was measured in terms of number of employed persons during a reference period. In other words, it refers to ratio of output (goods and services) to input (total hours worked and employment). While the System of National Accounts (SNA) 2008, United Nations (UN) states that volumes of output per hour worked (or per person employed) are described as measures of labour productivity. In general, labour productivity refers to the efficiency and effectiveness of each labour and capital to generate value added or overall output⁴.

³The Organisation for Economic Co-operation and Development (OECD), Manual Measuring Productivity

⁴Department of Statistics, Malaysia, Quarterly Labour Productivity

There are various measures of productivity in which the choice of measurement depends of the purpose and availability of data. Broadly, productivity measures can be classified using single factor productivity or multifactor productivity. Single factor productivity is a measure of output to a single measure of input while multifactor productivity focuses on measuring output to a multiple of inputs.

In Malaysia, labour productivity is compiled based on the concepts and guidelines outlined in the System of National Accounts (SNA) 2008, United Nations (UN) and The Organisation for Economic Co-operation and Development (OECD) Manual: Measuring Productivity. The computation of labour productivity is currently using single factor productivity or partial productivity measure which concern on the efficiency of one class input. The input used are employment and total hours work whereby the measurement is presented in absolute value rather than index form and users are advised to use percentage change of data for analysis purposes.

1.3 Objectives

The key objectives of this handbook are:

- To provide a convenient guide on single factor productivity measurement especially on developing methodology and sources of data;
- To assist in the analysis and interpretation of the country's productivity measurement; and
- To produce an additional source of reference in computing productivity particularly using value added and single input such as employment and hours worked.

1.4 Structure of Handbook

This handbook is segmented into nine chapters. **Chapter 1** illustrates the background and productivity definition. Sources of labour productivity indicators is explained in **Chapter 2**. Next, **Chapter 3** of the handbook discusses classifications and standards used. Component of labour productivity is presented in **Chapter 4** while **Chapter 5** covers the estimating procedures. Other than that, **Chapter 6** reviews the calculation for growth of labour productivity while **Chapter 7** highlights the 9 priority sub-sectors. In **Chapter 8** describes the data dissemination while limitation and discussion are presented in the last chapter, **Chapter 9**.

2 SOURCE OF LABOUR PRODUCTIVITY INDICATORS

The estimation of labour productivity indicators is based on the household survey data, establishment survey data and administrative data from various agencies. Hence, below are the data sources for the estimation of labour productivity indicators for the whole economy and by kind of economic activity.

Gross Domestic Product data is obtained from the Quarterly National Accounts Gross Domestic Product report. The report contains statistics of quarterly national accounts estimates by economic activity and type of expenditure in both current and constant prices at base year 2015. However, the GDP data used to produce labour productivity is the GDP by economic activity at constant prices. The compilation of the data is based on System of National Accounts (SNA) 2008 while Malaysian Standard Industrial Classification (MSIC) 2008 Ver. 1.0 in accordance with the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4, 2008 is adopted for the classification of the economic activity.

Labour Force Statistics is based on the Labour Force Survey (LFS) conducted by DOSM. The LFS is based on guidelines and recommendations of the ILO with reference to the Surveys of Economically Active Population, Employment, Unemployment and Underemployment: An ILO Manual on Concepts and Methods. This survey which is carried out every month provides statistics of labour force, employment and unemployment at the national and state levels as well as urban and rural areas. The LFS report provides the principal statistics of the labour force according to demographic and socioeconomic characteristics such as sex, age group, urban and rural strata, ethnic groups, educational attainment, occupation and industry. The data used for labour productivity are employed persons, average hours worked and employment on leave (number of employed not at work during the reference period) by economic activity.

Informal Sector Workforce Statistics is based on the Informal Sector Workforce Survey conducted every two years and guided by the concepts and guidelines of the ILO with reference to Measuring Informality: A Statistical Manual on the Informal Sector and Informal Employment. The statistics on employment in the informal sector are presented according to demographic and socioeconomic characteristics such as gender, age group, strata, educational attainment, occupational and industrial categories. The additional information used to estimate the employment component of labour productivity is employment in the informal sector by industry.

Economic Census Statistics presents statistics on all economic sectors based on the Economic Census. This census is conducted every five years and comprises of establishments identified in all economic sectors classified under the MSIC 2008 Ver. 1.0, in accordance with the ISIC, Revision 4, 2008. The data contained in the Economic Census Statistics are value of gross output, value of intermediate input, value added, number of persons engaged, salaries & wages and value of fixed assets as well as information on persons engaged by qualification and women ownership. However, the data used to estimate employment in labour productivity is the number of persons engaged by economic activity.

Annual Economic Statistics obtained from the Annual Economic Survey by kind of economic activity namely Agriculture, Mining & quarrying, Manufacturing, Construction and Services sector. These broad sectoral classification was based on detailed industry according to MSIC 2008 Ver. 1.0. The survey provides statistics on value of gross output, intermediate input, value added, number of persons engaged, salaries & wages paid and value of fixed asset. Meanwhile, the data used to estimate employment in labour productivity is the number of persons engaged by economic activity.

Employment Statistics, which is published based on the Quarterly Employment Survey is conducted on the registered establishments in the private sector, is aligned with the framework and guidelines recommended by the ILO and best practices of other national statistical offices. The statistics reported are jobs, filled jobs, vacancies and jobs created presented by five main economic sectors namely Agriculture, Mining & Quarrying, Manufacturing, Construction and Services sectors, classified according to MSIC 2008 Ver. 1.0. The data used to estimate the employment in labour productivity is filled jobs by economic activity.

Manufacturing Statistics are obtained from the Monthly Manufacturing Survey and it is covered the whole of Malaysia. The statistics provided are sales value, number of employees, salaries & wages and the main products manufactured whereby number of employees by economic activity is used to estimate the employment component of labour productivity. The concepts and definitions used are from the manual of Recommendations for Industrial Statistics 2008, United Nations Statistics Division (UNSD) whereby the definition of manufacturing is accordance to MSIC 2008 Ver. 1.0.

