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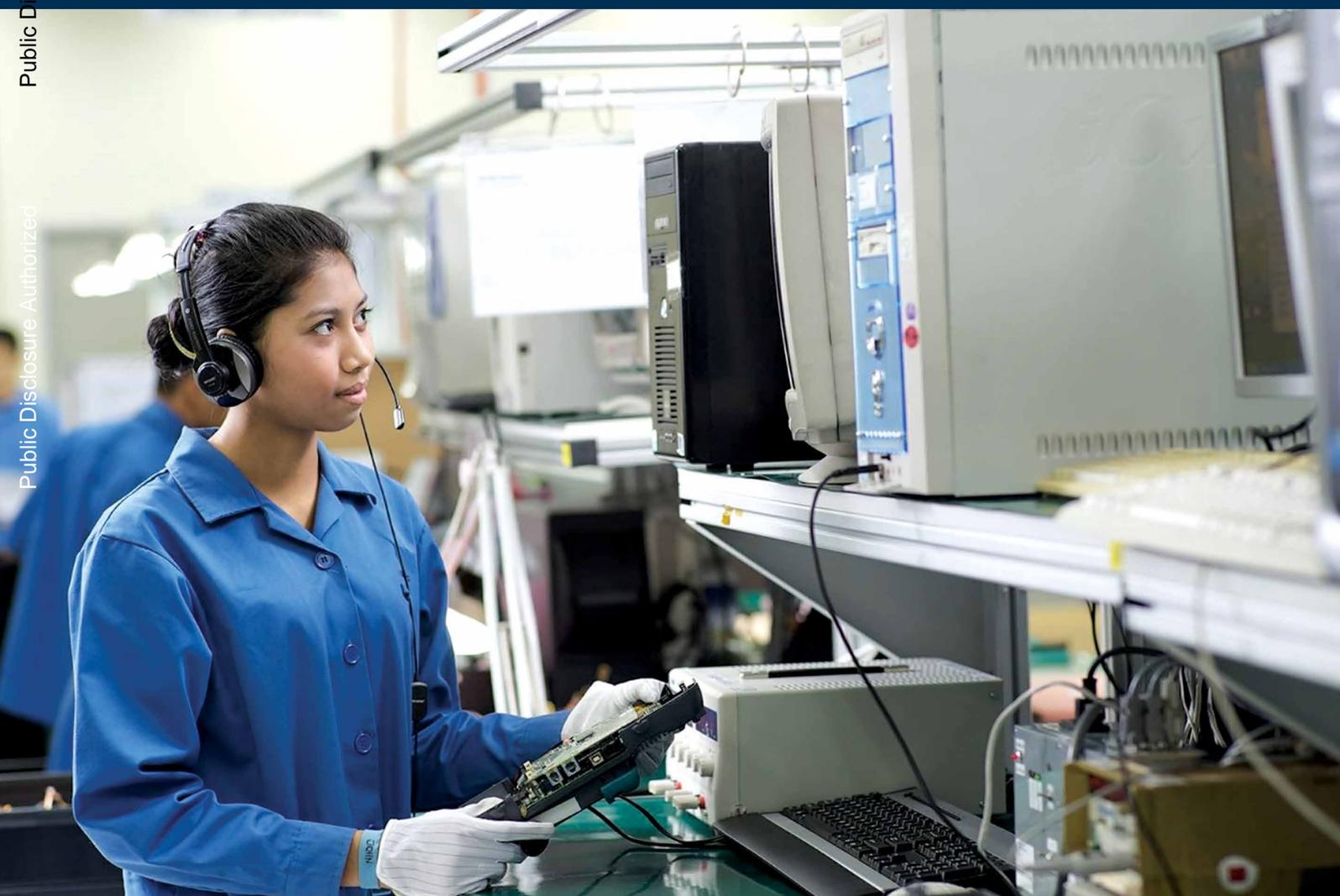
MACROECONOMICS, TRADE, AND  
INVESTMENT GLOBAL PRACTICE

JUNE 2018

THE MALAYSIA DEVELOPMENT EXPERIENCE SERIES

## Productivity Unplugged

The Challenges of Malaysia's Transition  
into a High-Income Country



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**Knowledge & Research** reports are flagship work emanating from the teams based in the Malaysia Hub.

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# Table of Contents

<b>Acknowledgements</b> .....	4
<b>List of Figures</b> .....	5
<b>List of Tables</b> .....	8
<b>List of Boxes</b> .....	8
<b>List of Acronyms</b> .....	9
<b>Overview</b> .....	10
<b>Chapter 1: Empirical Analysis of Productivity in Malaysia</b> .....	20
Factor Accumulation and Productivity Growth.....	22
Labor-Productivity Growth.....	24
Firm-Level Productivity.....	26
Firm-Level Productivity in the Manufacturing Sector.....	29
Conclusions.....	35
<b>Chapter 2: The Impact of Infrastructure on the Evolution of Productivity in Malaysia</b> .....	36
Introduction.....	37
Background.....	38
Physical Infrastructure.....	41
Intangible Infrastructure.....	53
Conclusions and Policy Recommendations.....	59
<b>Chapter 3: The Efficiency of Input and Output Markets in Malaysia: An Empirical and Comparative Analysis</b> .....	60
Resource Allocation and Productivity Gains in the Malaysian Manufacturing Sector.....	61
Financial-Market Efficiency.....	64
Labor-Market Efficiency.....	71
Output-Market Efficiency.....	74
Conclusions.....	81
<b>Chapter 4: The Evolution of Innovation in Malaysia: Policies, Institutions, and Outcomes</b> .....	82
Innovation Policies and Policy Actors in Malaysia.....	83
Characteristics of Innovative Firms in Malaysia.....	87
Innovation in Malaysia in Comparative Perspective.....	87
Conclusions.....	93
<b>Chapter 5: Education Policies and Outcomes: The Challenges of Adapting Skills to Productivity</b> .....	94
The Evolution of Malaysia Educational Policies Since Independence.....	95
Technical and Vocational Education and Training in Malaysia.....	98
Promoting Equity in Educational Attainment.....	100
The Role of the Private Sector as an Education Provider.....	100
The Role of Education in an Evolving Global Economy.....	101
Education and Skills Development in Malaysia in Comparative Perspective.....	102
Malaysia's Educational Outcomes in International Perspective.....	106
Public Spending and Educational Outcomes.....	108
Conclusions.....	110
<b>Conclusions and Policy Recommendations</b> .....	111
The Challenges of Raising Productivity.....	113
Policy Recommendations.....	114
Raising Economic Productivity to Achieve High-Income Status.....	116
<b>Annex 1: Main Determinants of Economic Productivity</b> .....	118
<b>Annex 2: Public Development Expenditures on Infrastructure, 1965-2010</b> .....	120
<b>Annex 3: A Historical Review of Malaysia Innovation Strategies, Plans, and Policies</b> .....	121
<b>Annex 4: Summarized Findings of the National Surveys of Innovation 5 (2005-2008) and 6 (2009-2011)</b> .....	123
<b>Annex 5: How to Measure the Capital and Output Wedge to Look for Allocative Inefficiency</b> .....	125
<b>Bibliography</b> .....	126

# Acknowledgements

**Productivity Unplugged: The Challenges of Malaysia’s Transition into a High-Income Country was prepared by a team of the World Bank’s Macroeconomics, Trade, and Investment Global Practice and with significant contributions by the Development Research Group in Kuala Lumpur and of Malaysian consultants.**

The team consisted of Julio E. Revilla (task team leader), Valeria Perotti, Rafael Munoz Moreno, Shakira Binti Teh Sharifuddin, Lay Lian Chuah, and Richard Record. Usman Khalid and Teo Wing Leong from the University of Nottingham Malaysia Campus, Moonyati Mohd Yatid from the Institute of Strategic and International Studies Malaysia, and Mohd Zaidi Mahyuddin from Bank Negara Malaysia contributed with the drafting of the Malaysian experience on the determinants of productivity. Other colleagues, including Smita Kuriakose, Mohammad Amin, and Young Eun Kim provided useful inputs. The final draft was edited by Maryam Ali-Lothrop. Joshua Foong, Kane Chong, Gregory Kong, and Gillian Gan provided excellent layout and editorial assistance.

The team worked under the overall guidance of Ulrich Zachau, Faris H. Hadad-Zervos, Mathew A. Verghis, Deepak K. Mishra, and Shabih Ali Mohib. The team is grateful for very insightful comments and contributions from Norman V. Loazy and Marc Tobias Schiffbauer as peer reviewers.

This report benefited from fruitful discussions in two international symposia held in Kuala Lumpur, in which methodological and empirical issues were presented, and comments and information from the Economic Planning Unit of the Prime Minister’s Department (EPU), the Malaysia Productivity Center, the Department of Statistics Malaysia, and Bank Negara Malaysia, and other agencies and Ministries of the Government of Malaysia were received and incorporated in this work. In particular, the team would like to thank Ms. Zakiah Jaafar, Director of the Macroeconomics section of the EPU, for her ongoing collaboration and support for the work on productivity that the World Bank has developed in Malaysia.

# List of Figures

Figure 1.	Contribution of Capital, Labor, and TFP to GDP Growth in Malaysia and High-Income Countries, 1990-2014	11
Figure 2.	Contribution of TFP to GDP Growth in Malaysia, EAP, Middle-Income, and Upper-Middle Income Countries	12
Figure 3.	The government aims to accelerate the TFP growth rate to 2.3 percent per year...	22
Figure 4.	...while boosting the annual growth rate of labor productivity to 3.7 percent, led by the construction sector.	22
Figure 5.	Capital accumulation has driven Malaysia's economic growth...	23
Figure 6.	...and its TFP growth rate has been below those of wealthier countries in the region.	23
Figure 7.	Labor productivity has grown more slowly in Malaysia than in other countries in the region...	25
Figure 8.	...but faster than labor productivity among peer countries worldwide.	25
Figure 9.	Prior to the 1998 AFC, sectors with higher rates of labor-productivity growth created more jobs	26
Figure 10.	After the AFC, job creation in the manufacturing sector slowed despite its rising labor-productivity growth rate	26
Figure 11.	Between 2012 and 2014, real annual sales growth in Malaysia was very modest, and a faster employment growth rate led to a moderate decrease in labor productivity	27
Figure 12.	The recent decline in labor-productivity growth in Malaysia was driven by large firms...	28
Figure 13.	...and exporters.	28
Figure 14.	Manufacturing firms drove the recent decline in labor productivity...	29
Figure 15.	...while productivity improved among firms in the services subsectors.	29
Figure 16.	Manufacturing firms in Malaysia have a wider TFP range than manufacturing firms in comparator countries...	30
Figure 17.	...and much of this variability is explained by differences between large and small firms.	30
Figure 18.	More manufacturing firms were below the labor-productivity median in 2010-2014 than in 2005-2010...	31
Figure 19.	...and the gap between the most- and least-productive manufacturing firms did not narrow.	31
Figure 20.	Young manufacturing firms experienced the largest productivity decline in 2010-2014...	32
Figure 21.	...yet labor-productivity gaps narrowed only slightly.	32
Figure 22.	Small manufacturing firms experienced higher labor productivity growth rates in 2010-2014	32
Figure 23.	Labor productivity gaps appear to have widened for small manufacturing firms	32
Figure 24.	Labor productivity among domestic manufacturing firms declined in 2010-2014...	33
Figure 25.	...and domestic firms exhibited larger productivity-growth gaps than foreign-owned firms.	33
Figure 26.	Domestically focused manufacturing firms experienced a smaller decline in labor productivity during 2010-2014	34
Figure 27.	Domestically focused and export-oriented manufacturing firms exhibit similar labor-productivity gaps	34
Figure 28.	Global Competitiveness Index Rankings, Malaysia and Comparators, 2017	39
Figure 29.	Global Competitiveness Index Rankings on Institutions and Infrastructure Pillars, Malaysia and Comparators, 2017	40
Figure 30.	Distance to Frontier Score, Doing Business report, Malaysia and Comparators, 2017	40
Figure 31.	GCI Quality of Roads Index, Malaysia and Comparators, 2016	42

## List of Figures, Tables, and Boxes

Figure 32.	GCI Quality of Railroad Infrastructure Index, Malaysia and Comparators, 2016	42
Figure 33.	Total Container Throughput by Sea Freight, Malaysia, 2009-2014	44
Figure 34.	GCI Quality of Ports Index, Malaysia and Comparators, 2016	45
Figure 35.	World Bank Logistics Performance Index, Malaysia and Comparators, 2007 and 2016	45
Figure 36.	GCI Air Transport Infrastructure Index, Malaysia and Comparators, 2016-2017	46
Figure 37.	LPI Customs and Timeliness Dimension, Malaysia and Comparators, 2016	46
Figure 38.	Share of Establishments that Consider Customs and Trade Regulations and Transport to be the Biggest Obstacle to their Operations	47
Figure 39.	Mobile Telephone Subscriptions per 100 people, Malaysia and Comparators, 2016	49
Figure 40.	Fixed Broadband Internet Subscriptions per 100 people, Malaysia and Comparators, 2016	49
Figure 41.	Percentage of Firms Identifying Telecommunications as Not an Obstacle to their Current Operations, Malaysia and Comparators	50
Figure 42.	Fixed Broadband Internet Tariffs, Malaysia and Comparators, US\$/month, 2016	50
Figure 43.	Quality of Electricity, Malaysia and Comparators, 2016	51
Figure 44.	Percentage of Firms Experiencing Power Outages in a Typical Month, Malaysia and Comparators	51
Figure 45.	Percentage of Firms Experiencing Water Shortages in a Typical Month, Malaysia and Comparators	52
Figure 46.	World Governance Indicator Rankings, Malaysia, 2000-2015	54
Figure 47.	World Governance Indicator Rankings, Malaysia and Comparators, 2015	54
Figure 48.	Rankings on Various GCI Institutional Pillars, Malaysia and Comparators, 2016	55
Figure 49.	Biggest Obstacle for Firms, Malaysia and Comparators	55
Figure 50.	GCI Macroeconomic Environment Pillar, Malaysia and Comparators, 2007/8 and 2016/17	57
Figure 51.	Inflation Rates, Malaysia and Comparators, 2010 and 2015	57
Figure 52.	Exchange Rate and Net Portfolio Flows, Malaysia, 2008-2016	58
Figure 53.	The widening disparity in TFPR values suggests that the allocation of factors across manufacturing firms has become less efficient over time	62
Figure 54.	The variation in TFPQ values confirms that distortions in factor allocation have worsened across manufacturing firms	62
Figure 55.	Distortions in factor markets do not appear to be correlated with firm productivity...	63
Figure 56.	...but distortions in output markets are linked to low productivity.	63
Figure 57.	Malaysia outperforms most comparator countries on indicators of financial-market development	64
Figure 58.	Malaysia's private-credit-to-GDP ratio is high compared to those of its peers, indicating a well-developed financial sector	65
Figure 59.	Malaysia's volume of corporate bonds as a share of GDP is high relative to those of its peers...	65
Figure 60.	...and the same is true for the market capitalization of publicly traded firms as a share of GDP.	65
Figure 61.	Malaysia outperforms most regional comparators in terms of the share of firms with access to a bank loan or line of credit...	66
Figure 62.	...and access to finance appears to correlate with firm size.	66
Figure 63.	Malaysian firms finance a larger share of their investment costs by selling equity than firms in comparable countries...	66
Figure 64.	...and medium-sized firms are the most likely to access the stock market.	66
Figure 65.	Low interest-rate spreads indicate a relatively efficient banking sector	67

Figure 66.	Malaysia is among the countries with the strongest framework to protect minority investors	69
Figure 67.	Malaysia performs well on indicators of credit access	69
Figure 68.	The insolvency process is more efficient in Malaysia than in most comparator countries	70
Figure 69.	Overall, Malaysia performs well on measures of labor-market efficiency, but its indicators for redundancy costs and female labor-force participation are poor relative to peer countries	71
Figure 70.	Malaysia's female labor-force participation rate is low by the standards of comparable countries	73
Figure 71.	Malaysia outperforms most comparator countries in terms of goods-market efficiency	74
Figure 72.	Malaysian firms most often cite the informal sector, business licensing, tax rates and tax administration as the main obstacles to doing business	75
Figure 73.	Business taxes in Malaysia are high by the standards of comparable countries...	75
Figure 74.	...and Malaysian firms often cite high tax rates as a major constraint on doing business.	75
Figure 75.	Malaysian firms spend less time dealing with tax officials than firms in comparator countries...	76
Figure 76.	...yet they are more likely to identify tax administration as an obstacle to doing business.	76
Figure 77.	Taxation appears to have a modest impact on investment incentives in Malaysia	76
Figure 78.	In the most recent Doing Business report, Malaysia performed poorly in terms of the ease of starting a business	77
Figure 79.	Malaysian firms spend less time dealing with government regulations than firms in comparable countries...	78
Figure 80.	...and large Malaysian firms spend more time dealing with government regulations than small firms.	78
Figure 81.	Malaysian firms are more likely than firms in comparable countries to cite the difficulty of acquiring permits and licenses as a constraint to starting a business...	78
Figure 82.	...even though less time is required to obtain permits and licenses in Malaysia than in comparable countries.	78
Figure 83.	The share of firms in Malaysia that report competing against firms in the informal sector is relatively small by the standards of comparable countries...	79
Figure 84.	...and larger firms are more likely to identify competition from the informal sector as a constraint to doing business.	79
Figure 85.	Malaysia's trade regime is relatively liberal by the standards of comparable countries...	80
Figure 86.	...and it trades more than most of its peers.	80
Figure 87.	Malaysia has a relatively high degree of export diversification...	80
Figure 88.	...and Malaysian firms are well integrated into global value chains.	80
Figure 89.	Malaysian firms primarily focus on nontechnical innovation...	88
Figure 90.	...and productivity is positively associated with all types of innovation.	88
Figure 91.	GII Scores, Malaysia and Comparator Countries, 2016	89
Figure 92.	GII Innovation Input Sub-Index and Innovation Output Sub-Index Scores, Malaysia and Comparator Countries, 2016	90
Figure 93.	Malaysia's 2011 and 2016 GII Scores by Pillar	91
Figure 94.	Malaysia's GCI Scores for Innovation, 2011 and 2016	92
Figure 95.	Malaysia's manufacturing firms have a larger share of workers with secondary education...	102
Figure 96.	...but the average education level among production workers is similar to that of other countries.	102
Figure 97.	Malaysian firms have lower average vacancy rates than ASEAN comparators...	103
Figure 98.	...but they report having greater difficulty identifying workers with adequate skills.	103

## List of Figures, Tables, and Boxes

Figure 99.	Malaysian firms are less likely to provide training and tend to train fewer workers	105
Figure 100.	Small Malaysian firms are especially unlikely to train their workforce	105
Figure 101.	Malaysian SMEs that provide training tend to have higher labor productivity...	105
Figure 102.	...as well as higher TFP relative to firms that do not offer training.	105
Figure 103.	Science scores have improved in relative terms since 1995...	106
Figure 104.	...while math scores have fallen both in absolute and relative terms.	106
Figure 105.	Malaysia's mathematics scores improved marginally between the 2009 and 2012 PISAs, but its science and reading scores fell	107
Figure 106.	Government Expenditure on Education, by Country (% GDP, 2013 or latest)	108
Figure 107.	PISA 2012 Mathematics Score vs. Government Spending on Education	108
Figure 108.	Performance on International Assessments by Public Spending per Student, Malaysia and Comparators, 2009	109
Figure 109.	Malaysia's economy has enjoyed a long period of robust expansion, but its growth rate has slowed since the AFC	112

## List of Tables

Table 1.	Summary of Potential Efficiency Gains	63
Table 2.	Malaysia's scores on almost all indicators of financial-market development have fallen in recent years	67
Table 3.	Most of Malaysia's indicators of labor-market efficiency have deteriorated in recent years	72
Table 4.	GII Rankings, Malaysia and Comparators, 2016	89
Table 5.	Innovation-Efficiency Ratio, Malaysia and Comparators	90
Table 6.	GII Rankings, Malaysia, 2011 and 2016	91
Table 7.	Malaysia's GII 2011 and GII 2016 Scores by Pillar	91
Table 8.	GCI 2016 Rankings, Malaysia and Comparators	92
Table 9.	GCI Scores for Innovation Indicators, Malaysia and Comparator Countries, 2016	93

## List of Boxes

Box 1.	Ongoing Government Initiatives and Areas for World Bank Support	13
Box 2.	Measuring TFP and Labor Productivity	24
Box 3.	The Scope of the World Bank Enterprise Surveys and Available Productivity Measures	27
Box 4.	The Knowledge Economy in Malaysia	84
Box 5.	Innovation Policy and Support for SME Development	86
Box 6.	The Formal Education System in Malaysia	96
Box 7.	The Three Reform Stages under the National Education Blueprint (2013-2025)	97
Box 8.	The Five Pillars of Malaysia's TVET System	98
Box 9.	Further Evidence of Skills Mismatches in the Malaysian Labor Market	104

# List of Acronyms

11MP	11th Malaysia Plan
AFC	Asian Financial Crisis
ASEAN	Association of Southeast Asian Nations
BNM	Bank Negara Malaysia
CEIC	Census and Economic Information Center
CPI	Consumer Price Index
DOSM	Department of Statistics Malaysia
EAP	East Asia and Pacific
ECER	East Coast Economic Region
EPU	Economic Planning Unit
EU	European Union
FDI	Foreign Direct Investment
GCI	Global Competitiveness Index
GCR	World Economic Forum's Global Competitiveness Report
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GNI	Gross National Income
GST	Goods and Services Tax
GTP	Government Transformation Programme
ICT	Information and Communications Technology
KLIA	Kuala Lumpur International Airport
KPIs	Key Performance Indicators
KVMRT	Klang Valley Mass Rapid Transit
LPI	World Bank's Logistics Performance Index
MOF	Ministry of Finance
MPC	Malaysia Productivity Corporation
MRT	Mass Rapid Transit
OECD	Organisation for Economic Cooperation and Development
SCORE	Sarawak Corridor of Renewable Energy (SCORE)
SDC	Sabah Development Corridor
SMEs	Small and Medium Enterprises
SPAD	Land Public Transport Commission of Malaysia
STI	Science, Technology and Innovation
TEU	Twenty-Foot Equivalent Unit
TFP	Total Factor Productivity
TFPQ	Production TFP
TFPR	Value-Added TFP
US\$	United States Dollars
WDI	World Development Indicators
WGI	World Bank's Worldwide Governance Indicators

# Overview

**As Malaysia continues to strive toward high-income status, accelerating productivity growth has become the country's central economic policy challenge.** Productivity growth has become increasingly important as the country's traditional economic engines have slowed. While the GDP growth rate has proven resilient in recent years, structural constraints are emerging. Declining oil and gas output, coupled with the slowing growth of the Malaysian mining sector, has reduced the pace of capital accumulation, while demographic trends are slowing the growth of the labor force. In this difficult context, a sustained increase in private investment, coupled with improvements in productivity, will be necessary to maintain a sustainable economic growth trajectory that enables Malaysia to reach high-income status.