Construction Statistics are acquired from the Quarterly Construction Survey. This survey covers main contractors registered with the Construction Industry Development Board (CIDB) Malaysia with the project value of RM500,000 and above. Construction is defined according to MSIC 2008 Ver. 1.0. The statistics presented are the value of construction work done for types of construction activity, state and construction project ownership by the government, private sector and public corporation. The value of construction work done includes new construction, major repairs, repairs, renovations and repairs and current maintenance carried out during the reference period for the project owner or investor. The estimation of employment component of labour productivity also referred to value of construction work done.

Services Statistics are collected through the Quarterly Survey of Services and Monthly Survey of Distributive Trade which comprises of the sub-sectors of Wholesale & retail trade; Information & communication; Transportation & storage; Food & beverages; Professional; Private health; Private education; Accommodation; Arts, entertainment & recreation and Real estate activities. These data are compiled based on the detailed classification of industries in MSIC 2008 Ver. 1.0 which is in line with ISIC Revision 4, 2008 published by the UNSD. The statistics provided are total revenue/sales value, number of persons engaged and salaries & wages paid. However, the data used to estimate the employment in labour productivity is the number of persons engaged by economic activity.

Secondary data are also used to estimate labour productivity namely **Employment Statistics in Financial Industry** by Bank Negara Malaysia, **Public Servant Statistics** by Public Service Department and **Foreign Workers** statistics from Ministry of Home Affairs

Table 1: Sources of Estimation for Labour Productivity Indicators

Data sources	Sector					
	Whole economy	Agriculture	Mining & quarrying	Manufacturing	Construction	Services
Output (constant gross domestic product)						
Gross Domestic Product Statistics	✓	✓	✓	✓	✓	✓
Input (employment)						
Labour Force Statistics	✓	✓	✓	✓	✓	✓
Informal Sector Workforce Statistics	✓	✓	✓	✓	✓	✓
Economic Census Statistics	✓	✓	✓	✓	✓	✓
Annual Economic Statistics	✓	✓	✓	✓	✓	✓
Employment Statistics	✓	✓	✓	✓	✓	✓
Manufacturing Statistics	✓			✓		
Construction Statistics	✓				✓	
Services Statistics	✓					✓
Employment Statistics in Financial Industry	✓					✓
Public Servant Statistics	✓					✓
Foreign Workers	✓					✓
Input (average hours worked)						
Labour Force Statistics	✓	✓	✓	✓	✓	✓

3 CLASSIFICATIONS AND STANDARDS

Labour productivity is compiled by kind of economic activity based on MSIC 2008 Ver. 1.0 which is aligned with the ISIC Revision 4. The categories of industries are as follows:

Table 2: Malaysia Standard Industrial Classification 2008 Ver. 1.0

Section	Description
A	Agriculture, forestry and fishing
B	Mining and quarrying
C	Manufacturing
D	Electricity, gas, steam and air conditioning supply
E	Water supply; Sewerage, waste management and remediation activities
F	Construction
G	Wholesale and retail trade; Repair of motor vehicles and motorcycles
H	Transportation and storage
I	Accommodation and food service activities
J	Information and communication
K	Financial and insurance/takaful activities
L	Real estate activities
M	Professional, scientific and technical activities
N	Administrative and support service activities
O	Public administration and defence; Compulsory social security
P	Education
Q	Human health and social works activities
R	Arts, entertainment and recreation
S	Other service activities
T	Activities of households as employers; Undifferentiated goods and services producing activities of households for own use
U	Activities of extraterritorial organizations and bodies

In addition, several reference materials are also used in generating labour productivity such as the Malaysian Standard Classification of Occupation (MASCO); guidelines and recommendations from International Conference of Labour Statisticians (ICLS); ILO Key Indicators of The Labour Market (KILM); ILO Manual on Concepts and Methods - Survey of Economically Active Population, Employment, Unemployment, and Underemployment; and Measuring Informality - A Statistical Manual on the Informal Sector and Informal Employment by the ILO. These materials are referred and used to determine the estimation of employment.

MASCO is a national benchmark for the classification of occupations in the employment structure of the country which is developed in accordance with the International Standard Classification of Occupations (ISCO) with changes and modifications to meet the needs of the country⁵ while the ICLS manual is used as guidelines on how to collect and process information about status in employment in statistical surveys and censuses⁶.

The KILM is a multifunctional research tool designed to make labour market information and analysis easily accessible. The 17 indicators provide detailed information related to 36 data tables, including indicators on employment (occupation, status, sector, hours, etc.), labour underutilization and the characteristics of job seekers, education, wages, labour productivity and working poverty. Taken together, these indicators provide a strong foundation from which to address key questions related to productive employment and decent work⁷.

The 2015 Sustainable Development Goal Agenda committed by all United Nations members including Malaysia had also included “productivity” in the framework, specifically in targets 2.3 and 2.4 (agricultural productivity), 8.2 (total factor productivity) as well as target 9.5 (research and development). Under these targets, there are six (6) indicators to be measured by nations, specifically:

- **Indicator 2.3.1:** Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size
- **Indicator 2.3.2:** Average income of small-scale food producers, by sex and indigenous status
- **Indicator 2.4.1:** Proportion of agricultural area under productive and sustainable agriculture
- **Indicator 8.2.1:** Annual growth rate of real GDP per employed person
- **Indicator 9.5.1:** Research and development expenditure as a proportion of GDP
- **Indicator 9.5.2:** Researchers (in full-time equivalent) per million inhabitants

Meanwhile ILO Manual on Concepts and Methods - Survey of Economically Active Population, Employment, Unemployment, and Underemployment; and ILO Measuring Informality - A Statistical Manual on The Informal Sector and Informal Employment are used as a guideline in the implementation of the survey.

⁵Malaysian Standard Classification of Occupation (MASCO) 2013, Ministry of Human Resources

⁶Resolution concerning the International Classification of Status in Employment (ICSE), adopted by the Fifteenth International Conference of Labour Statisticians (January 1993)

⁷Key Indicators of the Labour Market, Ninth edition, International Labour Office · Geneva, 2016

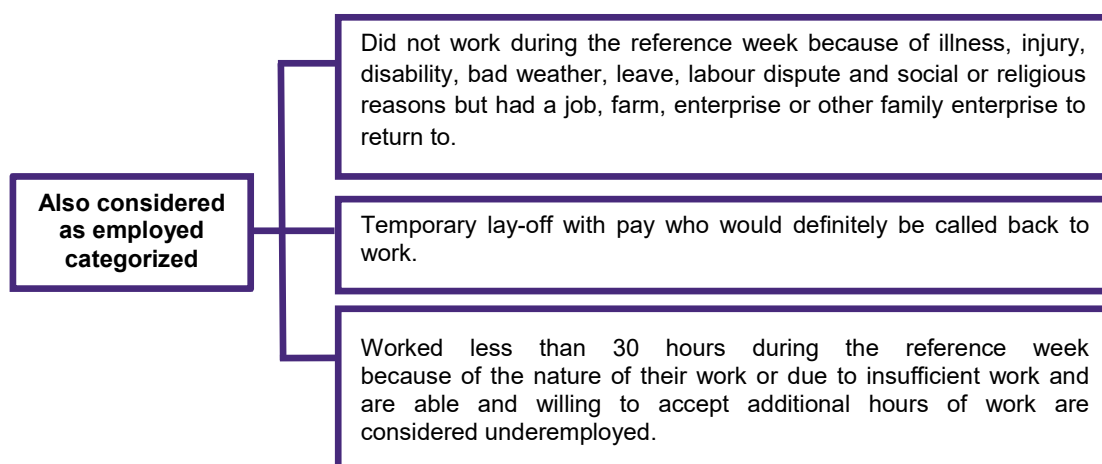
4 COMPONENT OF LABOUR PRODUCTIVITY

Value Added

Value added refers to the difference between output (value of goods and services produced) and intermediate consumption (value of goods and services consumed in the production process of goods and services excluding salaries and wages, depreciation of capital and net interest paid). It represents the value added of goods and services by economic activity. Hence, it is approximately equivalent to commercial profit, salaries and wages, depreciation price factor in the calculation of labour productivity. The value added refers to GDP at a constant price at base year 2015 which is the value of GDP without price effect.

Employment

All persons who, at any time during the reference week worked at least one hour for pay, profit or family gain as an employer, employee, own-account worker or unpaid family worker.



Employment on Leave

Employment on leave refers to the number of workers who did not work (because of illness, injury, disability, bad weather, leave, labour dispute and social or religious reasons) during the reference period. This group should be excluded as they did not contribute their services during that particular time. This data is obtained from the LFS.

Employment Hours Worked

Employment hours worked defined as the difference between employment and employment on leave. It also refers to the overall number of employees at the end of the reference period excluding the employees who did not work during the reference period because of illness, injury, disability, bad weather, leave, labour dispute and social or religion reason.

$$\text{EmpHW} = \text{Emp} - \text{EmpL}$$

where:

EmpHW	employment hours worked;
Emp	employment; and
EmpL	employment on leave.

Average Hours Worked

Average hours worked is defined as the number of hours worked per the number of people in employment. This employment refers to the employment hours worked or the overall number of employees at the end of the reference period excluding the employees who did not work during the reference period because of illness, injury, disability, bad weather, leave, labour dispute and social/religion reason. This data is obtained from the LFS.

Total Hours Worked

Total hours worked is the result of multiplying average hours worked with the employment hours. It is defined as the aggregate number of hours actually worked during the reference period.

$$\text{THW} = \text{AHW} \times \text{EmpHW}$$

where:

THW	total hours worked;
AHW	average hours worked; and
EmpHW	employment hours worked.

Exhibit 1: Components of Labour Productivity

Value added	Employment	Employment on Leave
The difference between output and intermediate consumption	All persons who, at any time during the reference week worked at least one hour for pay, profit or family gain	The number of workers did not work during the reference period should be excluded because of they did not contribute their services during that particular time
The overall number of employees at the end of the reference period excluding the employees who did not work/employment leave	The total number of hours worked divided by the number of people in employment	The total number of hours worked by all employment during the reference period
Employment Hours Worked	Average Hours Worked	Total Hours Worked

Table 3: Formula for Components of Labour Productivity

Description	Formula	
	Quarterly	Yearly
Value added (VA)	$VA_{qi} = O_{qi} - IC_{qi}$ <i>O</i> : output; <i>IC</i> : intermediate consumption	$VA_y = \sum_{i=1}^4 VA_{qi}$
Employment (Emp)	Extrapolation method	$TE_y = \frac{\sum_{i=1}^{n=4} Emp_{qi}}{n}$
Employment hours worked (EmpHW)	$EmpHW_{qi} = Emp_{qi} - EmpL_{qi}$ <i>EmpL</i> : employment on leave	$EmpHW_y = \frac{\sum_{i=1}^{n=4} EmpHW_{qi}}{n}$
Average hours worked (AHW)	-	$AHW_y = \frac{THW_y}{EmpHW_y}$
Total hours worked (THW)	$THW_{qi} = AHW_{qi} \times EmpHW_{qi}$	$THW_y = \sum_{i=1}^4 THW_{qi}$

Notes: y is yearly; q is quarterly; and i is 1st quarter to 4th quarter

5 ESTIMATING PROCEDURES

Labour productivity is estimated using the single factor productivity method. This estimate is based on information of **value added per employment** or **value added per hour worked** by economic activity. Value added at constant prices is used with reference to the value of goods and services at 2015 prices. Employment refers to the overall number of employees in the reference period whereas total hours worked are the aggregate number of hours actually worked during the reference period for paid employees or self-employed.