**Demographic trends underscore the vital importance of productivity growth to the continued development of the Malaysian economy.** Malaysia's demographic transition is inhibiting the expansion of the labor supply, and female labor-force participation is low by the standards of comparable countries. This explains the continued reliance on foreign workers that, at least over the medium term, cannot be easily substituted to sustain growth. As the growth of the labor stock decelerates, improvements in education and workforce skills have become increasingly critical to human-capital formation. Although the increasing technological sophistication of modern products and production methods, and the rise of knowledge-intensive service subsectors, have magnified the returns to human capital, the Malaysian education system has struggled to equip workers with the necessary skills to succeed in an ever-more complex and dynamic economy.

**Weakening external demand and intensifying global competition in Malaysia's key export industries confirm the necessity of increasing productivity levels.** In the past, Malaysia's large and growing labor force, combined with its relatively-sound physical and institutional infrastructure, provided an adequate foundation for export-driven growth fueled by large-scale foreign investment. However, a growing number of international competitors have leveraged similar advantages, increasing pressure on Malaysian exporters. Productivity is increasingly vital to Malaysia's international competitiveness, and a well-educated labor force, a conducive climate for innovation, efficient market mechanisms, advanced physical infrastructure, and highly-capable public institutions are essential to the continued evolution of its market position, and the success of its long-term structural transformation.

**The report presents an empirical analysis of the role of productivity in the Malaysian economy.** It evaluates the country's institutional and policy framework, and identifies key constraints to productivity growth. Using time-series data and cross-country comparisons, the report examines the ways in which infrastructure and institutional quality, market efficiency, innovation, and workforce skills influence productivity in Malaysia. This analysis is designed to inform a productivity-focused economic agenda, and the report concludes by presenting a set of policy recommendations and institutional reforms designed to bolster long-run productivity growth.

## Country Context

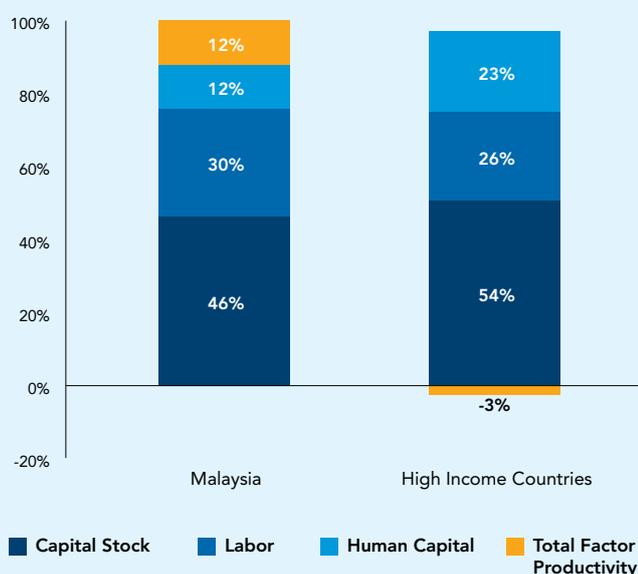
**Malaysia's transition from low-income to upper-middle-income status has been a remarkable success.** Malaysia has experienced a long period of robust economic growth while implementing ambitious development policies that have fostered the rise of new industries. High rates of infrastructure investment, accelerating private-sector activity, a rising female labor-force participation rate, and a growing working-age population, pushed the average annual GDP growth rate to 6.3 percent between 1960 and 2016.<sup>1</sup>

**A combination of factor accumulation and productivity growth has fueled Malaysia's economic transformation.** Beginning in the 1960s, strong domestic and external demand, supported by favorable demographic dynamics, contributed to a rapid increase in Malaysia's supply of capital and labor, as export-led industrialization drove an extended economic expansion. Malaysia's labor and capital stocks grew at an annual rate of approximately 2.0 percent between 1990 and 2014, similar to the rates observed in high-income countries. Meanwhile, total factor productivity (TFP) grew at a broadly stable rate of around 1.8 percent, reflecting the country's economic flexibility and expanding range of investment opportunities.

**However, the economic model that enabled Malaysia to reach upper-middle-income status will not sustain robust growth indefinitely.**

Malaysia's productivity growth rate has declined in recent decades, due in large part to the impact of international economic crises. The 1998 Asian financial crisis caused a marked drop in the contribution of TFP to economic growth, and Malaysia's TFP growth rate did not recover as swiftly as those of other regional countries. Moreover, in the wake of the 2008 global financial crisis, TFP has contributed less to Malaysia's growth than to the growth of its regional peers. Between 1990 and 2014, Malaysia's TFP growth rate was well below the regional average, and the averages for both upper-middle-income and middle-income countries worldwide.

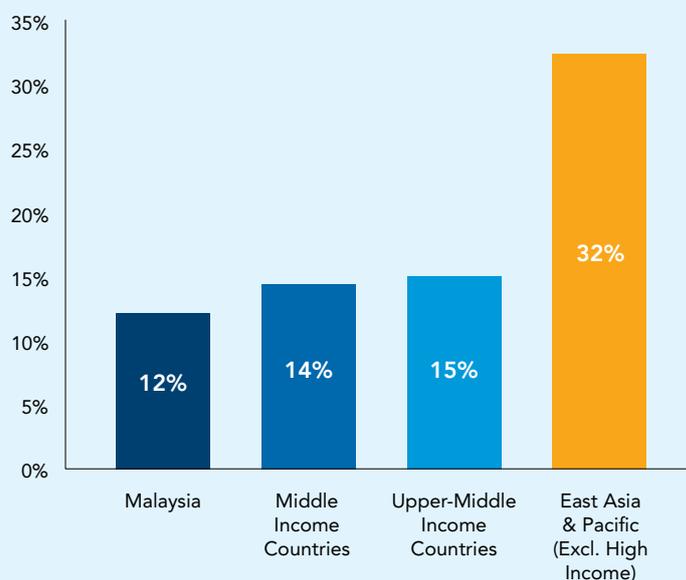
**FIGURE 1: Contribution of Capital, Labor, and TFP to GDP Growth in Malaysia and High-Income Countries, 1990-2014**



Source: World Bank Development Indicators and MFM

<sup>1</sup> The relatively large average rate of GDP growth since 1960, however, hides the fact that growth has slowed down to about 4.5 percent since the 1998 crisis, compared to 7.3 percent in the previous years. This is explained by the fall in the share of private fixed investment from more than 25 percent of GDP in the years before 1998 to around 13 percent since.

**FIGURE 2: Contribution of TFP to GDP Growth in Malaysia, EAP, Middle-Income, and Upper-Middle-Income Countries**



Source: World Bank Development Indicators and MFM

**Although the productivity of the Malaysian workforce has increased over the past 25 years, recent labor-productivity growth has not been sufficient to close the gap with higher-income economies in the region or with peer countries worldwide.** From 1990 to 2014, labor productivity was responsible for an estimated 72 percent of value-added growth, while rising employment accounted for 11 percent. However, both the 1998 Asian financial crisis and the 2008 global financial crisis substantially slowed the growth of labor productivity in Malaysia. While productivity growth rebounded following the 1998 crisis, it has stagnated in the wake of the 2008 crisis.

**Malaysia is within reach of a productivity renaissance.** While productivity growth in Malaysia remains well below the levels achieved by high-income countries, particularly in the services sector, the government has demonstrated a credible commitment to realizing the country's full productivity potential. Malaysia boasts a well-deserved reputation for maintaining sound macroeconomic policies, while adapting to changing international conditions, investing in infrastructure and human capital, and fostering an enabling business environment. Policy makers now face the considerable challenge of accelerating structural transformation to enhance productivity, promote diversification, and improve international competitiveness. Recognizing these challenges, the government incorporated several productivity targets into the 11th Malaysia Plan. Between 2016 and 2020, the government aims to increase the TFP growth rate to 2.3 percent per year. In addition, as part of its strategy to boost productivity, the government is set to introduce wide-ranging initiatives to address productivity issues at the national, sector, and firm levels (Box 1).

## BOX 1

## Ongoing Government Initiatives and Areas for World Bank Support

**Malaysia's strategy for reaching high-income status by 2020 is set forth in its Economic Transformation Programme.** The program is expected to accelerate public investment in large infrastructure projects by state-owned enterprises, and boost private investment in manufacturing and mining in targeted growth corridors. Under the program, the government has liberalized regulations on industrial and service activities to attract skilled workers and encourage capital mobility.

**The National Economic Advisory Council's New Economic Model for Malaysia further underscores the importance of transforming the country's main growth drivers and ascribes the country's weakening economic performance to low and stagnant private investment.** The strategy calls for reforms to accelerate the growth of services as the basis for sustainable long-term economic growth.

**The Malaysian Government created the Malaysia Productivity Corporation (MPC), previously known as the National Productivity Corporation, in 1962.** MPC is tasked with measuring productivity across sectors and time in Malaysia, as well as providing policy advice to the government and the private sector on issues of productivity and competitiveness. MPC publishes a comprehensive report every year, where the evolution of productivity across sectors and policies are presented.

**Recently, the government created a Productivity Council chaired by the Prime Minister with the aim of emphasizing the political and economic importance of productivity growth.** The World Bank has been invited to participate in the Productivity Council, and it is the only non-government agency in this role. The Bank has also acted as a reviewer and provided analytical advice to the recent Productivity Blueprint published by the government.

**The World Bank has initiated a long-term agenda in the study of productivity in Malaysia, of which this report is an example.** The DEC (World Bank research group) has published some innovative work on productivity and is working with the Department of Statistics and the Economic Policy Unit in analyzing panel data on the Malaysian manufacturing sector. Some preliminary aspects of this work are included in this report. In addition, the World Bank is discussing with the government the possibility of generating a survey to measure productivity in the services sector.

## Conceptual Framework and Analysis

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**Two dimensions of productivity have played a pivotal role in Malaysia's development: labor productivity and TFP.** Labor productivity reflects the capacity of individual workers to transform inputs into outputs. The growth of labor productivity hinges on improving the health and education of the national labor force. In more advanced economies, higher education and technical training are especially important components of labor productivity, as they enable workers to interact with more sophisticated forms of capital and succeed in skill-intensive industries. TFP is the residual share of output that cannot be explained by the quantity of inputs used in production. It represents the overall efficiency with which firms utilize the available stocks of land, labor, and capital to create goods and services. The structural, institutional, and policy factors that contribute to TFP include the economy's capacity for innovation, the education level of the national workforce, the allocative efficiency of factor markets, the quantity and quality of physical infrastructure, and the sophistication of public institutions.

**A recent analysis of the determinants of TFP by Loayza and Kim (2017) reveals that innovation has the greatest impact on productivity, followed by physical infrastructure, market efficiency, workforce education, and the quality of the institutional framework.** This analysis begins with a literature review designed to identify a range of variables believed to influence TFP. A statistical index is constructed for each variable, and each index is assessed in terms of its relative contribution to variations in TFP. The analysis examines 120 countries between 1985 and 2011. It ultimately concludes that innovation had the largest impact on TFP, but that other factors also significantly influenced productivity, both individually and together.<sup>2</sup>

### Innovation

**There is evidence that Malaysia's economy is becoming more innovative, and Malaysian firms perform especially well compared to other regional countries on measures of nontechnical innovation.** Malaysian firms are more likely to introduce nontechnical innovations into their existing operations, including new or improved distribution, organizational, and marketing methods. However, Malaysian firms are less likely than firms in other regional countries to leverage technical innovation to introduce a new or significantly improved product or production technique.

**Malaysian firms that innovate tend to be more productive.** Malaysian firms that have introduced technical innovations generally have higher levels of TFP, and firms that have introduced nontechnical innovations usually have higher rates of labor productivity. Firms that invest in R&D, or provide formal training to their workforce with the specific purpose of encouraging innovation, also have higher rates of labor productivity. The increase in productivity associated with both technical and nontechnical innovation is particularly significant for medium-sized firms. Large firms and exporting firms tend to be more innovative than small firms and non-exporting firms. In Malaysia, large firms are more likely to engage in all three types of innovation: non-technical, technical and R&D.

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<sup>2</sup> Although the analysis in Kim and Loayza (2017) does not include specific conclusions for Malaysia, as it is based on a cross-country sample of 120 countries (including Malaysia), it offers some relevant policy conclusions for developed and developing countries. By analyzing the impact of the different determinants of TFP, the study provides an empirical validation for the use of these determinants that we analyze in this work.

**In recent years, the amount that Malaysian universities spend on R&D, the number of academic researchers, the number of patents, and the range of academic publications have all increased.**

However, there is considerable scope to improve the overall quality of academic innovation. There are few platforms for conducting interdisciplinary research; the number of publication citations remains low; collaboration with the private sector is rare; and many research outcomes are not commercialized. Malaysian firms still have difficulty sourcing scientists and engineers from the local labor market, and a lack of highly-skilled local staff is a barrier to innovation in the manufacturing and services sectors.

## Education

**While Malaysian workers are more educated than workers in many comparable countries, Malaysian firms are more likely to report having difficulty finding workers with appropriate skills.**

About 81 percent of Malaysian workers have completed secondary school, a higher rate than many comparable countries have achieved, including some high-income and OECD economies. However, a substantial percentage of Malaysian firms report that acquiring workers with the necessary skills poses a significant challenge. These firms tend to have lower labor-productivity levels than firms that report having no difficulty finding appropriately-skilled workers. Moreover, while Malaysian firms report relatively-low vacancy rates, vacancies are most common for positions requiring skilled workers.

**This skills gap persists even though Malaysia spends more on education and training programs than many comparable countries.**

Peer countries, both in the region and worldwide, have demonstrated that greater educational outcomes can be achieved at a similar level of per-student spending. In 2013, Malaysia's level of public education spending relative to GDP (6.1 percent) was one of the highest among comparable countries, yet Malaysia's educational outcomes continue to lag those of comparable countries with similar or lower levels of education spending. The relatively-poor performance of Malaysia's educational system suggests that educational spending is poorly allocated. In a global marketplace driven by rapid technological advancement and tightening international connectivity, sophisticated technical skills are increasingly crucial to competitiveness and growth. As the Malaysian economy becomes increasingly knowledge-intensive, a persistent skills mismatch could slow the country's transition to high-income status.

## Factor-Market Efficiency

**Malaysia's financial sector is relatively efficient by the standards of comparable countries.**

While some indicators have deteriorated in recent years, this trend appears to reflect slowing GDP growth and tighter monetary policies in a more challenging macroeconomic environment. The banking sector, stock market and bond market are all deep relative to Malaysia's GDP, and the banking sector has a low interest-rate spread. Household access to finance is high, while firm access to bank credit is comparable to that of peer countries. However, a robust insolvency system is crucial to ensure that capital moves easily from less-efficient to more-efficient firms, and Malaysia's insolvency system is weak by international standards.

**Malaysia's labor market is relatively efficient overall.**

There are few impediments to hiring and firing workers; firms have a strong capacity to attract and retain talent; pay and performance are closely related; and worker-employer relations are generally cooperative. However, Malaysia's high redundancy costs and low female labor-force participation rate are serious structural issues that require policy intervention.

**An empirical analysis of the manufacturing sector suggests that Malaysia's output markets are less efficient than its input markets, and less efficient than the output markets of peer countries.**

Malaysia's domestic market is generally competitive and supported by an effective anti-monopoly policy, but the perceived intensity of local competition is relatively low. While Malaysia's output markets are generally efficient, alleviating constraints on the entry of both foreign and domestic firms could increase competition and sharpen efficiency incentives.

## Physical Infrastructure

**The Malaysian government has invested heavily in building and maintaining the country's infrastructure, and Malaysia consistently outperforms its peers on various measures of infrastructure quality.** While Malaysia's roads, highways, railways, seaports, airports, telecommunications systems, and electricity and water networks are generally of high quality, infrastructure bottlenecks continue to inhibit investment and slow business activity. This is especially true of urban traffic congestion, which increases transportation costs and hinders economic growth.

**Despite the generally high quality of Malaysia's roads, traffic congestion is a major problem in large cities, especially in Peninsular Malaysia.** The country's rapid population growth, urbanization and economic expansion have overwhelmed the capacity of many urban road networks. The government's slow progress in addressing traffic congestion reflects systemic weaknesses in urban planning and policies that favor private vehicle ownership over public transportation. In addition, as Malaysia continues to integrate into global supply chains, policymakers will need to devote greater attention to improving the last-mile connectivity of ports.

## Public Institutions

**Malaysia outperforms many comparator countries on indicators of institutional quality, and its institutional framework is conducive to productivity growth.** Malaysia has an independent judiciary and effective systems for protecting property rights and enforcing contracts. The country's scores on the World Bank's Worldwide Governance Indicators (WGI) and Global Competitiveness Index (GCI) have improved over the last decade. Malaysia outperformed most comparator countries on the 2014 WGI, ranking in the top five on almost every indicator. In the 2016 GCI, Malaysia ranked second among comparator countries on indicators of property rights, intellectual property protections, the regulatory burden and the efficiency of the legal framework for settling disputes. It also ranked third among its peers on indicators of corruption and judicial independence. However, Malaysian firms frequently cite excessively burdensome regulations as a key obstacle to doing business. On the 2016 GCI, nearly 28 percent of firms reported that regulations hindered business activity, citing burdensome procedures for obtaining licenses and permits, complying with labor laws and paying taxes.

## Policy Options

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**Malaysia's government has demonstrated a credible commitment to achieving the country's full productivity potential.** At the national level, the authorities have adopted policies designed to promote macroeconomic stability, enhance the business and investment climate, foster the development of human capital and encourage innovation. At the sector level, the government is striving to improve the efficiency of input and output markets, support the growth of a dynamic services sector, and further increase the stock of human capital by encouraging greater female participation in the labor force. The World Bank and the government's other development partners are providing critical support in many of these policy areas (see Box 1).

### Macroeconomic Management and Institutional Quality

**Malaysia performs relatively well on indicators of macroeconomic management.** Its inflation rate is broadly stable by regional standards, and its budget deficit is narrowing over time. In 2016, Malaysia ranked 35th globally and 8th among comparator countries on the macroeconomic environment pillar of the Global Competitiveness Index (GCI). Nevertheless, exchange-rate volatility remains high and could discourage investment. Moreover, Malaysia's macroeconomic environment has weakened recently compared to those of its peers, adversely affecting the country's competitiveness.

**The government's commitment to fiscal consolidation has contributed to a stable macroeconomic environment, but fiscal risks persist.** Fiscal discipline and sound overall macroeconomic management have supported business activity and boosted productivity growth. However, the combination of external headwinds, a narrow revenue base, and large spending needs, poses risks to fiscal sustainability, and some of the government's fiscal consolidation efforts have been excessively pro-cyclical. Continued fiscal discipline will be necessary to meet the government's expenditure consolidation targets, build buffers against future macroeconomic shocks, and create adequate fiscal space to address the anticipated costs of a rapidly-aging population. To accomplish these objectives, policymakers must continue to tightly manage the growth of the public-sector wage bill – including bonuses and other forms of remuneration – and resist pressure to provide untargeted cash assistance to households.