5.1 Employment Estimates

The estimation of employment is based on census and surveys data conducted by DOSM as well as administrative data from various agencies. These estimates include quarterly and annual estimates which covered employment by economic activities. The employment estimates by economic activities are calculated using extrapolation method that refer to a variety of data sources. This estimate is prepared using a bottom-up approach whereby employment is initially estimated at the 3-digit MSIC breakdown, bringing it up to the level of economic activities and finally by sector. The total employment is the sum of the employment estimates of all the sectors. Next, the estimation of total employment for a particular quarter is adjusted and realign to total employed persons published in quarterly report of LFS. Meanwhile, annual employment is the average quarterly employment for the year. It should be noted that employment estimates by economic activities is not solely based on LFS as the employment component of labour productivity has taken into account harmonisation of labour supply and demand data sources.

5.2 Total Hours Worked Estimates

The quarterly total hours worked is calculated by multiplying average hour worked with employment hours worked. The average hours worked is obtained from LFS. Meanwhile employment hours worked refers to the overall number of employees at the end of the reference period excluding the employees not at work during the reference period because of illness, injury, disability, bad weather, leave, labour dispute and social or religion reason. Annual total hours worked is sum of the quarter total hours worked in a year.

5.3 Labour Productivity per Employment

Labour productivity per employment is defined as the value that each employed person creates per unit of his/her input. It is measured as value added per employment. Labour productivity per employment for a quarter refers to value derives from the ratio of value added for a quarter to employment of the same quarter. To calculate labour productivity per employment for a year, the sum of value added during the four quarters of the year is divided by the quarterly average employment during the year.

$$LPE = \frac{VA}{Emp}$$

where:

- LPE** labour productivity per employment;
- VA** value added; and
- Emp** employment

Box 2: Example for Labour Productivity per Employment

In Q4 2020, value added for the Manufacturing sector was RM84,206 million while total employment in the sector was 2.584 million persons. Labour productivity per employment is calculated as follows:

$$LPE_{Q4\ 2020} = \frac{VA_{Q4\ 2020}}{Emp_{Q4\ 2020}}$$

$$LPE_{Q4\ 2020} = \frac{RM\ 84,206\ million}{2.584\ million\ person}$$

$$LPE_{Q4\ 2020} = RM32,583$$

Hence, the labour productivity per employment for Manufacturing sector in Q4 2020 was RM32,583. In other words, each employee in the Manufacturing sector produced RM32,583 value added in Q4 2020.

5.4 Labour Productivity per Hour Worked

Labour productivity per hour worked is measured as value added per total hours worked. It is reflected in the amount of output produced within an hour. Based on the Measuring Productivity manual by the OECD, the most appropriate single factor productivity input measurement is based on the number of hours worked. Labour productivity per hour worked for a quarter refers to value derives from the ratio of value added for a quarter to total hours worked for a quarter. Meanwhile, to calculate labour productivity per hour worked for a year, the sum of four quarterly value added for a year is divided by the sum of four quarter total hours worked in a year.

$$LPHW = \frac{VA}{THW}$$

where:

LPHW labour productivity per hour worked;
VA value added; and
THW total hours worked

Box 3: Example for Labour Productivity per Hour Worked

In Q4 2020, value added for Manufacturing sector was RM84,206 million while total hours worked 1,510.4 million hours. Calculation of labour productivity per hour worked is as follows:

$$LPHW_{Q4\ 2020} = \frac{VA_{Q4\ 2020}}{THW_{Q4\ 2020}}$$

$$LPHW_{Q4\ 2020} = \frac{RM84,206\ \text{million}}{1,510.4\ \text{million hours}}$$

$$LPHW_{Q4\ 2020} = RM55.8$$

Thus, the labour productivity per hour worked for the Manufacturing sector in Q4 2020 was RM55.8. In other words, each hour worked in the Manufacturing sector produced RM55.8 value added in Q4 2020.

Table 4: Formula for Labour Productivity

Description	Formula	
	Quarterly	Yearly
Labour productivity per hour worked (LPHW)	$LPHW_{qi} = \frac{VA_{qi}}{THW_{qi}}$	$LPHW_y = \frac{VA_y}{TE_y}$
Labour productivity per employment (LPE)	$LPE_{qi} = \frac{VA_{qi}}{Emp_{qi}}$	$LPE_y = \frac{VA_y}{Emp_y}$

Notes: y is yearly; q is quarterly; and i is 1st quarter to 4th quarter

6 CALCULATION FOR GROWTH OF LABOUR PRODUCTIVITY

6.1 Growth Year-on-Year for Quarterly Growth

Quarterly growth of labour productivity or indicators refers to percentage change from corresponding quarter of preceding year or year-on-year growth (YOY). YOY analysis is used for

- i) to estimate and extrapolate data based on YOY growth;
- ii) to understand general performance in long-term analysis; and
- iii) to analyse and control for fluctuation data in long-term.

The method of calculating the growth rate is the difference between level of quarter n year and level of quarter in previous year of n, then divided by level of quarter in previous year of n, and multiplied by 100.

$$YOY(Q_n) = \frac{Q_n - Q_{n-1}}{Q_{n-1}} \times 100$$

or

$$YOY(Q_n) = \left(\frac{Q_n}{Q_{n-1}} - 1 \right) \times 100$$

where:

$YOY(Q_n)$ growth year-on-year
 Q_n level of current quarter
 Q_{n-1} level of corresponding quarter of preceding year

Box 4: Example for Growth Year-on-Year for Quarterly Growth

Total hours worked in Q4 2020 for Manufacturing sector was 1,510.4 million hours while total hours worked in Q4 2019 was 1,554.2 million hours. The calculation of growth total hours worked for Manufacturing sector in Q4 2020 based on year on year change is as follows:

$$\text{Growth THW}_{Q4\ 2020} = \frac{\text{THW}_{Q4\ 2020} - \text{THW}_{Q4\ 2019}}{\text{THW}_{Q4\ 2019}} \times 100$$

$$\text{Growth THW}_{Q4\ 2020} = \frac{1,510.4 - 1,554.2}{1,554.2} \times 100$$

$$\text{Growth THW}_{Q4\ 2020} = -2.8\%$$

Labour productivity per hour worked in Q4 2020 for the Manufacturing sector was RM55.8 while in Q4 2019 labour productivity per hour worked was RM52.6. The growth of labour productivity per hour worked for the Manufacturing sector in Q4 2020 based on year on year change is as follows:

$$\text{Growth LPHW}_{Q4\ 2020} = \frac{\text{LPHW}_{Q4\ 2020} - \text{LPHW}_{Q4\ 2019}}{\text{LP(HW)}_{Q4\ 2019}} \times 100$$

$$\text{Growth LPHW}_{Q4\ 2020} = \frac{55.8 - 52.6}{52.6} \times 100$$

$$\text{Growth LPHW}_{Q4\ 2020} = 6.0\%$$

So by these examples, the growth of total hours worked for the Manufacturing in Q4 2020 was negative 2.8 per cent while labour productivity per hour worked was 6.0 per cent.

6.2 Growth Quarter-on-Quarter

Quarter-on-quarter (QOQ) refers to the short-term comparison of the labour productivity in the current quarter of interest to the previous quarter. QOQ analysis is used

- i) to measure progress and set benchmarks to adapt the method accordingly;
- ii) to perform comparative short-term data analytics; and
- iii) to identify short-term changes or seasonal trends.

The method of calculating the growth rate is the difference between level of labour productivity of the current quarter in current year and level of previous quarter in current year, then divided by level of previous quarter in current year, and multiplied by 100

$$QOQ(Q_t) = \frac{Q_t - Q_{t-1}}{Q_{t-1}} \times 100$$

or

$$QOQ(Q_t) = \left(\frac{Q_t}{Q_{t-1}} - 1 \right) \times 100$$

where:

QOQ(Q_t) growth quarter on quarter
 Q_t level of current quarter
 Q_{t-1} level of previous quarter

Box 5: Example for Growth Quarter-on-Quarter

Total hours worked in Q4 2020 for Manufacturing sector was 1,510.4 million hours while total hours worked in Q3 2020) was 1,473.2 million hours. The calculation of growth total hours worked for Manufacturing sector in Q4 2020 based on quarter-on-quarter change is as follows:

$$\text{Growth THW}_{Q4\ 2020} = \frac{\text{THW}_{Q4\ 2020} - \text{THW}_{Q3\ 2020}}{\text{THW}_{Q3\ 2020}} \times 100$$

$$\text{Growth THW}_{Q4\ 2020} = \frac{1,510.4 - 1,473.2}{1,473.2} \times 100$$

$$\text{Growth THW}_{Q4\ 2020} = 1.9\%$$

Labour productivity per hour worked in Q4 2020 for Manufacturing sector was RM55.8 while in Q3 2020 labour productivity per hour worked was RM56.0. The growth of labour productivity per hour worked for Manufacturing sector in Q4 2020 based on quarter-on-quarter change is as follows:

$$\text{Growth LPHW}_{Q4\ 2020} = \frac{\text{LPHW}_{Q4\ 2020} - \text{LPHW}_{Q3\ 2020}}{\text{LPHW}_{Q3\ 2020}} \times 100$$

$$\text{Growth LPHW}_{Q4\ 2020} = \frac{55.8 - 56.0}{56.0} \times 100$$

$$\text{Growth LPHW}_{Q4\ 2020} = 6.0\%$$

So by these examples, the growth total hours worked for Manufacturing in Q4 2020 was 1.9 per cent while labour productivity per hour worked was 6.0 per cent.

6.3 Annual Percentage Change

Annual percentage change for indicators or labour productivity refers to the percentage change from corresponding time period one year ago. Annual percentage change analysis is used

- i) to provide a more accurate description as to how the data can change over a period of time; and
- ii) to explained the percentage increase (positive value) and the percentage decrease (negative value) while conducting the analysis.

The method of calculating the annual percentage change is the difference between level of current year and level of previous year, then divided by level of previous year, and multiplied by 100.

$$APC = \frac{Y_n - Y_{n-1}}{Y_{n-1}} \times 100$$

or

$$APC = \left(\frac{Y_n}{Y_{n-1}} - 1 \right) \times 100$$

where:

APC	annual percentage change
Y_n	level of current year
Y_{n-1}	level of previous year

Box 6: Example for Annual Percentage Change

Total hours worked in 2019 for the Manufacturing sector was 6,118.0 million hours while total hours worked in 2020 was 5,569.0 million hours. The calculation of growth total hours worked for the Manufacturing sector in 2020 based on quarter-on-quarter change is as follows:

$$\text{Growth THW}_{2020} = \frac{\text{THW}_{2020} - \text{THW}_{2019}}{\text{THW}_{2019}} \times 100$$

$$\text{Growth THW}_{2020} = \frac{6,118.0 - 5,569.0}{5,569.0} \times 100$$

$$\text{Growth THW}_{2020} = -9.0\%$$

Labour productivity per hour worked in 2020 for the Manufacturing sector was RM55.3 while in 2019 labour productivity per hour worked was RM51.7. Growth of labour productivity per hour worked for the Manufacturing sector in 2020 based on quarter-on-quarter change is as follows:

$$\text{Growth LPHW}_{2020} = \frac{\text{LPHW}_{2020} - \text{LPHW}_{2019}}{\text{LPHW}_{2019}} \times 100$$

$$\text{Growth LPHW}_{2020} = \frac{55.3 - 51.7}{51.7} \times 100$$

$$\text{Growth LPHW}_{2020} = 7.0\%$$

So by these examples, the growth total hours worked for the Manufacturing in 2020 was negative 9.0 per cent while labour productivity per hour worked was 7.0 per cent.