**Further reforms could improve the quality of Malaysian policymaking and strengthen its public institutions.** The government has made significant advances in stakeholder involvement in the policy process, by holding regular consultations and participatory forums with domestic firms and business associations, foreign investors, civil-society representatives, and the public. In addition, more regular and comprehensive monitoring and evaluation of government programs and strategic plans could improve their efficiency, and independent performance audits could enhance program planning and implementation. Finally, greater transparency in the bidding process for public procurement could help reduce costs and enhance the efficiency of public investment.

### Education and Workforce Skills

**While the Malaysian workforce is relatively well educated, firms often have difficulty finding workers with specific skills.** Although the quality and quantity of higher-education and vocational training

programs in Malaysia is improving, graduates continue to struggle to find permanent employment, as their skills do not always suit employer demand. Comparable countries, both in the region and worldwide, have demonstrated that greater educational outcomes can be achieved at a similar level of per-student spending, and policymakers should strive to enhance the efficiency of the education budget, while keeping total expenditures close to their current levels. To maintain its external competitiveness, Malaysia will need to continually adapt its education system to meet the needs of an evolving global economy.

## Innovation

**While Malaysia's success in promoting innovation is comparable to that of peer countries, policymakers have considerable scope to enhance the impact of pro-innovation policies.** Efforts to deepen linkages between foreign and domestic firms could accelerate technology transfer, and greater trade openness could encourage domestic firms to innovate by intensifying competitive pressures. Further reducing tariffs, and reforming regulations on foreign direct investment, could enable Malaysia to accelerate trade-related technology transfer.

**Consolidating innovation policy under the authority of a single government agency could help to foster innovation.** Aggregating information on research grants and other forms of financial support could boost innovation among entrepreneurs and small firms. Encouraging collaboration between universities and the private sector could promote the development of new commercial technologies, and strengthening intellectual property protections could incentivize research in areas with commercial applications. Malaysia's recent efforts to build its capacity to support innovation have achieved mixed results, and a well-coordinated, demand-driven approach could both accelerate innovation and enhance the contribution of pro-innovation policies to productivity and competitiveness.

## Competition in Domestic Markets

**While Malaysia's goods markets are generally efficient, alleviating barriers to entry could increase competition in key markets.** Liberalizing rules governing the entry of foreign firms could intensify local competition and sharpen efficiency incentives. Malaysia's regulatory burden is relatively low and has lessened over time, and few firms cite the country's relatively-high tax rates as a major obstacle to doing business. However, mandatory sales-tax registration has increased the administrative cost of starting a business, and processes for obtaining business licenses and permits could be further streamlined. Malaysia's trade openness has promoted export diversification and enabled domestic firms to integrate into global value chains. Although average tariff rates have fallen over time, there is scope for further reductions, and easing regulations on foreign direct investment could boost the gains from trade and increase Malaysia's attractiveness as a destination for foreign capital.

## The Services Sector

**Productivity growth in the services sector has lagged other elements of the economy.** Expanding access to education and training opportunities will be vital to promote entrepreneurship and accelerate innovation, and leveraging information technology will facilitate the development of more sophisticated services subsectors. However, while services will become an increasingly important contributor to growth

over the long term, policymakers should moderate their short-term expectations for the sector, and attempting to emulate the sectoral share of services in GDP that prevails in developed economies could result in a distorted growth pattern. Nevertheless, the services sector accounts for an increasing share of GDP even in less-developed economies, and raising services-sector productivity – including among small and medium enterprises – could have a positive impact on economic growth in Malaysia.

## Female Labor-Force Participation

**Malaysia's labor market is relatively efficient overall, but the low female labor-force participation rate is slowing the growth of the human capital stock.** Although Malaysia's female labor-force participation rate has risen significantly in recent decades, it remains low by the standards of comparable countries. Allowing greater flexibility in working hours, expanded work-from-home options, and enhanced access to quality childcare could boost female labor-force participation. Expanding the supply of adult learning and re-skilling opportunities is especially critical to facilitate the re-entry of adult women into the labor market.

## Conclusion

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**As the role of factor accumulation diminishes, Malaysia's convergence with high-income economies will require sustained improvements in economy-wide productivity.** More efficient investment in human capital and continued infrastructure development will be necessary to sustain robust growth, as the gains from low labor costs and knowledge spill overs are gradually exhausted. Rapidly expanding the tertiary education system will be critical to equip workers with the skills to succeed in an increasingly dynamic, technology-driven economy, as highly-skilled workers and technical professionals are necessary to produce cutting-edge goods and services.

**Although Malaysia faces considerable challenges, its past performance justifies considerable optimism.** Malaysia's government has demonstrated an impressive capacity for sound macroeconomic management in the service of long-term policy goals. Enhancing productivity will require a coordinated approach involving multiple branches of the public administration, guided by a common vision of a dynamic economy that matches advanced technology with skilled workers, in a context of low regulatory costs, efficient public institutions, and highly competitive markets.



## CHAPTER 1

# Empirical Analysis of Productivity in Malaysia<sup>3</sup>

<sup>3</sup> This chapter is adapted from an analysis prepared by World Bank staff, which was originally presented in World Bank (2016a).

**Between 1990 and 2014, Malaysia enjoyed a period of solid economic growth driven by factor accumulation.** High rates of investment in infrastructure and private-sector development, combined with rising female labor-force participation and a growing working-age population, pushed the average annual GDP growth rate to 5.8 percent between 1990 and 2014. Total factor productivity (TFP) growth was negative for several years following the 1998 Asian financial crisis (AFC), but Malaysia has since maintained a steady annual TFP growth rate that reflects a combination of economic flexibility and robust investment in new sectors.

**The need to accelerate productivity growth has become more pressing, as the country's traditional economic engines have slowed.** While GDP growth in Malaysia has proven resilient in recent years, structural constraints are emerging, as headwinds associated with declining oil and gas output slow capital accumulation. Since 1990, growth in the mining sector has gradually decelerated from an average of 5.3 percent in 1990-99 to 0.8 percent in 2010-14.<sup>4</sup> Moreover, labor-force growth is expected to slow in line with demographic trends, and the share of the population over the age of 65 is expected to exceed seven percent by 2030.<sup>5</sup> In this difficult context, faster productivity growth will be necessary to ensure a sustainable growth trajectory that allows Malaysia to reach high-income status.

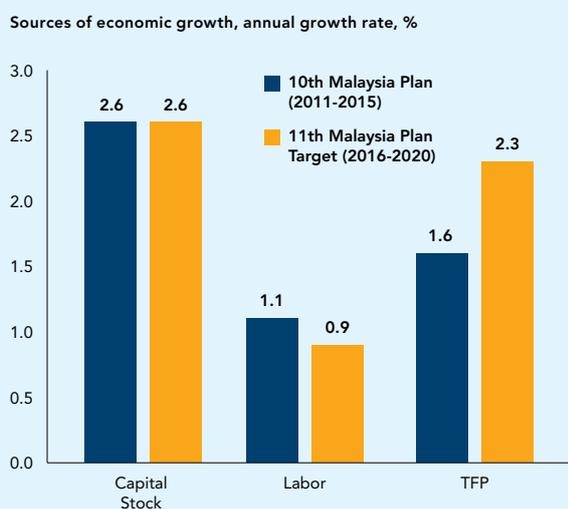
**A rising working-age population has contributed to Malaysia's economic development over the last 25 years, but as the demographic transition reduces the availability of labor, increased productivity will be vital to sustain growth.** Although Malaysia's demographic transition is at an earlier stage than in many other members of the Association of Southeast Asian Nations (ASEAN), over the long term an expanding workforce supported by capital accumulation will not be sufficient to sustain growth. By 2050, the age structure of Malaysia's population is expected to be similar to that of Singapore in 2000, but human capital in Malaysia is projected to remain smaller on a per capita basis. As a result, Malaysia's labor-productivity growth potential is greater than that of other ASEAN countries. Nevertheless, Malaysia's incipient demographic transition will constrain the growth of human capital over the long term. While an increasing average life expectancy will strengthen incentives to invest in education, with a positive effect on overall productivity growth, the limited availability of high-quality educational services is a key constraint on human-capital formation. This makes education a prime area for productivity-enhancing public investment.

**Recognizing these challenges, the government incorporated several productivity targets into the 11th Malaysia Plan.** Between 2016 and 2020, the government aims to increase the TFP growth rate to 2.3 percent per year (Figure 3). The overall target growth rate for labor productivity is 3.7 percent per year, driven by the services sector, which is expected to contribute more than 70 percent to total labor-productivity growth. At the sector level, construction has the highest labor-productivity growth target at 9.6 percent, followed by services at 4.1 percent, agriculture at 3.6 percent, and manufacturing at 2.6 percent (Figure 4). In addition, as part of its strategy to boost productivity, the government is set to introduce wide-ranging initiatives to address productivity issues at the national, sector and firm levels.

<sup>4</sup> These figures are based on a sectoral decomposition of GDP.

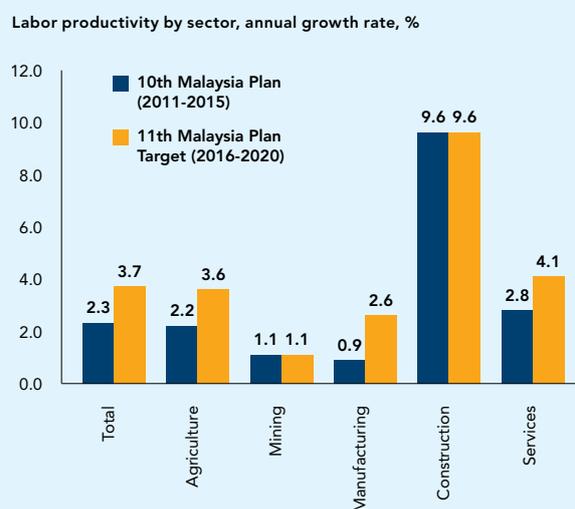
<sup>5</sup> World Bank East Asia and Pacific Regional Report. 2016. "Live Long and Prosper". A population is defined as "aging" when the share of the total population over the age of 65 exceeds seven percent.

**FIGURE 3: The government aims to accelerate the TFP growth rate to 2.3 percent per year...**



Source: Economic Planning Unit (EPU), Department of Statistics Malaysia (DOSM)

**FIGURE 4: ...while boosting the annual growth rate of labor productivity to 3.7 percent, led by the construction sector.**



Source: EPU, DOSM

**This chapter analyzes productivity trends in Malaysia and compares them to the experience of the country’s regional and international peers.** The chapter begins by examining the evolution of productivity in Malaysia, including the contribution of productivity and employment creation to the growth of per-worker value addition. It then draws on the results of the most recent World Bank Enterprise Surveys for ASEAN countries and selected middle- and high-income economies, identifying areas that correlate positively with productivity, and assessing Malaysia’s performance against that of comparator countries. Finally, the chapter utilizes a panel-data sample of manufacturing firms in Malaysia, based on the 2005, 2010 and 2014 economic census and survey, to identify the key characteristics of productivity growth in the manufacturing sector.

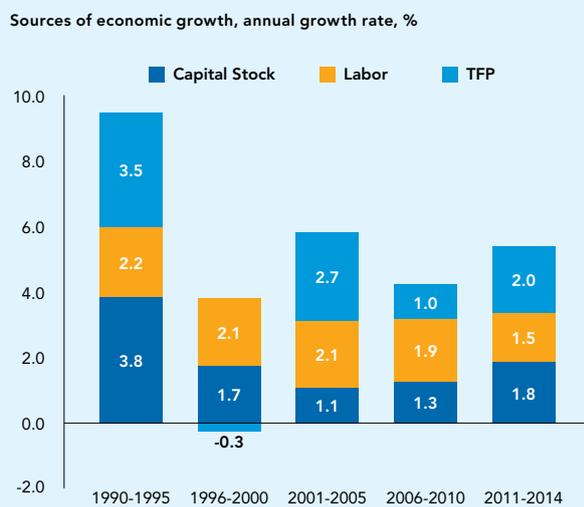
## Factor Accumulation and Productivity Growth

**Factor accumulation has driven Malaysia’s economic growth over the past 25 years (Figure 5).** Estimates based on the Solow growth model indicate that Malaysia’s labor and capital stocks grew at an annual rate of approximately 2.0 percent between 1990 and 2014. Meanwhile, the country’s annual TFP growth rate was significantly lower at 1.8 percent. While TFP growth has accelerated moderately over the years, it has still generally been outpaced by the growth of both the labor and capital stocks. Indeed, TFP growth during this period may have been even lower than these estimates suggest – possibly as low as 1.0 percent – if a higher capital-stock-to-income ratio is assumed.<sup>6</sup>

<sup>6</sup> The estimates were generated using the Solow growth model and reflect two general assumptions – a share of capital to income ( $\alpha$ ) of 30 percent and a depreciation rate of capital of six percent – which allow for cross-country comparisons. However, a higher ( $\alpha$ ) of 50 percent, which could be more indicative of the economy, would imply significantly slower TFP growth.

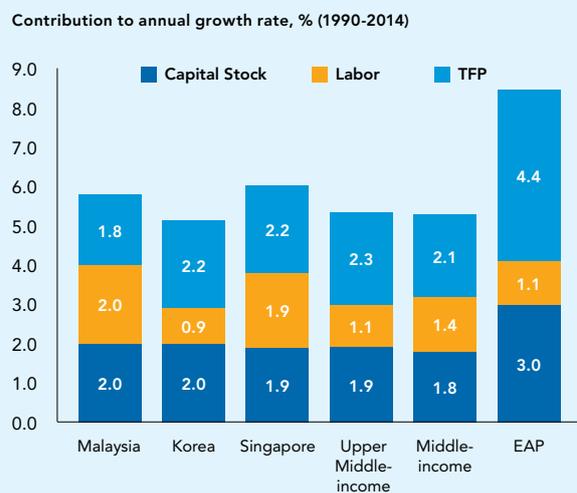
**TFP in Malaysia has grown more slowly than in peer countries (Figure 6).** As a result, Malaysia has been unable to close the gap with global comparators and higher-income economies in the East Asia and the Pacific (EAP) region. While capital accumulation has driven economic growth in countries throughout the region, higher-income EAP economies have typically exhibited higher TFP growth rates. For example, while Malaysia, Singapore and Korea experienced similar labor and capital growth rates, TFP grew more rapidly in Singapore and Korea, rising at an average annual rate of 2.2 percent, compared to 1.8 percent in Malaysia. A similar pattern can be observed when comparing TFP growth in Malaysia to the EAP regional average, as well as the averages for both upper-middle-income and middle-income countries worldwide.

**FIGURE 5: Capital accumulation has driven Malaysia's economic growth...**



Source: World Development Indicators, World Bank staff calculations

**FIGURE 6: ...and its TFP growth rate has been below those of wealthier countries in the region.**



Source: World Development Indicators, World Bank staff calculations

**TFP's contribution to Malaysia's economic growth has increased steadily over time, but at a slower pace than in other regional countries.** With the exception of three crisis periods,<sup>7</sup> TFP has consistently made a positive contribution to economic growth in Malaysia. From 1990 to 2014, TFP represented around 31 percent of GDP growth, while the rising stocks of capital and labor contributed around 35 and 34 percent, respectively. The 1998 AFC caused a marked drop in TFP's contribution to growth. Malaysia's TFP growth rate has since largely recovered, but not as swiftly as TFP growth rates in other regional countries affected by the AFC, such as Korea, Thailand, and Indonesia. In addition, TFP contributed more to growth in these comparator countries during the post-crisis period (2009-2014) than it did in Malaysia.

<sup>7</sup> These include the 1998 AFC, the 2011 telecommunications bubble, and the 2008 global financial crisis.

## Labor-Productivity Growth

**Labor productivity, especially in the services sector, has driven the growth of value addition in Malaysia.** From 1990 to 2014, labor productivity was responsible for an estimated 72 percent of value-added growth, while rising employment accounted for 11 percent.<sup>8</sup> The services sector drove enhanced labor productivity and employment creation.

### BOX 2

## Measuring TFP and Labor Productivity

**TFP is commonly measured through growth-accounting models, which examine how much of an observed rate of change in output is not accounted for by the rate of change of combined inputs, such as the capital and labor stocks.** Thus, the growth-accounting approach identifies TFP growth as a residual. However, accuracy remains a challenge, as different assumptions can lead to very different estimates. Moreover, assessing TFP growth can be problematic when it reflects factors other than technological change, such as increasing returns to scale, price distortions caused by imperfect competition, or gains from the reallocation of inputs between sectors.

**Labor productivity is another important and widely-used productivity indicator, as it is also strongly correlated with changes in living standards.** Labor productivity measures gross output or gross value added per unit of labor input, which indicates how efficiently labor is used in production. One advantage of assessing labor productivity is that it is relatively easy to calculate and can be understood intuitively. However, as changes in labor productivity result from the combined effects of different causes, such as technological change and capital accumulation, as well as the capacity of workers and the intensity of their efforts, it can be difficult to isolate the contribution of each variable.

Source: Authors

**Labor productivity growth has trended downward since the 2008 global financial crisis.** While a period of strong productivity growth followed the 1998 AFC, robust employment creation in the wake of the global financial crisis has not been accompanied by a similar recovery in labor productivity. Indeed, the growth of labor productivity in both the industrial and services sectors has been slowing since 2008.

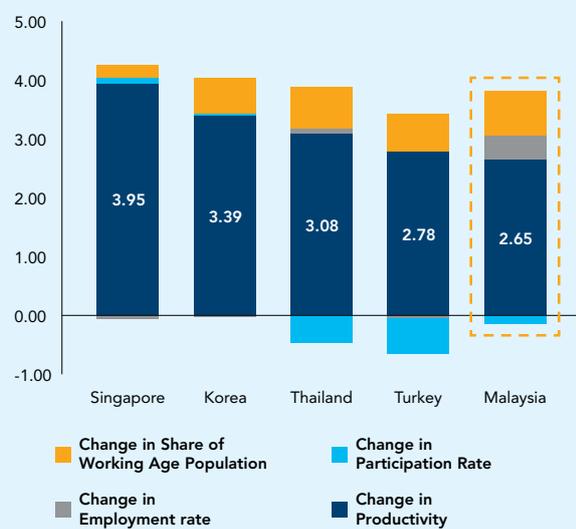
**Over the past 25 years, labor productivity has grown more slowly in Malaysia than in many regional comparators (Figure 7).** At 2.65 percent, Malaysia's labor-productivity growth rate is higher than those

<sup>8</sup> Estimates for labor productivity were calculated using the Shapley decomposition method. This method decomposes per-capita growth output into four parts: productivity growth, employment growth, labor-force growth, and changes in the working-age population. It also calculates different sectors' contributions to aggregate productivity and employment growth. The method sheds light on the respective roles of productivity and employment creation in driving overall economic growth.

of Peru, Brazil, Chile and Mexico and comparable to those of Indonesia and Turkey (Figure 8). However, labor-productivity growth rates among regional comparators such as Singapore (3.95 percent), Korea (3.39 percent), Hong Kong (3.15 percent) and Thailand (3.08 percent) have surpassed Malaysia's rate. Moreover, unlike Malaysia, other regional countries did not experience a marked reduction in labor-productivity growth following the global financial crisis. On the other hand, Malaysia has experienced faster employment creation than these countries.

**FIGURE 7: Labor productivity has grown more slowly in Malaysia than in other countries in the region...**

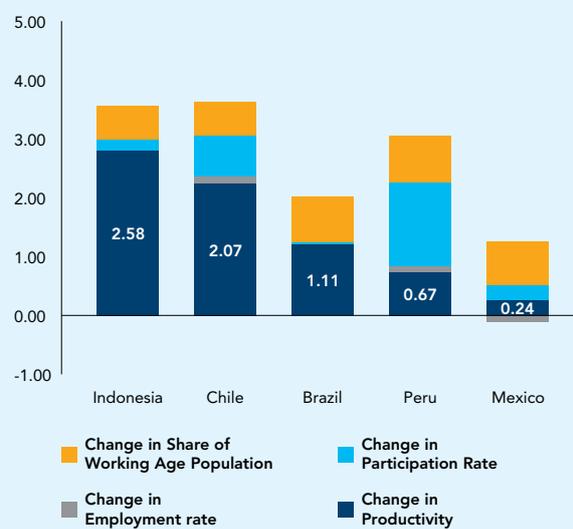
Value-added growth per worker, annual growth rate, % (1990-2014)



Source: EPU, DOSM, World Development Indicators, World Bank staff calculations

**FIGURE 8: ...but faster than labor productivity among peer countries worldwide.**

Value-added growth per worker, annual growth rate, % (1990-2014)



Source: EPU, DOSM, World Development Indicators, World Bank staff calculations

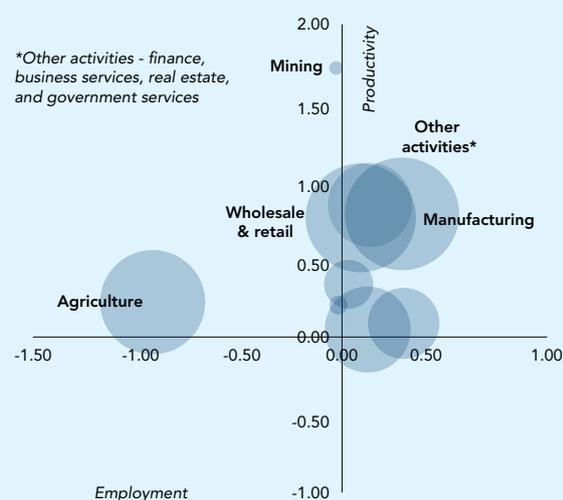
### Employment in more-productive sectors, such as manufacturing, has declined in recent years.

Disaggregating the growth of value addition by subsector reveals two distinct trends during the pre-AFC (1990-1998) and post-AFC (1999-2014) periods. Before the AFC, employment grew rapidly in sectors with higher labor-productivity growth, such as manufacturing and finance (Figure 9). During this period, value addition grew in most economic sectors, except agriculture and mining. Following the AFC, increased value addition per worker contributed to employment growth in key services subsectors, including wholesale and retail trade, and finance. However, while labor-productivity growth in the manufacturing sector also increased, this did not translate into employment growth, and employment in the manufacturing sector has declined since the crisis (Figure 10).<sup>9</sup>

<sup>9</sup> While the analysis does not identify the underlying factors behind this development, one possible reason that the manufacturing sector has not experienced greater employment growth despite its higher labor productivity is the increasing automation of the sector, which has reduced demand for unskilled workers.

**FIGURE 9: Prior to the 1998 AFC, sectors with higher rates of labor-productivity growth created more jobs**

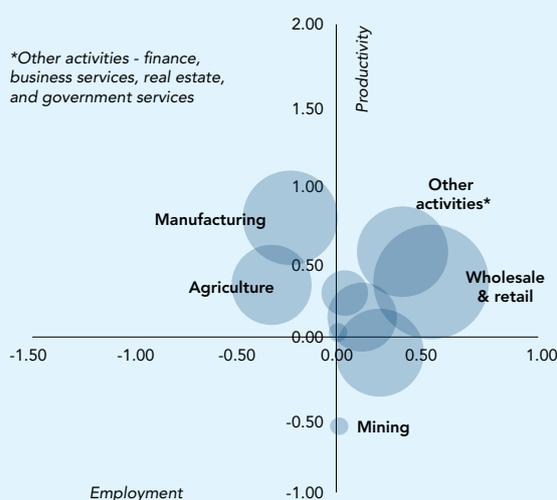
Growth of value addition per worker by sector, % (1990-1998)



Source: EPU, DOSM, World Bank staff calculations  
Note: Bubble size reflects employment in the sector

**FIGURE 10: After the AFC, job creation in the manufacturing sector slowed despite its rising labor-productivity growth rate**

Growth of value addition per worker by sector, % (1999-2014)



Source: EPU, DOSM, World Bank staff calculations  
Note: Bubble size reflects employment in the sector

## Firm-Level Productivity

**This section draws on the results of the most recent World Bank Enterprise Surveys for Malaysia.**

The survey covered formal firms with five or more employees in the manufacturing sector and in the main services subsectors.<sup>10</sup> Together, manufacturing and services represented 76.4 percent of Malaysia's GDP in 2014. Other sectors, such as agriculture, extractive industries, public utilities, government services, healthcare, and financial services, are not included in the analysis.

**As similar Enterprise Surveys are conducted around the world using a standard methodology, the results for Malaysia can be benchmarked against the performance of other countries (Figure 11).** The Enterprise Surveys typically focus on emerging and developing economies, and data is only available for a small number of high-income countries. The following analysis compares Malaysia against selected high-income and OECD economies,<sup>11</sup> other ASEAN countries<sup>12</sup> and China.

<sup>10</sup> These sectors include retail and wholesale trade, automotive repair, hotels and restaurants, transportation, storage, communications, construction, and information technology.

<sup>11</sup> These countries include Chile, Croatia, the Czech Republic, Estonia, Israel, Latvia, Lithuania, Mexico, Poland, the Slovak Republic, Slovenia, Sweden, Turkey, and Uruguay.

<sup>12</sup> These countries include Cambodia, Indonesia, Lao PDR, Myanmar, the Philippines, Thailand, and Vietnam.

## BOX 3

## The Scope of the World Bank Enterprise Surveys and Available Productivity Measures

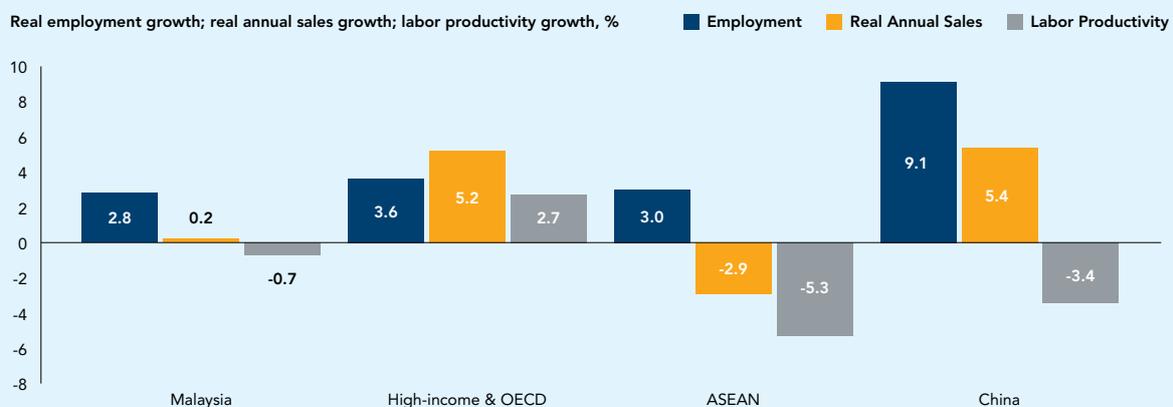
The Enterprise Surveys collect data on labor productivity (defined in terms of sales per worker or sales over the total cost of labor) for both manufacturing and services firms. TFP, however, is only estimated for manufacturing firms.<sup>13</sup> TFP estimates are revenue-based (sales are measured in local currency rather than by unit), and thus production efficiency cannot be separated from the effects of market power.

The Enterprise Surveys are usually conducted on a regional basis every 4-5 years. While the surveys for Malaysia and other ASEAN economies were collected at approximately the same time, data for other comparator countries come from different years. The data for China are from 2012, while the data for high-income and OECD economies were collected between 2010 and 2015.<sup>14</sup>

Source: Authors

The Enterprise Surveys reveal that marginal labor productivity in Malaysia deteriorated between 2012 and 2014. The decline in labor productivity during this period was driven both by decreased sales and continued employment creation. Between 2012 and 2014, employment grew at a rate of 2.8 percent per year, exceeding the 0.2 percent annual growth rate of real sales.<sup>15</sup> This resulted in a 0.7 percent annual reduction in labor productivity measured as real sales per worker (Figure 11). The decline in labor productivity occurred in a context of limited international sales growth, and during the period, both sales and labor productivity fell across ASEAN economies.

**FIGURE 11: Between 2012 and 2014, real annual sales growth in Malaysia was very modest, and a faster employment growth rate led to a moderate decrease in labor productivity**



Source: World Bank Enterprise Surveys

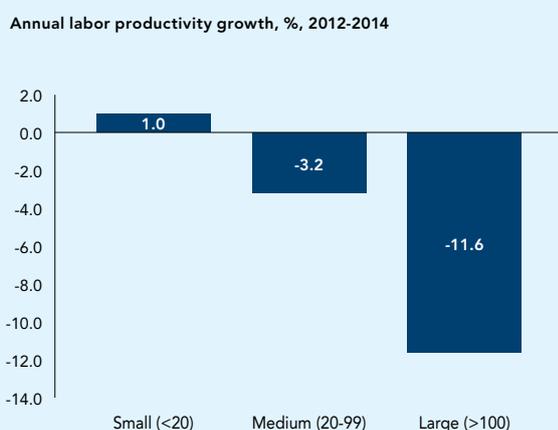
<sup>13</sup> See the appendix for further details on the estimation methodology.

<sup>14</sup> For further details, see: [www.enterprisesurveys.org](http://www.enterprisesurveys.org)

<sup>15</sup> Expressed in constant 2009 Malaysian ringgit.

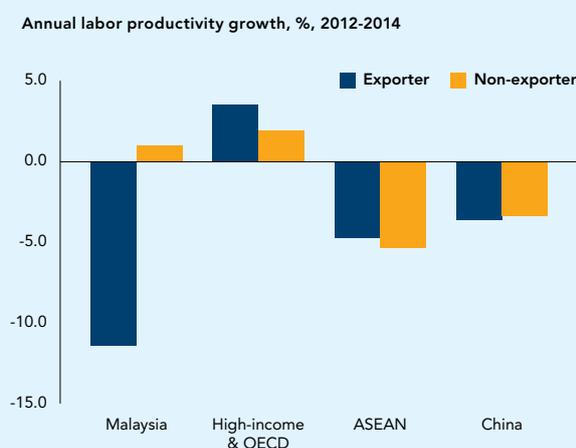
**The slowdown in labor productivity was most severe among large firms.** Overall, small firms, which are defined as having five to 19 employees, performed significantly better than larger firms in terms of labor-productivity growth (Figure 12).<sup>16</sup> In Malaysia, large firms, exporters and manufacturers tend to overlap. For example, almost 60 percent of large firms are manufacturing exporters. As a result, declining sales among exporters, due to weakening external demand in the wake of the 2008 global financial crisis, appears to have had a disproportionate impact on large firms.<sup>17</sup> Labor-productivity growth among Malaysia’s non-exporters compared favorably to that of other ASEAN economies and China. While productivity growth was modest among non-exporters in Malaysia, it was deeply negative among non-exporters in other ASEAN countries and China (Figure 13). Moreover, younger firms in Malaysia tended to perform better than older firms.

**FIGURE 12: The recent decline in labor-productivity growth in Malaysia was driven by large firms...**



Source: World Bank Enterprise Surveys

**FIGURE 13: ...and exporters.**



Source: World Bank Enterprise Surveys

**Labor productivity rose in Malaysia’s services subsectors and fell in its manufacturing sector.** While labor productivity among services firms grew at a rate of 1.7 percent per year, labor productivity contracted at a rate of 14.6 percent per year among manufacturing firms (Figure 14). All manufacturing subsectors experienced a decrease in both sales and labor productivity, and the decline in labor productivity was significantly greater in Malaysia than in comparator countries. Conversely, firms in Malaysia’s services subsectors vastly outperformed their counterparts in other ASEAN economies and in China (Figure 15).

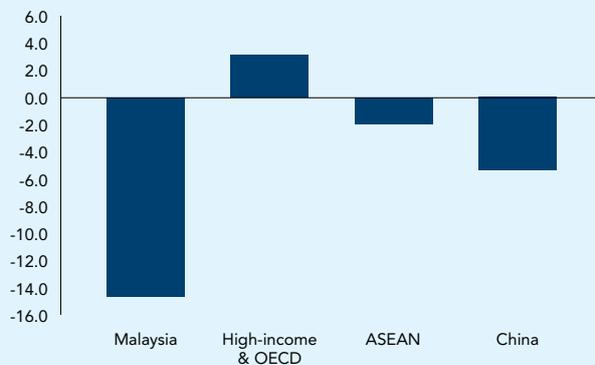
**Labor productivity growth in the services sector also varies by firm size.** Smaller firms in the Malaysian services sector have experienced positive labor productivity growth, while growth among medium and large firms has been negative. Similar trends have been observed in the other ASEAN countries and in China.

<sup>16</sup> Medium-sized firms are defined as having 20-99 employees; large firms are defined as having 100 employees or more.

<sup>17</sup> Exporting firms are defined as firms that export at least 10 percent of their sales.

**FIGURE 14: Manufacturing firms drove the recent decline in labor productivity...**

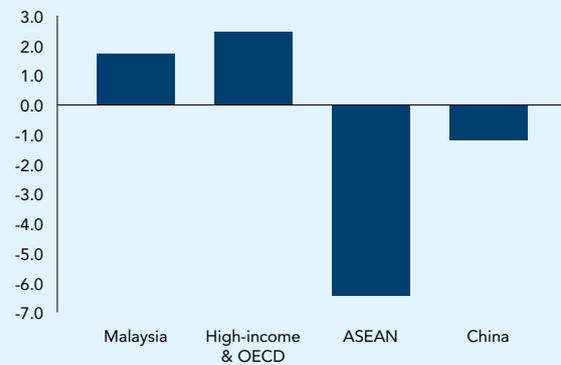
Manufacturing, annual labor-productivity growth, %, 2012-2014



Source: World Bank Enterprise Surveys

**FIGURE 15: ...while productivity improved among firms in the services subsectors.**

Services, annual labor-productivity growth, %, 2012-2014



Source: World Bank Enterprise Surveys

**Firms in the services sector appear to be less productive than manufacturing firms.** The ratio of labor productivity among services firms compared to manufacturing firms is smaller in Malaysia than in comparator countries, and this trend holds across firms of all sizes. Moreover, as in the manufacturing sector, firm size greatly influences labor productivity in the services sector, with medium-sized and larger firms experiencing greater variations.

## Firm-Level Productivity in the Manufacturing Sector

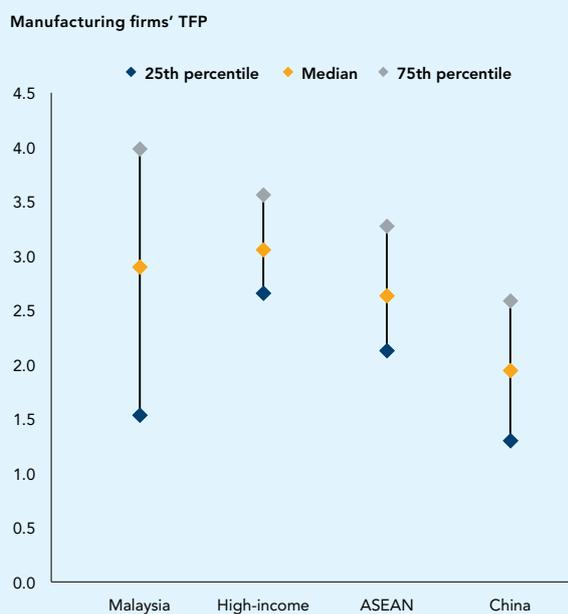
**The median TFP of Malaysian manufacturing firms is comparable to those of firms in high-income and OECD economies (Figure 16).** However, this is only true for medium and large manufacturing firms. Small Malaysian manufacturing firms underperform small firms in comparator countries.

**TFP levels vary significantly across Malaysian manufacturing firms (Figure 17).** Manufacturing firms in the top 25 percent of the TFP distribution are 11.6 times more productive than those in the bottom 25 percent. By contrast, this gap is just 2.5 in high-income and OECD economies, 3.1 in other ASEAN economies and 3.6 in China. Moreover, the TFP of the best-performing large firms in Malaysia exceeded that of the best-performing small firms in high-income and OECD comparators. Conversely, the TFP of the worst-performing Malaysian small firms was markedly lower than those of small firms in comparator countries.

**Exporting firms in the manufacturing sector have higher TFP levels than non-exporters.** TFP is positively correlated with the share of exported sales among manufacturing firms. Conversely, there is no clear relationship between the TFP of manufacturing firms and their share of imported inputs, although firms that import at least a portion of their inputs tend to have lower levels of labor productivity, particularly large firms. Many more firms use imported inputs in Malaysia than in comparator countries.

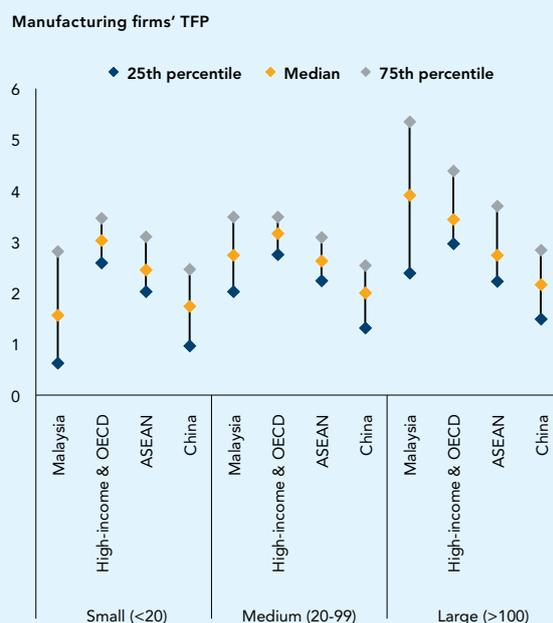
**The relatively-poor performance of less-productive non-exporting firms reduces the manufacturing sector’s overall TFP.** The median TFP of non-exporters in Malaysia is lower than that of non-exporters in comparator countries. This is mainly due to the variability of TFP between manufacturing firms in Malaysia, which is especially pronounced among non-exporters. This suggests that traditional market mechanisms may not be forcing unproductive manufacturers out of the domestic market.

**FIGURE 16: Manufacturing firms in Malaysia have a wider TFP range than manufacturing firms in comparator countries...**



Source: World Bank Enterprise Surveys

**FIGURE 17: ...and much of this variability is explained by differences between large and small firms.**

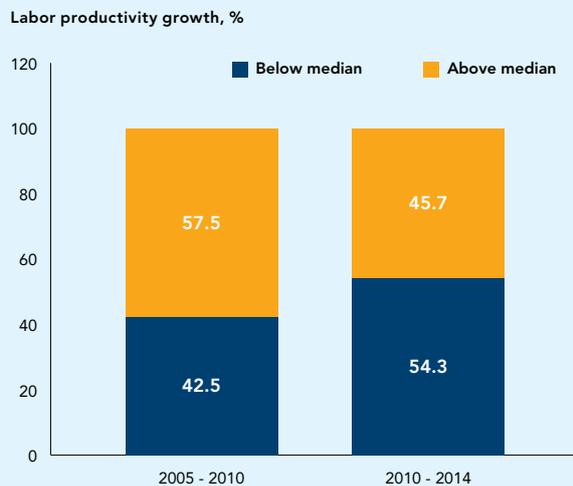


Source: World Bank Enterprise Surveys

**Labor productivity in Malaysia’s manufacturing sector has fallen over the past five years.** Labor productivity grew at an average annual rate of 4.6 percent from 2005-2010, then contracted at an annual average rate of 2.1 percent from 2010-2015. Moreover, fewer firms had labor-productivity growth rates above the median in 2014 than in 2010, underscoring the general decline in labor-productivity growth (Figure 18).<sup>18</sup> Overall, the gap between most- and least-productive firms failed to narrow, with firms above the median registering annual labor productivity growth rates of 9.4 percent and 2.8 percent during the 2005-2010 and 2010-2014 periods, respectively. Meanwhile, firms below the median experienced an even larger decline in their productivity growth rates (Figure 19). This trend could be explained by the unwillingness of firms to reduce their labor force when demand falls, especially if managers regard declining demand as the effect of a temporary cyclical downturn.

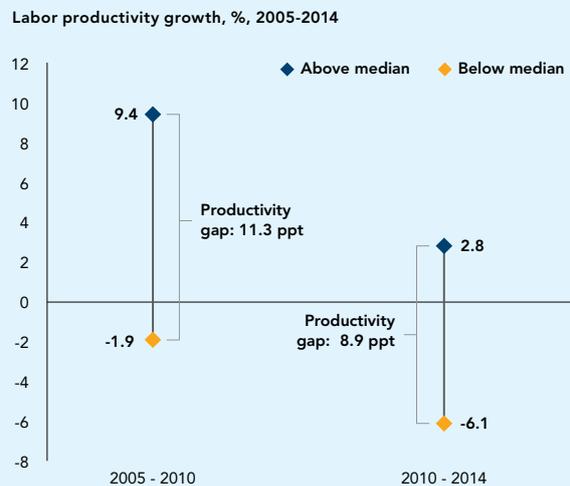
18 2005 is the first year for which data are available, and 2010 represents the midpoint of the available panel data. Labor productivity medians were identified for both years. Labor-productivity growth rates were calculated for the 2005-2010 and 2010-2014 periods, and firms were divided into groups above and below the productivity medians for 2005 and 2010. Firms above the median are assumed to have higher labor-productivity growth rates, and vice versa for firms below the median. If this were the case, labor productivity differences between firms would tend to persist over time, corroborating the findings of the literature (Syverson, 2011).