Table 5: Formula for Growth of Labour Productivity

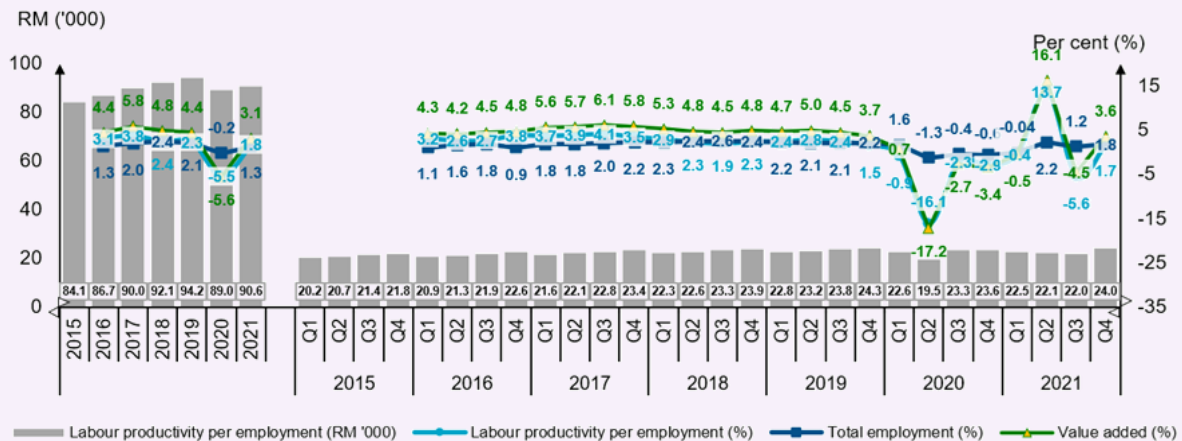
Description	Formula	
Growth year-on-year for quarterly growth	$YOY(Q_n) = \frac{Q_n - Q_{n-1}}{Q_{n-1}} \times 100$	$YOY(Q_n) = \left(\frac{Q_n}{Q_{n-1}} - 1 \right) \times 100$
Growth quarter-on-quarter	$QOQ(Q_t) = \frac{Q_t - Q_{t-1}}{Q_{t-1}} \times 100$	$QOQ(Q_t) = \left(\frac{Q_t}{Q_{t-1}} - 1 \right) \times 100$
Annual percentage change	$APC = \frac{Y_n - Y_{n-1}}{Y_{n-1}} \times 100$	$APC = \left(\frac{Y_n}{Y_{n-1}} - 1 \right) \times 100$

Notes: Y is yearly; Q is quarterly; and n is 1st quarter to 4th quarter

Box Article 1 – Labour Productivity Situation in Malaysia

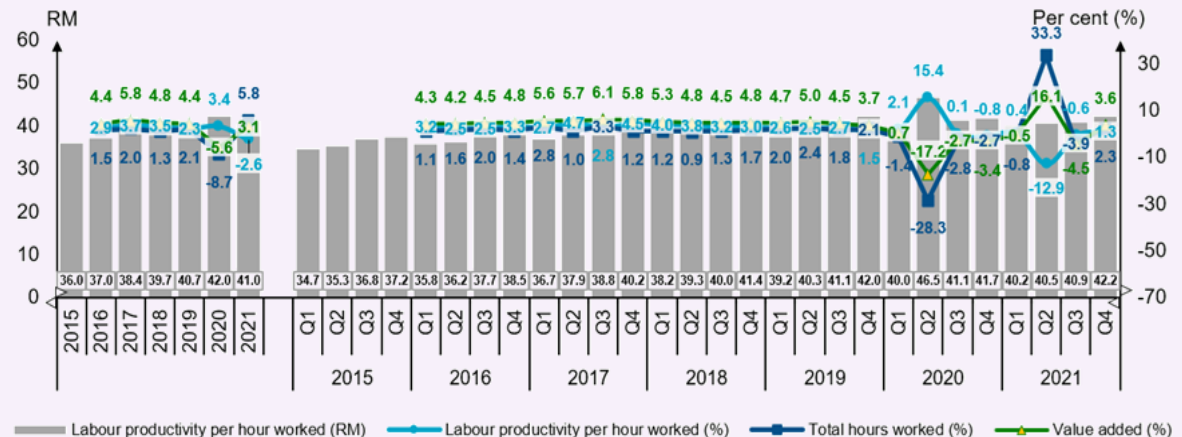
Labour productivity in Malaysia is measured for the whole economy and five main economic activities, Agriculture, Mining & quarrying, Manufacturing, Construction and Services. Labour productivity as measured by value added per employment dropped drastically in year 2020 the most significant dive observed in the second quarter of 2020 due to the pandemic that hit the world at that time as depicted in **Chart 1-1**.

Chart 1-1: Labour Productivity per Employment, Q1 2015 – Q4 2021



Meanwhile, **Chart 1-2** shows the growth of labour productivity by value added per hour worked which been spiked significantly following a large decline in total hours worked in the second quarter of 2020.

Chart 1-2: Labour Productivity per Hour Worked, Q1 2015 – Q4 2021



7 9 PRIORITY SUB-SECTORS

The 9 priority sub-sectors which is also known as productivity nexus is a dedicated platform providing enhancement programmes for enterprises to encourage productivity growth of the industry at the sectoral level. It is one of the national strategies to drive continuous economic growth and development through industrial cooperation in Malaysia. Therefore, the government launched the MPB in May 2017 as part of the 11th Malaysia Plan. Within the MPB, 9 priority sub-sectors were identified as high potential growth for the country namely Agro-food; Chemicals and chemical products; Electrical and electronics (E&E); Machinery and equipment; Retail and food & beverages (F&B); Tourism; Information, communication and technology (ICT); Professional services; and Private healthcare. These sub-sectors are under three main economic sectors namely Agriculture, Manufacturing and Services.

The combination of these 9 sub-sectors contributed to 30 per cent of Malaysia's GDP and 40 per cent of total employment. These sub-sectors are prioritised based on the following criteria:

- Contribution to GDP;
- Share of workforce;
- Opportunity for productivity improvement;
- High multiplier effect; and
- Readiness to implement productivity improvement.

The classification of 9 priority sub-sectors which has been determined using MSIC 2008 Ver. 1.0 are as shown in **Table 6**.