**FIGURE 18: More manufacturing firms were below the labor-productivity median in 2010-2014 than in 2005-2010...**



Source: DOSM, World Bank staff calculations

**FIGURE 19: ...and the gap between the most- and least-productive manufacturing firms did not narrow.**



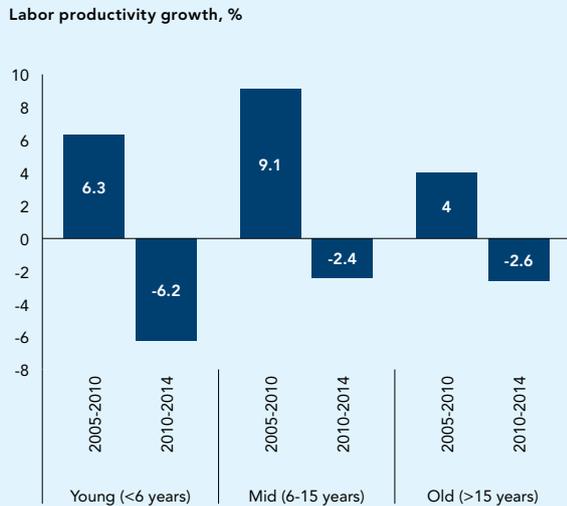
Source: DOSM, World Bank staff calculations

**The decline in labor productivity in the manufacturing sector between 2010 and 2014 was especially pronounced in certain industries.** Labor-productivity growth rates fell in all major manufacturing subsectors, with the petroleum and chemical products as well as the food and beverages industries declining slightly more than average. Weakening global demand may have contributed to falling labor productivity in the petroleum and chemical-products subsector. Similarly, anemic global demand likely contributed to lower rates of labor-productivity growth among firms in primarily export-oriented industries, such as the machinery and electrical and electronics subsectors.

**The fact that the declining trend in labor productivity growth encompassed all major manufacturing industries suggests an unknown systemic cause.** In the context of an overall slowdown in labor-productivity growth, differences in labor-productivity growth between firms above and below the median for each industry remained broadly similar across the two periods, at 11.3 percentage points in 2005-2010 and 8.9 percentage points in 2010-2014. During 2010-2014, most industries registered labor-productivity gaps above the sectoral average, except for the food and beverage, machinery and equipment, and electrical and electronics industries.

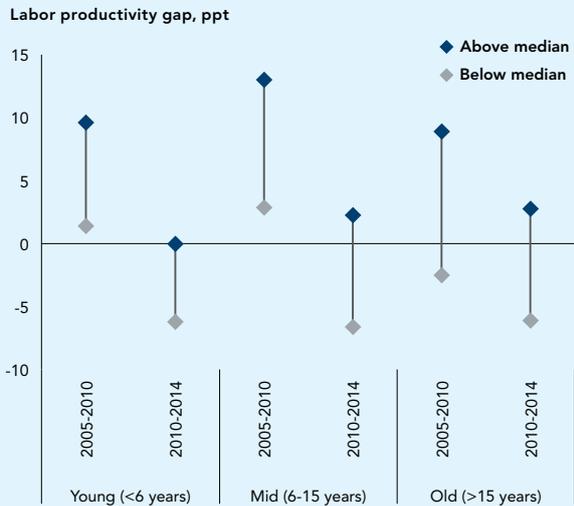
**Young firms – defined as firms that had been in operation for fewer than six years – experienced the largest productivity decline in the 2010-2014 period (Figure 20).** Firms of all ages registered lower labor-productivity growth rates in this period, but the smallest decline was observed among older firms at 2.0 percent, followed by middle-aged firms at 2.4 percent and young firms at 6.2 percent. Despite the overall slowdown in labor-productivity growth rates, the average gaps in labor productivity between firms above and below the median narrowed only slightly, from 9.9 percentage points in 2005-2010 to 8.0 percentage points in 2010-2014 (Figure 21). While the productivity gap for older firms also narrowed, it remained larger than those of young and middle-aged firms. Indeed, the average labor-productivity growth rate for older firms above the median in all industries during 2010-2014 was 3.9 percent, less than half the rate of 8.4 percent observed in 2005-2010. Middle-age firms above the median exhibited markedly slower labor productivity growth during 2010-2014.

**FIGURE 20: Young manufacturing firms experienced the largest productivity decline in 2010-2014...**



Source: DOSM, World Bank staff calculations

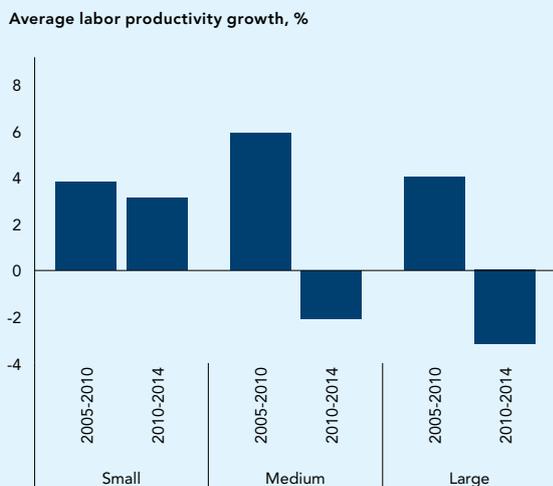
**FIGURE 21: ...yet labor-productivity gaps narrowed only slightly.**



Source: DOSM, World Bank staff calculations

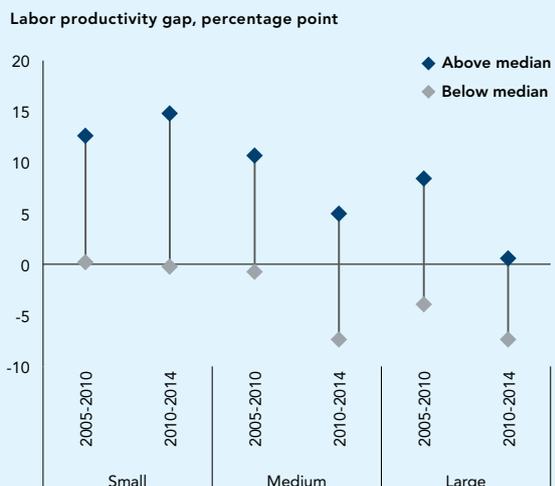
**Small manufacturing firms experienced higher labor-productivity growth rates during the 2010-2014 period (Figure 22).** The growth rate for small firms during this period was comparable to that of large firms from 2005-2010, which may indicate that smaller firms are able to more easily adapt to changes in the economic environment. This trend may also reflect the relatively-high growth rates of small firms at the top of the productivity distribution. While the labor-productivity growth gap among small firms appears to have widened, the gap among medium-sized firms remained broadly constant, and among larger firms, the gap

**FIGURE 22: Small manufacturing firms experienced higher labor productivity growth rates in 2010-2014**



Source: DOSM, World Bank staff calculations

**FIGURE 23: Labor productivity gaps appear to have widened for small manufacturing firms**

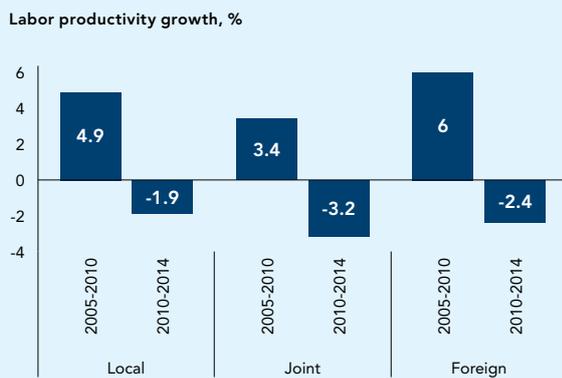


Source: DOSM, World Bank staff calculations

narrowed (Figure 23). This seems to contradict the consensus in the international literature that small firms tend to be less productive than larger ones due to their typically lower levels of capital intensity and their concentration in less-productive industries.<sup>19</sup>

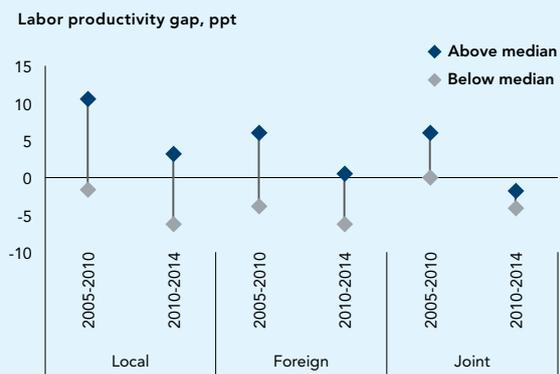
**On average, labor-productivity growth among domestically-owned firms increased in 2005-2010, then declined in 2010-2014 (Figure 24).** Domestically-owned firms also experienced a more significant gap in labor-productivity growth, though it narrowed in the latter period (Figure 25). These results may be influenced by the large share of domestic firms in the dataset (84 percent) and the much smaller share of foreign firms (15 percent). In general, firms in traditional industries<sup>20</sup> experienced greater labor-productivity growth than firms in non-traditional industries.<sup>21</sup> Small and medium-sized firms in the wood, paper products, and furniture industries registered the highest labor-productivity growth rates in 2010-2014. Large firms in the textile subsector also registered strong productivity growth during the period.

**FIGURE 24: Labor productivity among domestic manufacturing firms declined in 2010-2014...**



Source: DOSM, World Bank staff calculations

**FIGURE 25: ...and domestic firms exhibited larger productivity-growth gaps than foreign-owned firms.**



Source: DOSM, World Bank staff calculations

19 For instance, Leung et al (2008) found a positive relationship between firm size and labor productivity at the aggregate level in both the manufacturing and non-manufacturing sectors in Canada.

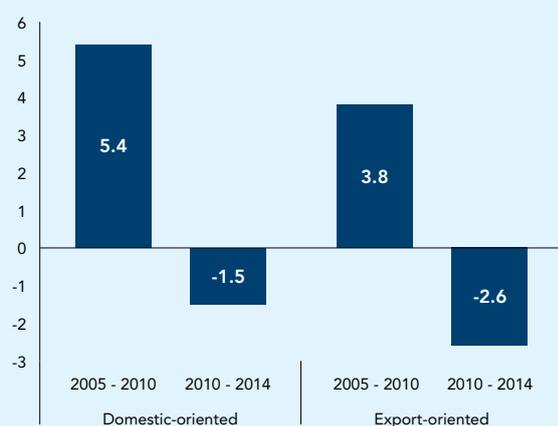
20 Traditional industries refer to wood, paper products, furniture, textile, apparel, and leather production.

21 Non-traditional industries include petroleum, chemical products, machinery, electronics, and computers.

**Firms that primarily serve the domestic market<sup>22</sup> experienced a smaller decline in labor productivity in 2010-2014 than export-oriented firms (Figure 26).** Economic growth in Malaysia outpaced global growth from 2005 to 2014, which may have contributed to this disparity in labor-productivity growth rates. The observed trend also seems to corroborate earlier research, which found that the TFP of domestically-focused firms was larger than that of export-oriented firms, and that smaller domestically-focused firms tended to be as efficient as export-oriented firms at the aggregate level during the period of FDI-intensive growth in the 1990s.<sup>23</sup> The labor-productivity growth gaps among domestically-focused and export-oriented firms are similar and appear to have narrowed slightly in 2010-2014 (Figure 27).

**FIGURE 26: Domestically-focused manufacturing firms experienced a smaller decline in labor productivity during 2010-2014**

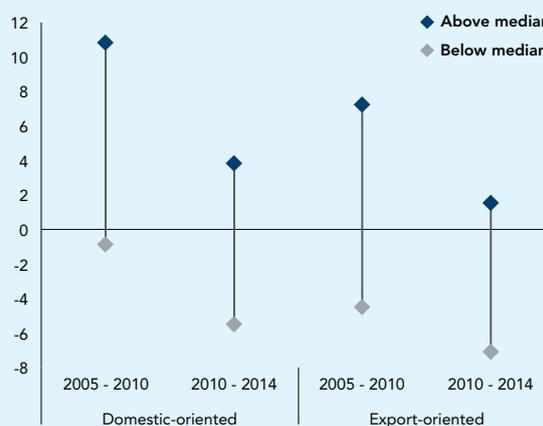
Labor productivity growth, %



Source: DOSM, World Bank staff calculations

**FIGURE 27: Domestically-focused and export-oriented manufacturing firms exhibit similar labor-productivity gaps**

Labor-productivity gap, ppt



Source: DOSM, World Bank staff calculations

22 Domestically-focused firms export less than 10 percent of their total sales.  
 23 Menon (1998); Orguchi et al. (2002).

## Conclusions

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**The overall productivity of the Malaysian economy compares favorably with that of other middle-income countries, but remains below the levels attained by high-income countries.** Over the last 25 years, factor accumulation has driven economic growth in Malaysia, as robust domestic and external demand, and positive demographic dynamics, boosted the country's stocks of capital and labor. Cross-country comparisons highlight that while Malaysia's TFP growth has been broadly positive, it has not been sufficient to close the gap with higher-income economies in the region or with peer countries worldwide. TFP's contribution to growth has steadily increased over the years, but at a slower pace than in other regional countries.

**Malaysia's productivity growth rate has declined in recent decades, due in part to weakening external demand.** The 1998 AFC and 2008 global financial crisis substantially slowed the growth of labor productivity in Malaysia. While productivity growth rebounded following the 1998 crisis, robust employment creation in the wake of the 2008 crisis has not been sufficient to return labor-productivity growth to its pre-crisis levels. The Enterprise Surveys reveal that large firms have led the slowdown in labor-productivity growth. Given the prevalence of exporters and manufacturers among large firms, this trend seems to reflect a substantial post-crisis decline in global demand for manufactured goods, a risk to which the Malaysian economy is particularly exposed.

**The subsequent chapters explore productivity trends in Malaysia in greater detail, and analyze constraints and support on productivity growth, by looking at the institutional and policy aspects, in addition to the analysis provided with firm-level data.** With economic headwinds inhibiting capital accumulation, and an aging population slowing the growth of the labor force, accelerating productivity growth will become increasingly crucial as Malaysia strives to achieve convergence with high-income economies. Using international comparators, as well as institutional and implicit policy aspects, the following chapters examine the ways in which infrastructure quality, allocative efficiency, innovation, and workforce skills influence productivity in Malaysia, and identify priority policy and institutional reforms to accelerate productivity growth.



**CHAPTER 2**

# The Impact of Infrastructure on the Evolution of Productivity in Malaysia

## Introduction

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**Given Malaysia's resources and current level of economic development, improvements in productivity growth will be vital for the country to realize its goal of achieving high-income status by 2020.** In line with this aim, the government intends to accelerate the average annual labor productivity growth rate to 3.7 percent between 2016 and 2020.<sup>24</sup> Against this backdrop, improvements in infrastructure will be critical in setting the foundation for higher productivity and long-term economic growth.

**Several studies have found a relationship between poor or inadequate infrastructure and productivity efficiency losses.** Straub and Terada-Hagiwara (2010) find that weak or unreliable transport and telecommunication networks can limit access to markets and potential clients, causing firms to miss out on market opportunities, and leading to higher inventory levels and logistic costs, as well as information losses. Moreover, they find that the efficiency and reliability of electricity networks may impact firm-level investment and technological decisions, as frequent power outages and unstable voltage output increase production costs, and raise the risk of machinery issues. As a result, many firms delay investments, or choose to invest in suboptimal remedial equipment and technologies, such as power generators, rather than in productive technologies.<sup>25</sup> The above discussion underscores the importance of quality infrastructure in raising productivity levels, as high-quality infrastructure contributes to a strong enabling environment for businesses to realize their full potential.

**This chapter focuses on infrastructure quality and its potential contributions to productivity growth in Malaysia.** To get a holistic view of infrastructure quality and business competitiveness, it focuses on the quality of both physical and intangible infrastructures, by comparing Malaysia's ranking on different indices with those of peer countries at a similar level of economic development.<sup>26</sup> The following types of infrastructure are discussed in the chapter: transport; logistics; telecommunications; electricity and water; institutional; and the macroeconomic environment. The report aims to identify current infrastructure deficiencies in Malaysia, and provides policy recommendations on how to overcome these issues.

**The analysis reveals that Malaysia outperforms peer countries with respect to the quality of its physical infrastructure in some sectors, while it underperforms in other sectors.** With respect to transport and logistics infrastructure, Malaysia has consistently ranked among the top 20 percent of countries in the World Economic Forum's Global Competitiveness Index (GCI) 2016-2017 in terms of the quality of its roads and highways, railway networks, ports, and airports.<sup>27</sup> However, Malaysia lags many comparator countries with respect to the quality of its telecommunications, electricity, and water infrastructure. The Malaysian government is striving to improve infrastructure quality and reduce inefficiencies in these sectors.

**With respect to intangible infrastructure, Malaysia outperforms comparator countries on various institutional quality and macroeconomic environment measures, though excessively burdensome regulations remain an issue for businesses.** Malaysia's strong performance on institutional quality indicators points to the relative efficiency of Malaysian institutions and the presence of strong property rights, an independent judiciary, and strong contract enforcement measures. However, many businesses find the country's regulatory framework to be overly burdensome and a major impediment to their operations. Malaysia performs relatively well with respect to the macroeconomic environment; it has a relatively stable inflation rate compared to other countries, and its budget deficit is on a downward trend. However, exchange rate volatility remains a concern, and may limit productive investments.

<sup>24</sup> Economic Planning Unit, 2015

<sup>25</sup> Alby, Dethier, and Straub (2009)

<sup>26</sup> In this chapter, Malaysia's performance is compared to those of the following ten countries: Singapore, Indonesia, Vietnam, South Korea, Chile, China, Philippines, Turkey, Mexico, and Thailand.

<sup>27</sup> Schwab (2015)

## Background

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**Both physical and intangible infrastructure are increasingly viewed as essential drivers of improvements in productivity and economic growth.** Physical infrastructure refers to the physical structures that enable the provision of goods and services to the public, and includes transportation, telecommunications, and energy-supply systems. Intangible infrastructure includes the quality of public institutions and the stability of the macroeconomic environment. Infrastructure directly affects both production and consumption, creating positive and negative spillover effects on economic growth, and includes significant capital spending in infrastructure.

**Infrastructure can affect productivity and economic growth through two channels.** First, infrastructure investment contributes to physical capital formation, and the output of public capital is a component of GDP.<sup>28</sup> Second, infrastructure and public services increase TFP by reducing unit costs of production and transportation, increasing the efficiency of productive inputs. Many studies have shown a significant correlation between infrastructure investment and long-term growth.<sup>29</sup>

**Historically, Malaysia has invested heavily in infrastructure. Under the 9th Malaysia Plan, almost 58 percent of the total developmental budget was allocated to infrastructure (see Annex 3).** The country's robust infrastructure investment spending has enhanced access to basic amenities, such as clean water and reliable electricity, and improved transportation and communication networks. Improvements to the railway system, roads, highway networks, ports, and airports, as well as investments in digital infrastructure, such as high-speed broadband, and a more efficient water and electricity supply, have expanded physical and virtual connectivity within the country. This, in turn, has contributed to more inclusive economic growth and a steady rise in productivity.<sup>30</sup>

**Under the Tenth Malaysia Plan (2011-2015), the Malaysian government made significant investments in transport, digital, and energy infrastructure.** The road network in Malaysia grew by 68 percent between 2010 and 2015, contributing to more inclusive growth. Two major national ports in Malaysia, the Port of Tanjung Pelepas and Port Klang, were ranked among the world's top 20 container ports by the International Association of Ports and Harbours in their 2013 World's Top 20 Container Ports report, as a 23 percent increase in cargo and container volumes since 2010 increased demand and expanded activities at these ports. Passenger capacity at Kuala Lumpur International Airport (KLIA) grew by 46 percent between 2010 and 2014, as a new runway and terminal were opened. Moreover, under the National Broadband Initiative, 55,801 km of fiber-optic cable infrastructure was laid out, increasing the broadband penetration rate to 70.2 percent of Malaysian households. Finally, construction of the strategic Pengerang Integrated Petroleum Complex, which began in 2012 on approximately 9,100 hectares of land, is expected to enhance energy security.

**The transportation and logistics sectors will remain a priority investment area under the 11th Malaysia Plan (2016-2020).** Additional investments on roads, railways, and air services are expected to boost regional development and connectivity, while an expansion of broadband infrastructure in rural areas will improve digital connectivity. Malaysia will also continue to invest in new water and sewage networks, and in increasing treatment plant capacity. Efforts to accelerate the migration to a new licensing regime under

28 Serven (2010)

29 See e.g., Gramlich (1994); Romp and De Haan (2007); Straub (2008). The seminal work of Aschauer (1989) found a highly significant relationship between infrastructure investment and aggregate U.S. TFP. More recent empirical studies find a more moderate causal relationship between infrastructure and productivity, likely due to improved methodological approaches that allow for more accurate estimates. See, e.g., Canning (1999); Holtz-Eakin (1994); Holtz-Eakin and Schwartz (1995); Munnell (1992); Nadiri and Mamuneas (1994); and Shah (1992). See also: Calderón, Moral-Benito, and Servén (2015)

30 EPU (2015)

the Water Services Industry Act 2006 will help ensure the sustainability of water services. As energy security underpins all of these initiatives, the authorities are striving to further strengthen the security of Malaysia’s fuel and electricity supplies.

**The Malaysian government is also committed to improving the country’s intangible infrastructure.**

Under the 11th Malaysia Plan, the authorities will streamline licensing and regulations, and strengthen institutional frameworks, to improve integrated planning and regulatory oversight. According to the Economic Planning Unit (EPU), “These efforts will lay the right “software” for infrastructure as new significant investments – from mass rapid transit system, high-speed broadband, expanded sewerage networks to new oil refining capacity – are rolled out in the next five years.”<sup>31</sup>

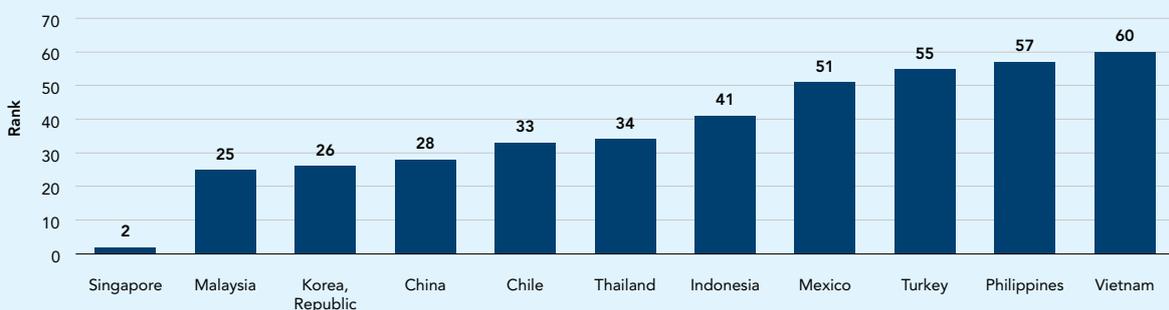
**Malaysia ranks highly on several international indices with respect to its infrastructure quality, productivity, and business environment.**

Malaysia ranked 25th out of 138 economies in the Global Competitiveness Index 2016-2017, placing it among the top 20 percent of countries worldwide and the highest ranked developing Asian country. Moreover, Malaysia ranked 23rd worldwide on the World Bank’s 2017 Doing Business report on the ease of doing business, outperforming developed countries such as France (29th), Switzerland (31st), and Japan (34th). Among ASEAN economies, Malaysia ranked 2nd after Singapore, while it ranked 7th among nations in the Asia-Pacific region after New Zealand, Singapore, Hong Kong, South Korea, Taiwan, and Australia. Similarly, Malaysia ranked 19th out of 61 economies<sup>32</sup> in the Institute for Management Development’s World Competitiveness Yearbook 2016 – which ranks countries based on their economic performance, government efficiency, business efficiency, and infrastructure – placing 6th among the 14 nations in the Asia-Pacific region included in the report.

**Malaysia outperformed most comparable countries on the GCI with respect to both physical and intangible infrastructure.**

Malaysia ranked 2nd overall (Figure 28) among comparator countries, behind only Singapore. With respect to the report’s institutions and infrastructure pillars, Malaysia ranked 2nd in terms of institutional quality (Figure 29), behind only Singapore<sup>33</sup> and 3rd in terms of physical infrastructure quality, behind Singapore and South Korea.

**FIGURE 28: Global Competitiveness Index Rankings, Malaysia and Comparators, 2017**



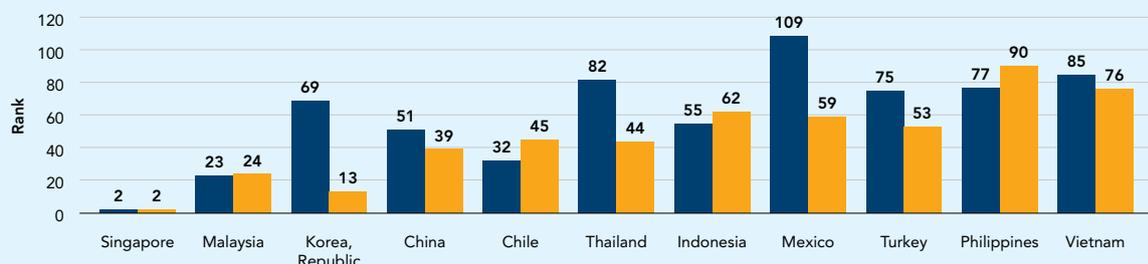
Source: World Economic Forum (WEF) Global Competitiveness Report, 2016-2017

31 EPU (2015). The right “software” refers to the strong regulatory framework.

32 Malaysia ranked ahead of Finland (20th), Israel (21st), Belgium (22nd), Iceland (23rd), Austria (24th), China (25th), Japan (26th), the Czech Republic (27th), Thailand (28th), and South Korea (29th).

33 The infrastructure pillar captures the quality and availability of transport, electricity, and communications infrastructure. The institutions pillar captures concepts such as the protection of property rights, the efficiency and transparency of the public administration, the independence of the judiciary, physical security, business ethics, and corporate governance.

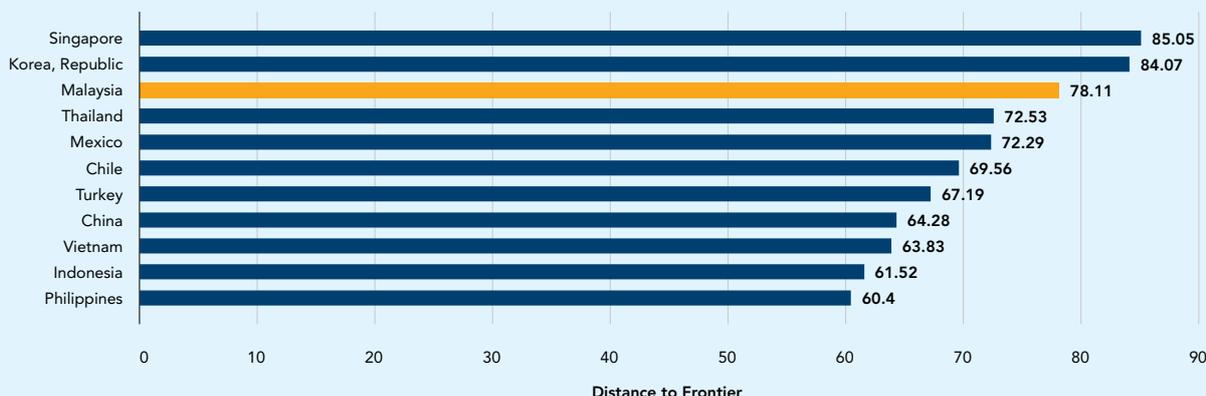
**FIGURE 29: Global Competitiveness Index Rankings on Institutions and Infrastructure Pillars, Malaysia and Comparators, 2017**



Source: WEF Global Competitiveness Report, 2016-2017

**Comparing Malaysia’s distance to the frontier score<sup>34</sup> to comparators on the World Bank’s Doing Business report reveals a similar trend.** While Malaysia’s distance to frontier score lags those of South Korea and Singapore, it outperforms other comparator countries (Figure 30). This suggests that Malaysia’s institutional environment is relatively conducive to starting and operating a business, and that infrastructure quality and availability, and regulations, do not represent serious obstacles for businesses.

**FIGURE 30: Distance to Frontier Score, Doing Business report, Malaysia and Comparators, 2017**



Source: World Bank *Doing Business* 2017

**Malaysia’s relatively-high rankings on the GCI and the Doing Business report reflect Malaysia’s robust infrastructure spending and continued focus on maintaining and improving the availability and quality of its infrastructure.** Despite the country’s achievements to date, there are areas for improvement that could increase economic productivity and growth. The following sections examine the country’s physical and intangible infrastructure endowments and deficiencies in greater detail, comparing Malaysia’s performance in specific sectors to comparator economies, and identifying areas for improvement.

<sup>34</sup> The Doing Business report introduced the distance to frontier score. This measure shows how far on average an economy is from the best performance achieved by any economy on each Doing Business indicator.

## Physical Infrastructure

### Roads, Highways, and Railways

**The Malaysian government has invested substantially in improving road and highway infrastructure throughout the country.** The country's road network expanded by almost six fold from 1966 to 2005, from 15,000 kilometers (km) to over 85,000 km,<sup>35</sup> and stood at 144,000 km in 2010. Under the 10th Malaysia Plan (2011-2015), the government further extended the road network by 93,100 km between 2010 and 2015, a 68 percent increase. As a result, Malaysia's National Road Development Index score improved from 1.42 in 2010 to 2.29 in 2015. A well-functioning and well-connected transport system can enhance efficiency and productivity, and help the country maintain a globally competitive position, through industrial restructuring, the adoption of new transport technologies, cost reductions, and changes in logistics or distribution patterns.

**Under the 11th Malaysia Plan, the government plans to construct an additional 3,000 km of paved roads, and existing roads, including ex-logging roads, will be upgraded to improve connectivity, particularly in Sabah and Sarawak, and Orang Asli settlements in Peninsular Malaysia.** Improved connectivity in rural areas remains a priority, and the authorities will focus on constructing roads that connect villages and link villages with nearby towns. Transportation networks will also be improved to enhance connectivity and mobility in regional economic corridors. This includes the construction and upgrading of roads and highways, such as the Pan Borneo Highway to link the Sarawak Corridor of Renewable Energy (SCORE) and the Sabah Development Corridor (SDC), as well as the Central Spine Road and Kota Bharu-Kuala Krai Highway to increase connectivity in the East Coast Economic Region (ECER). The completion of Mukah Airport is expected to accelerate development in Mukah and the areas surrounding SCORE, as Mukah becomes a "smart city" and growth hub in SCORE.<sup>36</sup>

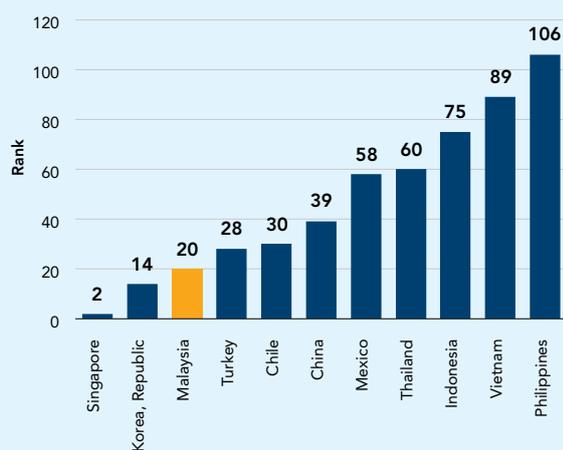


<sup>35</sup> Naidu (2007)

<sup>36</sup> EPU (2015)

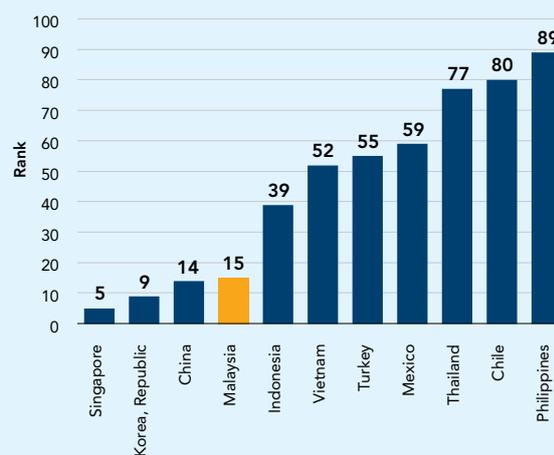
**The quality of Malaysia’s road and highway infrastructure is relatively high compared to that of other countries.** Malaysia ranked 20th in the world and 3rd among comparator countries with regard to the quality of its road infrastructure on the GCI’s quality of roads index (Figure 31).

**FIGURE 31: GCI Quality of Roads Index, Malaysia and Comparators, 2016**



Source: WEF Global Competitiveness Report, 2016-2017

**FIGURE 32: GCI Quality of Railroad Infrastructure Index, Malaysia and Comparators, 2016**



Source: WEF Global Competitiveness Report, 2016-2017

**The Malaysian government has also made significant investments in the country’s railway infrastructure.** Under the 10th Malaysia Plan, the country’s electrified double-track railway was extended from Padang Besar, Perlis in the north, to Gemas, Negeri Sembilan in the south, increasing freight volume capacity, reducing transportation costs, and improving citizen mobility. The Klang Valley Mass Rapid Transit (KVMRT) Line 1 from Sungai Buloh to Kajang has also become operational in 2017, improving connectivity among Klang Valley residents. Initiatives under the 10th Malaysia Plan increased annual urban-rail ridership by 31 percent in Greater Kuala Lumpur/Klang Valley, from 171 million in 2010 to 226 million in 2014. Under the 11th Malaysia Plan, the government aims to foster a people-centric public transport system and achieve 40 percent of travelers/commuters using public transport in urban areas by 2030. To achieve this, the authorities will strengthen the regulatory framework, increase transport capacity, promote seamless connectivity, and establish a robust monitoring and enforcement mechanism.<sup>37</sup>

**Malaysia performs well on the GCI’s quality of railroad infrastructure index, which captures the efficiency, connectivity, and performance of railroad infrastructure among countries (Figure 32).** Malaysia ranked 15th in the world and 4th among comparator countries, behind Singapore, South Korea, and China. Malaysia’s rankings with respect to the quality of its road, highway, and railway networks suggest that the country’s transportation infrastructure is highly conducive for businesses, allowing entrepreneurs to more easily transport goods and services in a secure and timely manner, and facilitating the movement of workers to the most suitable jobs.

37 Ibid.

**Despite Malaysia's high ranking with respect to the quality of its roads, several major cities experience regular traffic congestion, especially in Peninsular Malaysia.** Rapid population growth and economic expansion in most Malaysian cities over the past two decades has been a driving force behind traffic congestion.<sup>38</sup> Moreover, low-interest rates, relaxed loan approval processes, and highly-subsidized petrol fuel has made it easier and cheaper to own a car or motorcycle. As a result, Malaysia had more than 20 million registered vehicles in 2012 – a significant challenge in a country with just over 5 million households. The authorities' inability to resolve issues surrounding traffic congestion reflect systemic inefficiencies and policies that favor private vehicle ownership over public transportation. Moreover, the country's industrial policies encourage the development of local car manufacturing, employment, and export growth.<sup>39</sup> As a result, the government has to continually assign a large portion of the national budget to expanding road capacity and maintaining roads.<sup>40</sup> Moreover, the planning and delivery of urban transport in Malaysia remains highly fragmented across geographical and administrative boundaries, and different levels of government, as well as with respect to public and private transportation.<sup>41</sup>

**Resolving traffic congestion issues will require policies that discourage the use of private transportation and facilitate public transport.** The authorities have recently taken steps to limit dependence on private car use and encourage public transport. The number of agencies responsible for managing transportation policies was reduced from three (the Ministry of Transport, Road Transport Department, and Commercial Vehicle Licensing Board) to a single federal-level agency – the *Suruhanjaya Pengangkutan Awam Darat* (SPAD) or the Land Public Transport Commission – which reports to the Prime Minister's office.<sup>42</sup> Moreover, policy decisions are now based on national transportation objectives rather than individual departments' key performance indicators (KPIs).<sup>43</sup> With SPAD's creation, the focus of transportation policy has shifted increasingly to supporting public transportation initiatives. Several projects, such as the Bus Rapid Transit and Mass Rapid Transit systems, have assumed priority over road construction in the national agenda, except for in rural areas.<sup>44</sup> Despite being in its early stages, SPAD has pushed for initiatives that encourage more sustainable forms of transportation, such as hybrid vehicles and biomass fuel, and the agency has sought to streamline licensing processes and regulations in several service delivery sectors, including truck haulage and urban-transport fare setting (e.g. for taxis and intercity buses).<sup>45</sup>

38 Abdelfatah et al. (2015)

39 Abdelfatah et al. (2015); Olszewski and Tay (1996)

40 Abdelfatah et al. (2015)

41 Gil Sander et al. (2015)

42 Ibid.

43 Abdelfatah et al. (2015)

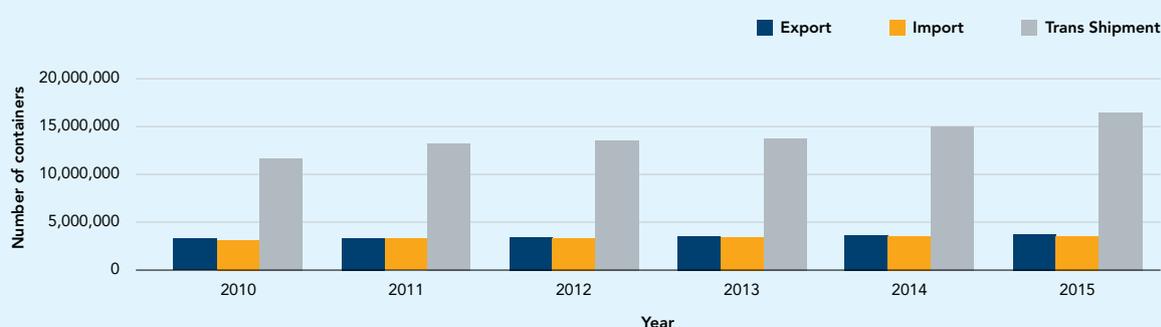
44 Ibid.

45 Gil Sander et al. (2015)

## Ports and Airports

**Ports and airports are important elements of a country's logistics infrastructure and form the backbone of modern supply chains.** Due to its strategic location, Malaysia is becoming a regional transshipment center. With 69 percent of the country's container throughput coming from other countries in 2015, it has become increasingly vital to improve the efficiency of seaport infrastructure (Figure 33). Moreover, as Malaysia further integrates into the ASEAN Economic Community and the global economy, increased trade will require higher-capacity and more-efficient port infrastructure. Ports and airports facilitate the movement of people and products, and low-quality ports and airports appear to constrain logistics performance in developing countries.<sup>46</sup>

**FIGURE 33: Total Container Throughput by Sea Freight, Malaysia, 2009-2014**



Source: WEF Global Competitiveness Report, 2016-2017

**Malaysia currently has seven major federal ports,<sup>47</sup> though the ports in Sabah and Sarawak remain under the jurisdiction of the Sabah and Sarawak state governments.** In 2014, 539.2 million tonnes of freight volume were transported by sea, representing 98.4 percent of total freight, and sea-freight volume grew at an annual rate of 4.7 percent between 2010 and 2014. Similarly, the country's total container volume increased from 18.2 Twenty-Foot Equivalent Units (TEUs) in 2010 to 22.4 million TEUs in 2014, reflecting an annual growth rate of 5.3 percent. Port Klang in Selangor, which ranked 13th on the International Association of Ports and Harbours' 2013 report on the world's top container ports, had 10.4 million TEUs, while Port of Tanjung Pelepas, which ranked 19th, had 7.6 million TEUs.

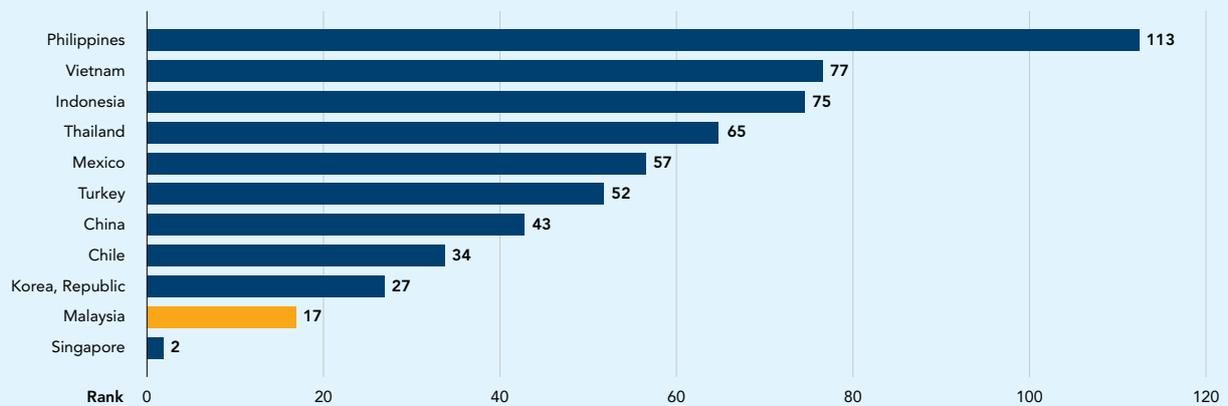
**Under the 10th Malaysia Plan, the authorities undertook several major projects to expand port capacity.** This includes the construction of new container wharfs at Northport and Westports of Port Klang, Port of Tanjung Pelepas, Penang Port, and Kuantan Port. Moreover, the Malaysian government allocated RM3.0 billion to further spur the development of logistics infrastructure under the Third Industrial Master Plan 2006-2020. Given the country's strong economic performance in recent years, the plan set a target for Malaysian ports of 36 million TEUs, or 751 million tonnes of cargo, to account for growing trade volumes.

<sup>46</sup> The World Bank (2010)

<sup>47</sup> These include Port Klang, Johor Port, Port of Tanjung Pelepas, Kuantan Port, Penang Port, Bintulu Port, and Kemaman Port.