Table 6: Classification of 9 Priority Sub-sectors Using MSIC 2008 Ver. 1.0

MSIC	DESCRIPTION
Agro-food	
011	Growing of non-perennial crops
012	Growing of perennial crops*
013	Plant propagation
014	Animal production
015	Mixed farming
03	Fishing & aquaculture
* exclude: 01261, 01262, 01273, 01281, 01291, 01292, 01295	
Chemicals and chemical products	
20	Manufacture of chemicals and chemical products
Electrical and electronics	
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
Machinery and equipment	
28	Manufacture of machinery and equipment n.e.c.
Retail and food & beverages	
47	Retail trade, except of motor vehicles and motorcycles
56	Food and beverage service activities
Tourism	
55	Accommodation
Information, communication and technology (ICT)	
58	Publishing activities
59	Motion picture, video and television programme production, sound recording and music publishing activities
60	Programming and broadcasting activities
61	Telecommunications
62	Computer programming, consultancy and related activities
63	Information service activities
Private healthcare	
69	Legal and accounting activities
70	Activities of head offices; management consultancy activities
71	Architectural and engineering activities; technical testing and analysis
72	Scientific research and development
73	Advertising and market research
74	Other professional, scientific and technical activities
75	Veterinary activities
Professional services	
86	Human health activities

Box Article 2 – Labour Productivity of 9 Priority Sub-sectors

In 2020, the growth of labour productivity per employment by 9 priority sub-sectors dropped 5.1 per cent after an increase of 1.8 per cent in 2019. In spite of the decline in 2020, the sub-sectors posted positive growths with Electrical and Electronics recorded the highest growth of 4.0 per cent. In term of the level of labour productivity per employment, Information, communication and technology (ICT) ranked first at RM367,295 per person as illustrated in **Chart 2-1**.

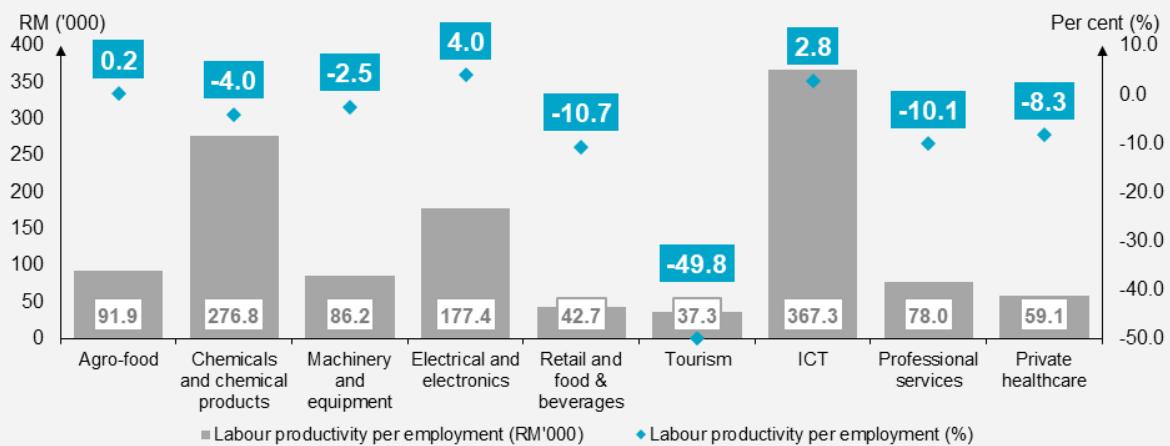


Chart 2-1: Labour Productivity per Employment by 9 Priority Sub-sectors, 2020

In the meantime, labour productivity per hour worked by 9 selected sub-sectors increased 4.6 per cent as compared to 2.2 per cent in 2019. The highest growth of labour productivity per hour worked was recorded by Electrical and Electronics (16.0%). At the same time, sub-sector Information, communication and technology (ICT) has the highest value added per hour worked with RM170 per hour in 2020 as shown in **Chart 2-2**.

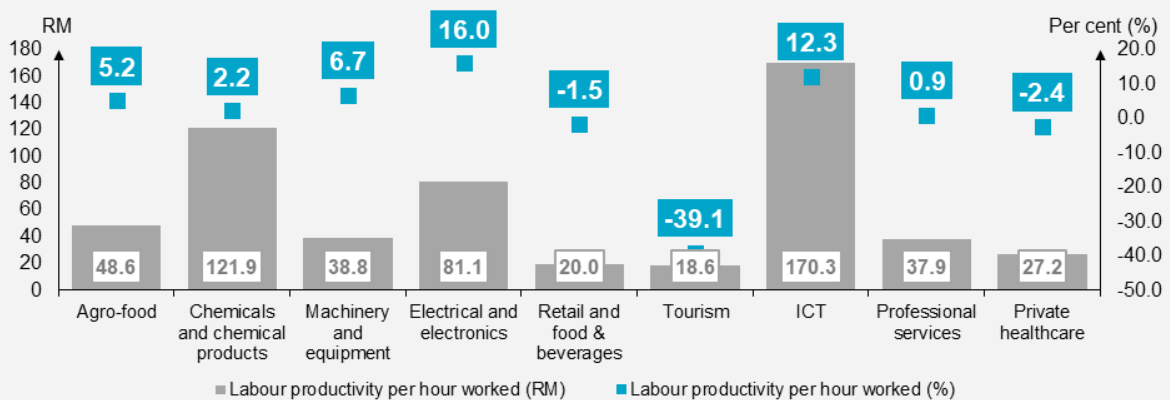
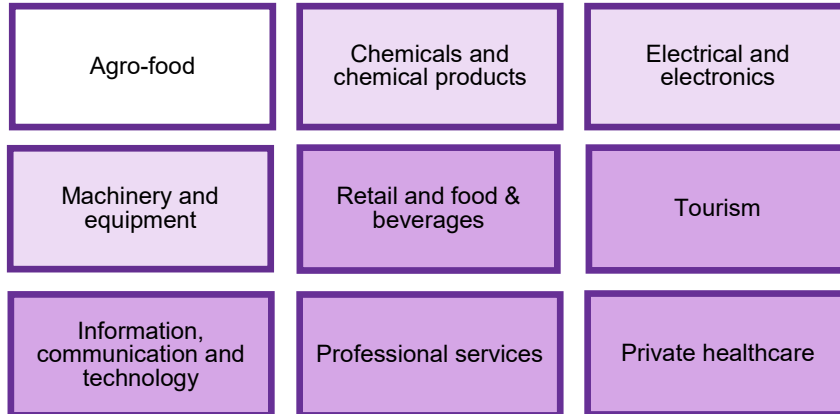
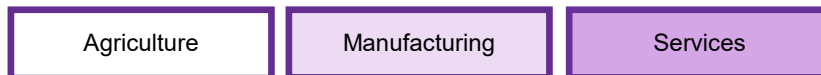