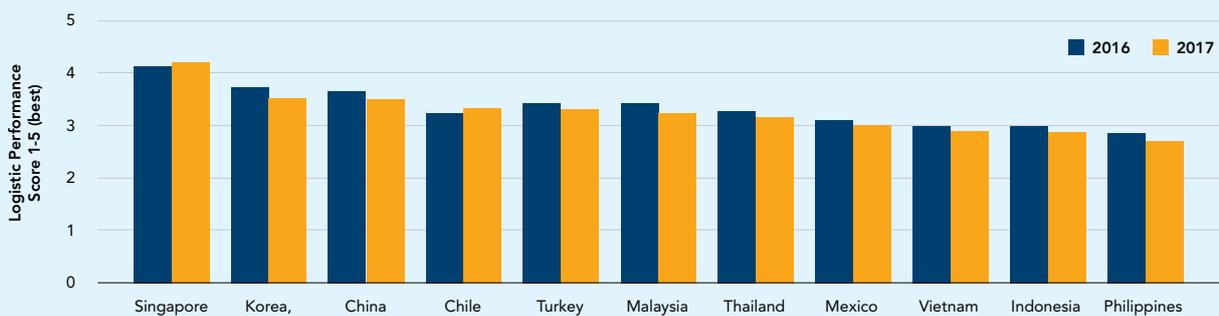
**Malaysia performs relatively well against comparator countries with respect to the quality of its ports.** It ranked 17th in the world and had the 2nd best port infrastructure among comparator countries (Figure 34). Malaysia also continues to rank above many peer countries on the World Bank’s Logistics Performance Index (LPI), which assesses the quality of trade and transport infrastructure and related services (Figure 35). Malaysia’s relatively strong rankings on these indices underscore the competitive and efficient nature of the country’s port infrastructure – a critical driver for increased trade and productivity. Due to the government’s continued focus on efficiency improvements in port terminal infrastructure, cargo handling technology and equipment, and port information technology, all ports are currently performing over capacity.<sup>48,49</sup>

**FIGURE 34: GCI Quality of Ports Index, Malaysia and Comparators, 2016**



Source: WEF Global Competitiveness Report, 2016-2017

**FIGURE 35: World Bank Logistics Performance Index, Malaysia and Comparators, 2007 and 2016**



Source: World Bank Logistics Performance Index

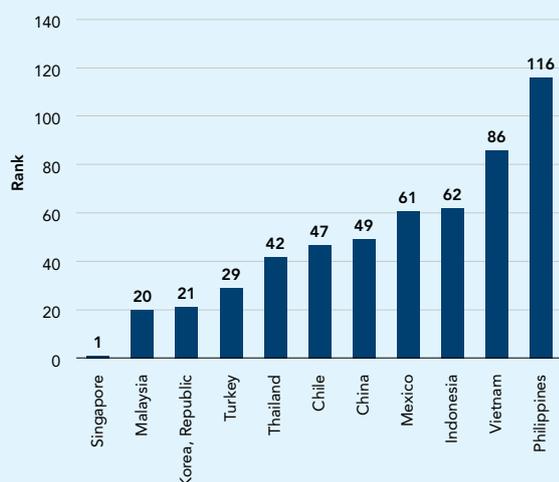
48 Jeevan, et al (2015)

49 As Khalid (2007) notes, the Malaysian government’s primary policy objectives with respect to port development include (i) developing and expanding port facilities; (ii) optimizing the utilization of existing port facilities; (iii) improving port productivity and management efficiency; (iv) enhancing port infrastructure and capacity; (v) promoting multimodal transport; (vi) developing and improving ancillary services; (vii) developing land-side transportation and cargo handling facilities; (viii) promoting and enhancing automation and the use of IT in port operations and cargo handling; (ix) promoting the use of Electronic Data Interchange to facilitate advanced, flexible, and more-effective customs clearance; (x) establishing free zones in ports to reduce customs formalities and encourage commercial activities; (xi) establishing District parks within port areas to encourage value-adding activities to attract transshipment cargo; (xii) establishing Inland Clearance Depots in industrial areas to speed up the processing and documentation of cargo before reaching seaports; and (xiii) privatizing federal ports to improve the management, performance, and efficiency of ports.

**Malaysia's strategic location in the Asia-Pacific region makes it a prime air-transit hub to Asia.** Air cargo services are well-developed in the country's seven international airports.<sup>50</sup> Malaysia's biggest airport, KLIA, is surrounded by four major cities – Kuala Lumpur, Shah Alam, Seremban, and Melaka – and has the capacity to handle 40 million passengers and more than 1.2 million tonnes of cargo per year. Moreover, cargo import and export procedures are fully automated at the KLIA to further reduce delivery times.<sup>51</sup> The number of passengers traveling through Malaysian airports increased at an average annual growth rate of 8.5 percent between 2010 and 2014, while the total volume of passengers handled rose by 39 percent, and stood at 85 million in 2014.<sup>52</sup>

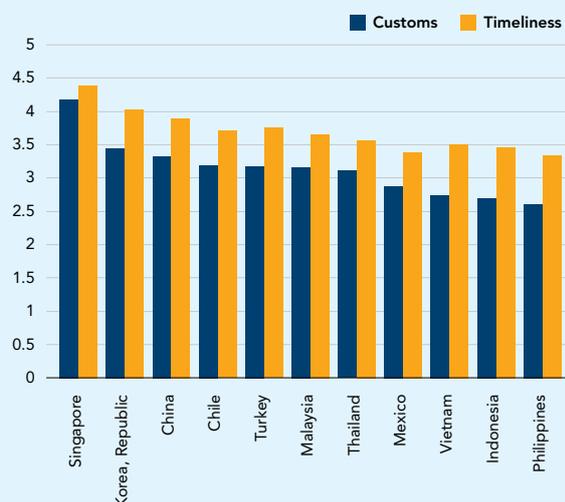
**Following its ratification of the ASEAN Open Skies Agreement in 2013, the Malaysian government has made numerous investments to accommodate growing demand and improve domestic connectivity to rural areas.** KLIA2 was opened as a new low-cost carrier terminal at KLIA in 2014, and an additional third runway became operational to facilitate increased aircraft traffic. Under the 11th Malaysia Plan, the government plans to increase cargo-handling facilities. The cargo-handling facilities and freighter services at Kota Kinabalu International Airport will be upgraded to support agricultural produce exports, particularly aqua-cultural products. In addition, the need for cargo facilities at KLIA, such as cool ports and staging areas to consolidate and facilitate cargo movement, will be reviewed, and the former low-cost carrier terminal will be transformed into a regional cargo hub. The quality of Malaysia's air transport infrastructure is relatively high compared to those of other countries, and Malaysia ranked 20th on the 2016-2017 GCI quality of airport infrastructure index.

**FIGURE 36: GCI Air Transport Infrastructure Index, Malaysia and Comparators, 2016-2017**



Source: WEF Global Competitiveness Report, 2016-17

**FIGURE 37: LPI Customs and Timeliness Dimension, Malaysia and Comparators, 2016**



Source: World Bank Logistics Performance Index

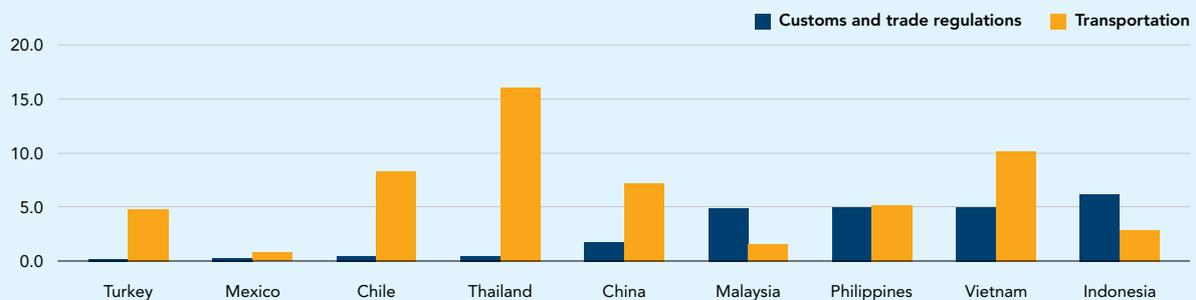
50 These include KLIA, Kuala Lumpur International Airport 2 (KLIA2), Penang International Airport, Langkawi International Airport and Senai International Airport in Peninsular Malaysia, Kota Kinabalu International Airport in Sabah and Kuching International Airport in Sarawak.

51 Malaysian Investment Development Authority

52 EPU (2015)

**Despite the relatively-high quality of Malaysia’s transport infrastructure, the country has room for improvement in terms of its regulatory practices.** The productivity and efficiency of a country’s logistics are influenced not only by infrastructure quality and management efficiency, but by strong regulatory practices. Poor regulatory practices can slow the movement of goods and diminish their marketability. Malaysia’s ranking on the LPI’s customs and timeliness dimension is lower than several of its peers (Figure 37). Moreover, 4.9 percent of establishments identify customs and trade regulations as the biggest obstacle to their operations – a relatively high share compared to other countries – while only 1.6 percent of establishments identify transportation as a major obstacle (Figure 38). This suggests that Malaysia must improve its regulatory framework to further capitalize on its transportation and logistics infrastructure and improve productivity.

**FIGURE 38: Share of Establishments that Consider Customs and Trade Regulations and Transport to be the Biggest Obstacle to their Operations**



Source: World Bank Enterprise Surveys

**The authorities have included several reforms under the 11th Malaysia Plan to strengthen regulatory functions and improve the efficiency of logistics and transport infrastructure.** These include strengthening the institutional and regulatory framework through the National Logistics Task Force, and regulating additional functions such as off-dock depots, warehousing activities, and commercial vehicle registrations, as well as enhancing trade facilitation mechanisms to reduce cargo clearance times and encourage greater paperless trading. The government also intends to build freight infrastructure efficiency and capacity, by improving last-mile connectivity at Port Klang, and expanding air and rail freight infrastructure. It will also develop virtual selling platforms and other logistics infrastructure for e-commerce. Finally, the authorities will strengthen the capabilities of logistics service providers through training and accreditation programs.

## Telecommunications

**Telecommunications infrastructure has become an essential input in the production of many goods and services, and the quality of a country's telecommunications infrastructure can have a significant impact on economic productivity and growth.** According to Davidavičienė (2008), information systems have become an increasingly important component of business operations in the past decade, with implications for productivity. Telecommunications infrastructure, in particular, can decrease costs by reducing the time, energy, labor, and capital required for production and consumption.<sup>53</sup> Strong telecommunications infrastructure can, moreover, help raise productivity through (i) quality of life improvements stemming from the ability to work remotely; (ii) increased labor productivity through more efficient processing of information-related tasks; (iii) speedier inter-firm transaction speeds and consequently, reduced costs; (iv) improved innovation capacity; and (v) simplified and flexible production processes.

**Moreover, information and communications technology (ICT) contributes to increased productivity and economic growth through improved business processes and decision making, more efficient market conditions, and reduced costs.**<sup>54</sup> Changes in strategy formation and business coordination processes, through improved information processing, increases the pace of decision making and reduces coordination costs, allowing for more flexible and sensitive responses to changes in market conditions.<sup>55</sup> Moreover, ICT development can contribute to economic growth by shortening the distribution process for goods and services, reducing contract times, improving demand-to-supply ratios, and encouraging the wider diffusion of new technologies.<sup>56</sup> ICT also acts as a substitute for other forms of capital and labor, freeing productive resources to expand overall economic output, and eventually raising the productivity of the existing capital and labor stock.<sup>57</sup>

**Over the past few decades, Malaysia has invested heavily in telecommunications infrastructure, building one of the most advanced telecom networks in the developing world, with its widespread application of modern technologies such as fiber-optics, wireless transmission, digitalization, and satellite services.** Broadband penetration stood at 70 percent in 2014.<sup>58</sup> State-of-the-art digital infrastructure is expected to lay the foundation for the country's continued economic development through knowledge-intensive industries, supporting Malaysia's goal of becoming a developed nation by 2020. In line with this goal, the Malaysian government plans to improve the country's digital infrastructure by increasing the reach of broadband infrastructure to 95 percent of populated areas. Under the 11th Malaysia Plan, the authorities will expand the successful roll-out of digital technologies, such as high-speed broadband and digital terrestrial television. Combined with efforts to increase the affordability of such services and enhanced consumer protection standards, this will result in increased fiber-optic connectivity, ensuring that Malaysians have access to affordable, high-quality digital infrastructure on par with that of the world's most developed economies.

**Malaysia's comparative rankings on the quality of its telecommunications infrastructure vary substantially depending on the indicator.** Malaysia ranked 27th globally and 2nd among comparator countries with respect to mobile telephone subscriptions in 2016, suggesting that it has among the best telecom network infrastructure in South-East Asia (Figure 39). However, examining the number of fixed broadband subscriptions per 100 people, Malaysia ranked well below other comparators and 73rd worldwide, with only nine subscribers (Figure 40).

53 Njikam (2009)

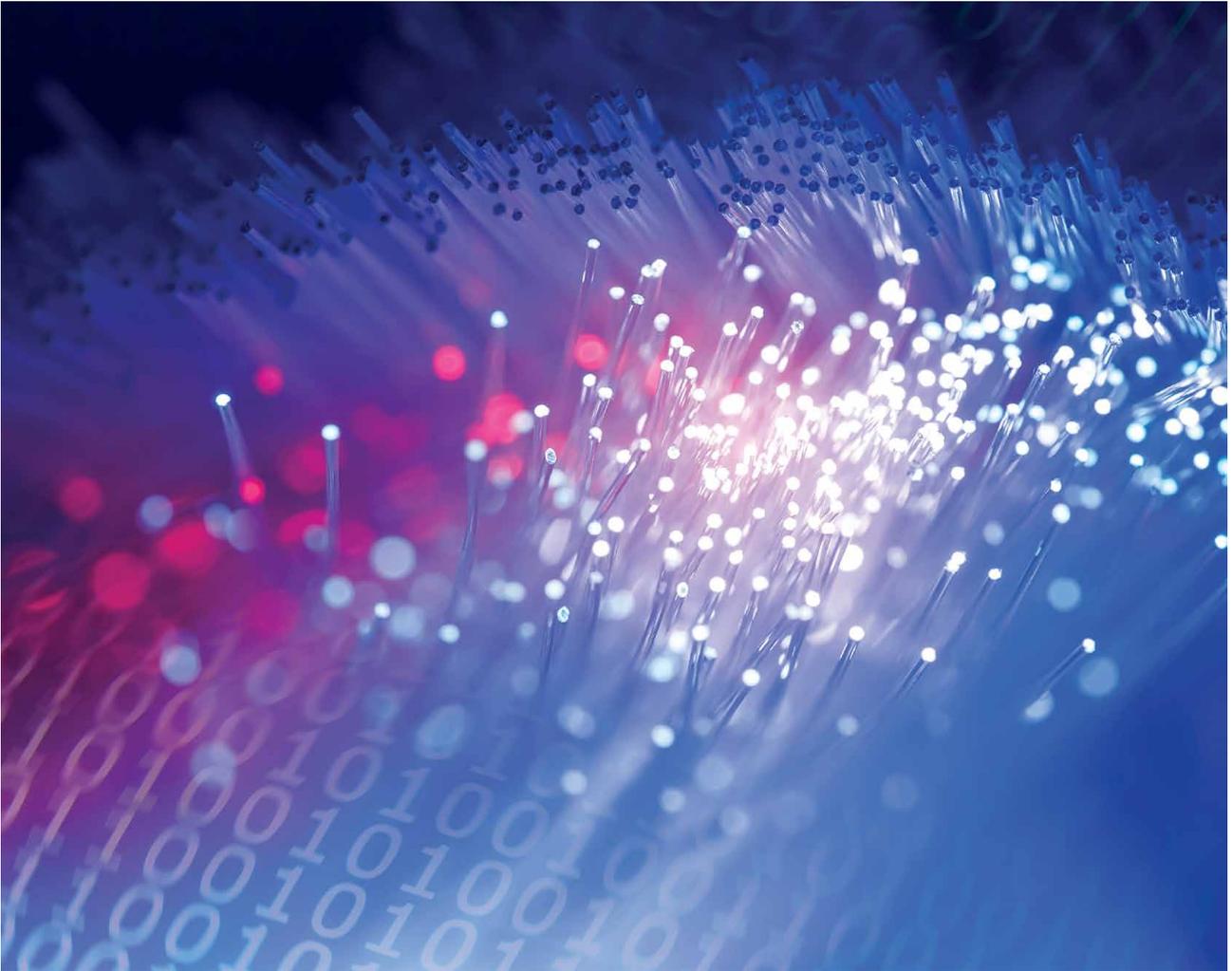
54 Mačiulytė-Šniukienė & Gaile-Sarkane (2014)

55 Ibid.

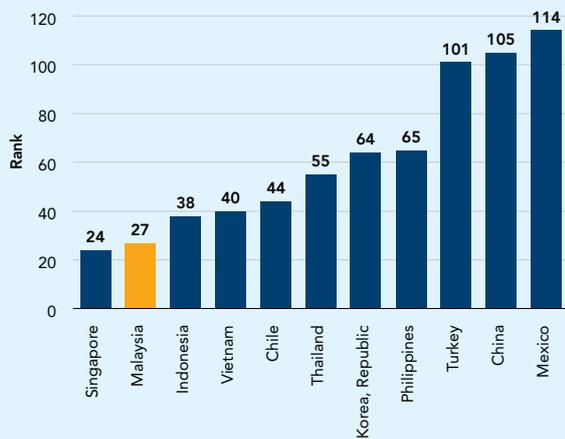
56 Ibid.

57 Qiang, Pitt, and Ayers (2004)

58 EPU (2015)

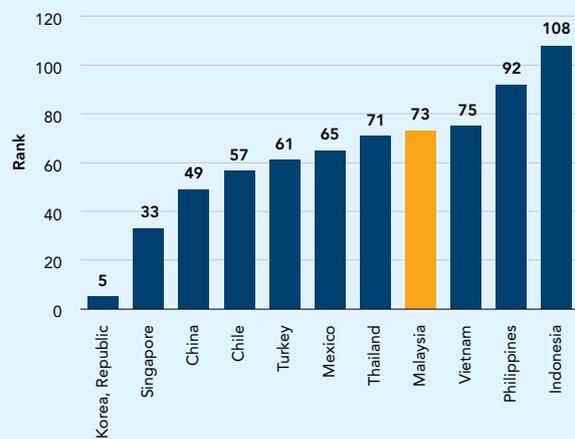


**FIGURE 39: Mobile Telephone Subscriptions per 100 people, Malaysia and Comparators, 2016**



Source: WEF Global Competitiveness Report, 2016-2017

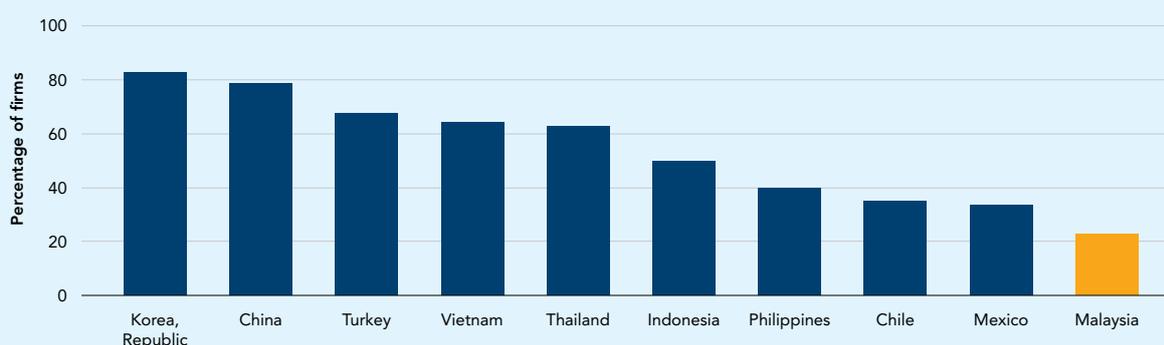
**FIGURE 40: Fixed Broadband Internet Subscriptions per 100 people, Malaysia and Comparators, 2016**



Source: WEF Global Competitiveness Report, 2016-2017

**The number of businesses identifying telecommunications as an obstacle to their current operations was highest in Malaysia among comparator countries.** Almost 78 percent of Malaysian businesses reported that telecommunications represented an obstacle to their current operations in 2015, with almost 40 percent citing telecommunications as a moderate to major obstacle. Moreover, the share of businesses reporting telecommunications as an obstacle has increased over time. In 2007, the share of firms that did not cite telecommunication as an obstacle to doing business was 72 percent for services and 70 percent for manufacturing.

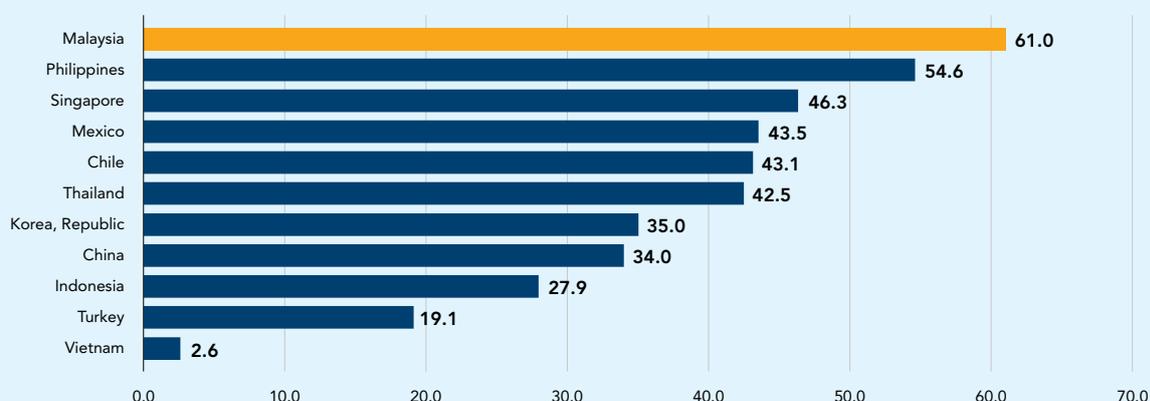
**FIGURE 41: Percentage of Firms Identifying Telecommunications as Not an Obstacle to their Current Operations, Malaysia and Comparators**



Source: World Bank Enterprise Surveys. Data for latest year available.