Exhibit 2: 9 Priority Sub-sectors

- **Sub-sectors are identified presenting high potential growth for the country:**



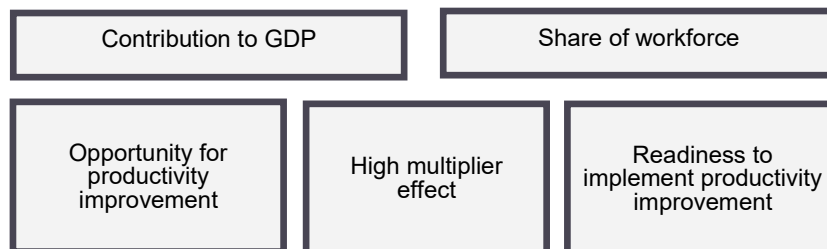
- **Sub-sectors under three main economic sectors:**



- **Sub-sectors selected contribute:**



- **Sub-sectors prioritised based on the following criteria:**



Source: Malaysia Productivity Blueprint

8 DATA DISSEMINATION

The Advance Release Calendar (ARC) for the dissemination of Labour Productivity statistics is a mechanism to ensure timeliness where the specific date for release to the public is made known. From the ARC, users will be kept informed regarding the dates of the future releases of Labour Productivity. The embargo time for Labour Productivity is 12.00 pm on the day of release.

8.1 Quarterly Publication

The NPC meeting chaired by the YAB Prime Minister has decided that labour productivity statistics will be announced a week after the publication of GDP. For the time being, Labour Productivity publication has been disseminated on quarterly basis by DOSM and annual basis by the MPC. In DOSM, the soft copy of quarterly Labour Productivity press release and publication in soft copy is released after the embargo time through online platform whereby data frequency are quarterly and annually.

8.2 Level of Dissemination

Level of dissemination is classified according to economic activities. It is divided into five sectors namely Agriculture, Mining & quarrying, Manufacturing, Construction and Services. However, the Manufacturing and Services sectors are disaggregated into eight sub-sectors. The classification of economic activity are as follows:

Table 7: Classification of Economic Activity Using MSIC 2008 Ver. 1.0

MSIC	DESCRIPTION
A	Agriculture, forestry and fishing
B	Mining and quarrying
C	Manufacturing
10	Vegetable and animal oils & fats and food processing
11, 12	Beverages and tobacco products
13, 14, 15	Textiles, wearing apparel and leather products
16, 17, 18, 31	Wood products, furniture, paper products and printing
19, 20, 21, 22	Petroleum, chemical, rubber and plastic products
23, 24, 25*	Non-metallic mineral products, basic metal and fabricated metal products *excluded 252
26, 27, 28	Electrical, electronic and optical products *included 252 & 325
29, 30, 32*, 33	Transport equipment, other manufacturing and repair *excluded 325
F	Construction
	Services
D, E	Utilities
G	Wholesale & retail trade
I	Food & beverages and Accommodation
H	Transportation and storage
J	Information and communication
K	Finance and insurance
L, M, N	Real estate and business services
P, Q, R, S, T	Other services

8.3 Statistical Release

To deliver and disseminate quality and timely statistical releases based on the date and time set in the ARC, various statistics release documents will be provided such as teasers, stats alerts, media statements, infographics and videos.

8.4 Revision of Statistics

Revision of statistics on labour productivity is subject to any revision on the statistics of value added, hours worked and employment. Statistics of value added has been revised based on the GDP base year 2015. Statistics on employment has been aligned with the latest available data from the censuses and surveys conducted by DOSM.

9 LIMITATION AND DISCUSSIONS

Malaysia labour productivity statistics produced by DOSM has significantly benefited the country by providing additional input for economic analysis. Over the years, productivity measurement has received a noteworthy encounter especially in responding to structural changes of the economy. Moving forward, to produce more comprehensive statistics, DOSM intends to identify new and structured data series to support current estimation while continue to strengthen the measuring method used. Additionally, DOSM aims to explore other method in presenting productivity such as through index rather than absolute value and producing new statistics such as labour productivity per job.

The limitation of using the single factor productivity method is that the measurement might not refer to the actual amount of production for an employee in certain industries. For example, productivity value for capital intensive industry such as in the manufacturing sector may not reflect the real circumstances whereas factors such as capital and technology that influenced value added remain constant in this method. Therefore, DOSM aspire in studying method to compute multifactor productivity as it is able to measure economic performance by comparing the amount of output per unit of labour and capital factor inputs to production.

Based on OECD (2001), multifactor productivity measurement helps to disentangle the direct growth contributions of labour, capital, intermediate inputs and technology. Through this method, changes in management practices, organisational changes, general knowledge, adjustment costs, network effects and measurement errors can be reflected. However, the Australian Bureau of Statistics (ABS) highlighted some difficulties in measuring multifactor productivity such as difficulty in measuring output of non-market industries such as public administration and safety, education and training, and health care and social assistance. Apart from that, estimation also varies with time periods whereby in the short run, it can be difficult for a business to change the amount of inputs used in response to changes in demand. Moreover, some inputs namely natural resources and intangible capital inputs are difficult to measure.

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