**Malaysia’s relatively-high fixed broadband tariff rates may be contributing to these results.** Malaysia’s tariff rate stood at around US\$61 a month in 2016, the highest rate among comparator countries (Figure 42). To address this issue, the Malaysian government aims to reduce the cost of fixed broadband services from 2.42 percent of GNI per capita in 2013 to 1 percent in 2020 under the 11th Malaysia Plan. Facilitating competition and improving infrastructure sharing among service providers is expected to increase the affordability and accessibility of broadband services.

**FIGURE 42: Fixed Broadband Internet Tariffs, Malaysia and Comparators, US\$/month, 2016**



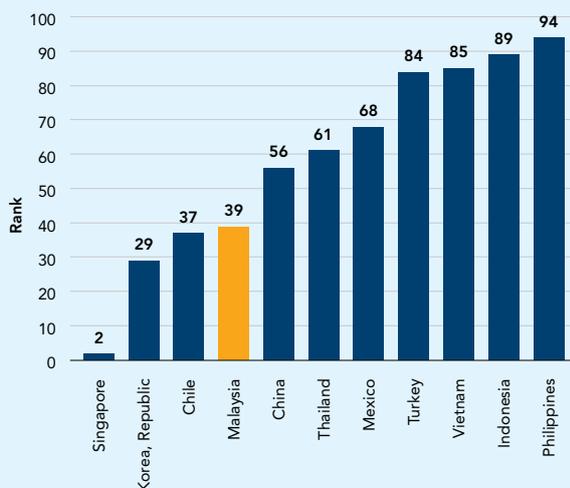
Source: The Networked Readiness Index Historical Dataset  
 Note: US\$ figures are expressed in 2014 purchasing-power-parity terms.

## Electricity and Water

**Energy and water infrastructure are critical components of virtually any production process, and the limited or interrupted supply of either impacts the economic productivity of firms.** Power outages can affect business activities by disrupting or limiting production processes and thereby reducing output. Moreover, frequent power outages can increase production costs by necessitating the replacement or repair of broken machines and equipment, or the disposal of spoiled products or inventory.<sup>59</sup> Furthermore, firms may need to rely on alternative sources of energy such as generators to hedge against the risk of power shortages, further increasing production costs. Power outages can also impact the ability of firms to meet their production schedules, obtain materials from suppliers on time, or profit from new market opportunities. Ultimately, this could lead businesses to leave more capital idle and hire fewer workers. Similarly, uncertainties surrounding the water supply can negatively impact productivity and economic growth, particularly in countries that depend on agricultural production. Agriculture, industry, and households all rely on water services.<sup>60</sup> The provision of many goods and services is determined by the quantity and quality of available water. Proper management and allocation of water infrastructure and services are therefore essential.

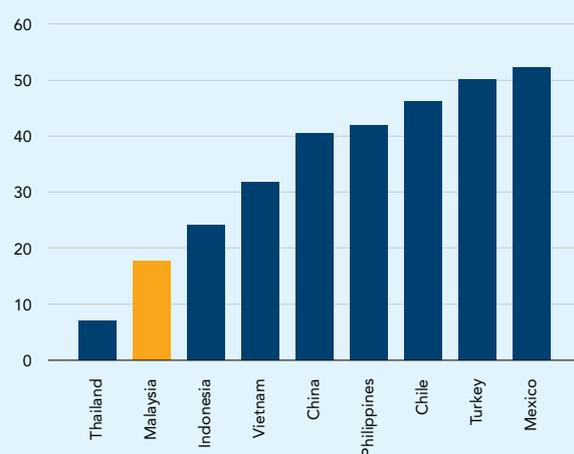
**The Malaysian government has invested heavily in improving the country's electricity and water infrastructure.** Under the 10th Malaysian Plan, 10 power plants were commissioned to ensure a reliable electricity supply, generating 5,458 megawatts (MW) of additional capacity.<sup>61</sup> This helped increase electricity coverage in rural areas from 93 percent in 2010 to 98 percent in 2015.<sup>62</sup> Malaysia's substantial investment in electricity infrastructure is reflected in its relatively-high rankings on the GCI quality of electricity index, at 39th globally and 4th among comparator countries (Figure 43). Moreover, according to the World Bank Enterprise Surveys, Malaysia had the second-lowest share of firms reporting power outages in a typical month (Figure 44). This suggests that Malaysia has successfully fostered an environment of certainty with respect to the country's electricity supply, thereby contributing to increased productivity.

**FIGURE 43: Quality of Electricity, Malaysia and Comparators, 2016**



Source: WEF Global Competitiveness Report, 2016-2017

**FIGURE 44: Percentage of Firms Experiencing Power Outages in a Typical Month, Malaysia and Comparators**



Source: World Bank Enterprise Surveys (different years)

59 Cissokho and Seck (2013)

60 Turner (2004)

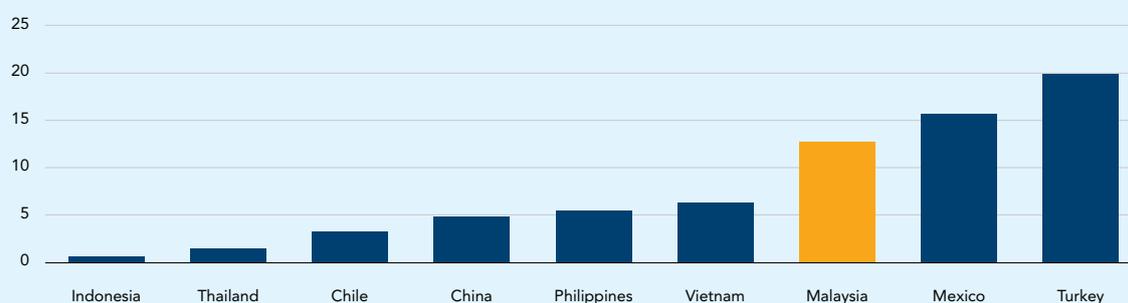
61 EPU (2015)

62 EPU (2015)

**The high quality of Malaysia’s electrical infrastructure should keep production costs relatively low; however, inefficiencies in the country’s energy market distort pricing mechanisms and result in the suboptimal use of energy resources.** The government’s use of energy subsidies, in particular, creates significant price distortions that increase inefficiencies in the use of energy resources. Under the 11th Malaysia Plan, the government has committed to developing policies that rationalize energy subsidies and move towards a market-based energy pricing mechanism.<sup>63</sup>

**The Malaysian government is committed to improving the country’s water services infrastructure and water resource management.** The share of the population with access to clean drinking water increased from 94.2 percent in 2010 to 95.1 percent in 2014, with most states reporting a coverage rate of 99 percent in urban areas.<sup>64</sup> However, rural coverage in Kelantan, Sabah, and Sarawak remained below 80 percent.<sup>65</sup> Comparing the quality of water services in Malaysia to peer countries, firms in Malaysia are more likely to report experiencing water shortages (Figure 45). Water shortages can be a major obstacle to enhancing the productivity and efficiency of other inputs used in the production process. The authorities are committed to further improving water services infrastructure and increasing the share of the population with access to clean and treated water to 99 percent by 2020. To achieve this target, alternative water supply systems such as rainwater harvesting, tube wells, and gravity feed systems will be expanded into rural areas, particularly in Kelantan, Pahang, Sabah, and Sarawak.<sup>66</sup>

**FIGURE 45: Percentage of Firms Experiencing Water Shortages in a Typical Month, Malaysia and Comparators**



Source: World Bank Enterprise Surveys, different years

**Unmetered water connections are a priority area for improving water management.** The share of water distributed through unmetered connections increased from 36.3 percent in 2010 to 36.6 in 2015, leading to substantial revenue losses and contributing to water shortages. Under the 11th Malaysia Plan, the government aims to reduce non-revenue water from 36.6 percent in 2013 to 25 percent in 2020 with the implementation of a holistic non-revenue water reduction program. Specific initiatives include the development of comprehensive district metering zones, including meter and pipe-replacement programs, and pressure-control management and enforcement on illegal tapping.

63 EPU (2015).

64 Kelantan was a notable exception at 59.5 percent.

65 Ibid.

66 Ibid.

## Intangible Infrastructure

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### Institutions

**Institutions play a key role in determining a country's economic outcomes. Numerous empirical studies have found that institutions are critical for economic development.**<sup>67</sup> A large body of literature has explored the relevance of institutions in determining international trade, foreign direct investment, financial development, and efficiency.<sup>68</sup> Moreover, institutions have been identified as substantive predictors of macroeconomic stability and entrepreneurship.<sup>69</sup>

**The quality of public institutions has also been found to play a role in determining a country's productivity levels.** The rules, norms, and enforcement characteristics that make up a society's institutional foundations create incentives and impose constraints which influence how that society directs the allocation of economic resources.<sup>70</sup> Improvements in institutional quality can improve productivity by lowering either transaction or transformation costs in the economy. According to North (1994), transaction costs are the costs of measuring and enforcing agreements, while transformation costs are the costs of physical production; together they make up the total costs of a firm. Institutions that enable the introduction or application of a technological improvement can lower transformation costs, while those that facilitate the enforcement of agreements can reduce transaction costs.<sup>71</sup>

**A productive and well-functioning system of public institutions is critical to reduce an economy's transaction and transformation costs.** It enables markets to provide goods and services more efficiently, and diverts resources away from less productive uses. For instance, a strong judicial system and 'rule of law' culture facilitate dispute resolution, contract enforcement, and the protection of property rights, which reduce transaction costs and make markets more efficient and productive. The protection of property rights, and particularly intellectual property rights, are vital for improving economic productivity, as effectively-enforced intellectual property rights attract multinational enterprises and impact the productivity of domestic firms through vertical linkages.<sup>72</sup> Conversely, a high level of regulation can increase the regulatory burden on firms and encourage corruption, contributing to higher transaction costs.

<sup>67</sup> See Acemoglu, Johnson, and Robinson (2001); Easterly and Levine (2003); Hall and Jones (1999); Knack and Keefer (1995); Mauro (1995); and Rodrik, Subramanian, and Trebbi (2004)

<sup>68</sup> See Adkins, Moomaw, and Savvides (2002); Busse and Hefeker (2007); Levchenko (2007); La Porta et al. (1998).

<sup>69</sup> See Acemoglu et al. (2003); Aidis, Estrin, and Mickiewicz (2010); Simón-Moya, Revuelto-Taboada, and Guerrero (2014); Stephen, Urbano, and van Hemmen (2005).

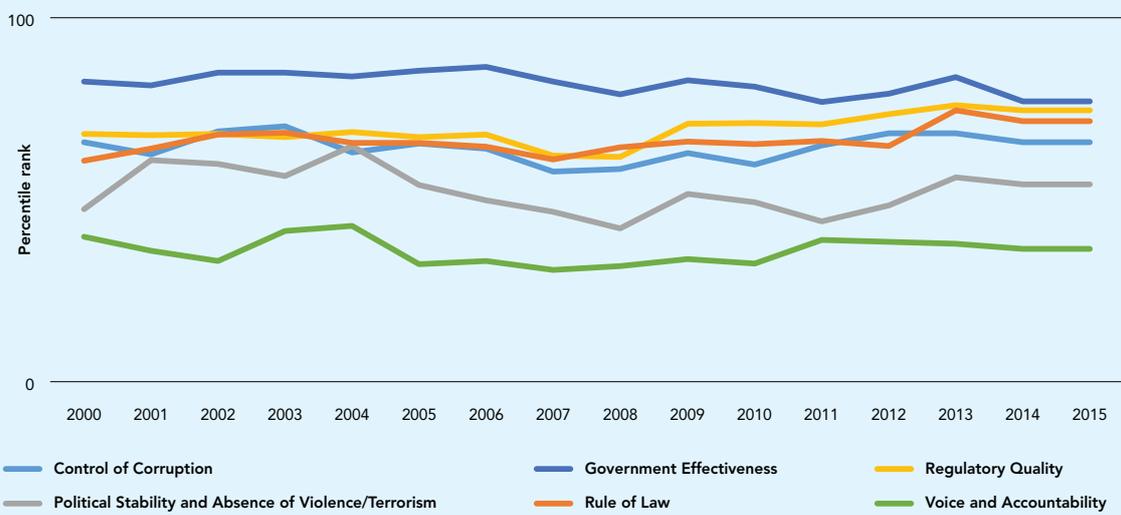
<sup>70</sup> North (1994)

<sup>71</sup> Ibid.

<sup>72</sup> Besley and Ghatak (2010)

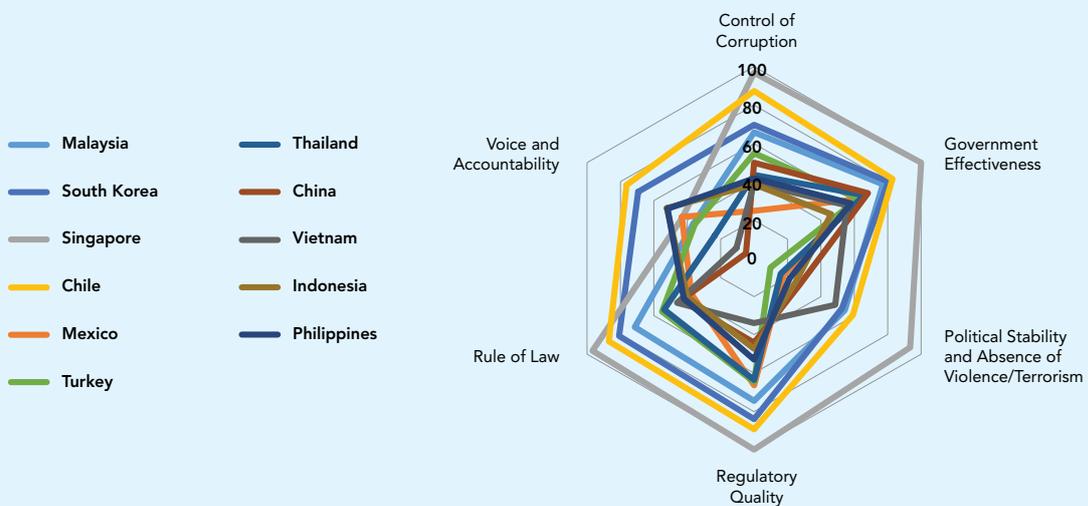
**Malaysia’s institutional framework appears to be efficient in many respects.** The country’s scores on the World Bank’s Worldwide Governance Indicators (WGI) have improved over the last decade (Figure 46). Malaysia’s ranking for the rule of law rose from the 66th percentile in 2005 to the 72nd percentile in 2015. Over the same period, its score on control of corruption improved from the 63rd to 66th percentile, while regulatory quality rose from 69 to 75. However, the country’s ranking on government effectiveness deteriorated from 84 to 77, and while its score on voice and accountability increased slightly from 32 to 36, it remains low relative to many comparator countries (Figure 47). Nevertheless, Malaysia outperformed most comparator countries in other WGI categories in 2014, ranking fourth on almost every indicator in the index, behind Singapore, Chile, and South Korea.

**FIGURE 46: World Governance Indicator Rankings, Malaysia, 2000-2015**



Source: World Governance Indicators (WGI)

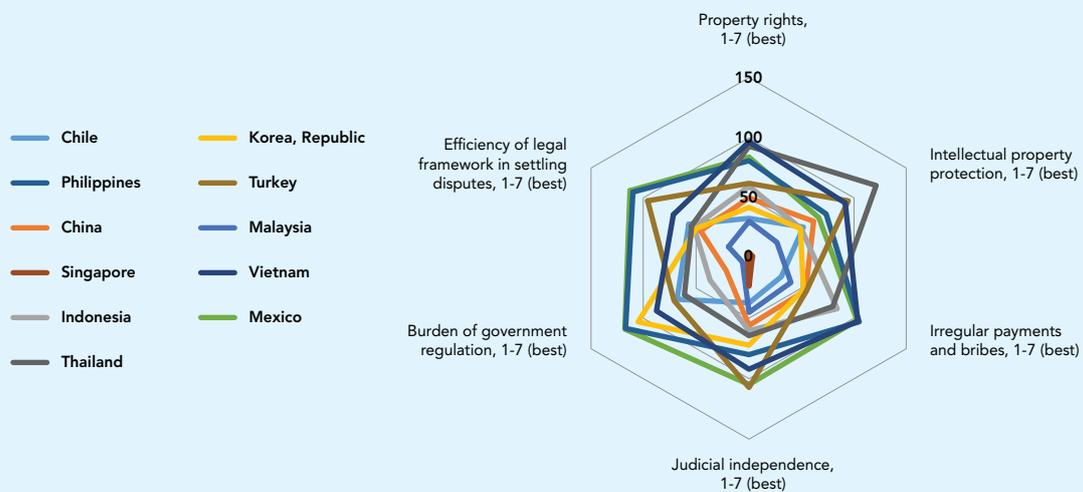
**FIGURE 47: World Governance Indicator Rankings, Malaysia and Comparators, 2015**



Source: World Governance Indicators (WGI)

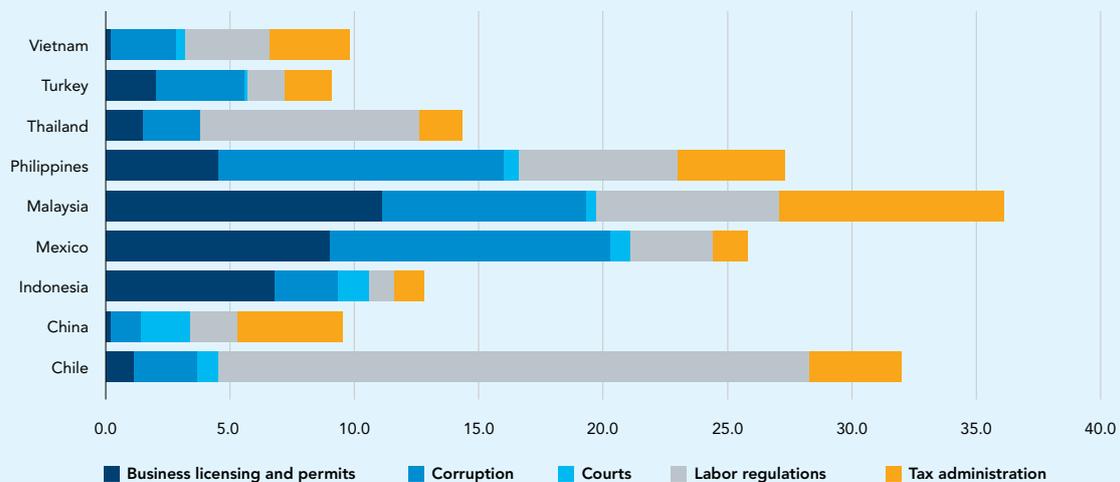
**Malaysia’s strong rankings on several different pillars of the GCI further point to the relatively high-quality of the country’s institutional framework.** Malaysia ranked second among comparator countries on property rights, intellectual property protection, burden of government regulation, and the efficiency of the legal framework in settling disputes, and it ranked 3rd on irregular payments and bribes, and judicial independence (Figure 48). However, many businesses in Malaysia continue to identify regulatory burdens as a major challenge to their operations. Nearly 28 percent of firms report that some type of regulation is hindering their business activities, whether it is obtaining business licenses and permits, labor regulations, or tax administration (Figure 49).

**FIGURE 48: Rankings on Various GCI Institutional Pillars, Malaysia and Comparators, 2016**



Source: World Governance Indicators (WGI)

**FIGURE 49: Biggest Obstacle for Firms, Malaysia and Comparators**



Source: World Bank enterprise surveys, different years

**Malaysia's relatively-strong performance on these indicators reflects the government's ongoing reforms under the Government Transformation Programme (GTP) launched in 2010, the 10th Malaysia Plan, and the Economic Transformation Programme.**<sup>73</sup> Reforms have sought to streamline the regulatory framework, reduce business licensing requirements, and promote ICT use by government agencies. The Malaysia Productivity Corporation (MPC) is the central coordinating agency responsible for improving regulatory governance. The agency has overseen initiatives to modernize business licensing processes, establish guidelines on effective public consultation, reduce unnecessary regulatory burdens, and implement a regulatory impact assessment system that evaluates the positive and adverse effects of proposed regulations.<sup>74</sup>

**Additional reforms could further improve public-sector productivity and contribute to economic growth.**

These include efforts to enhance public service delivery, rationalize the roles and functions of ministries, empower state and local authorities, implement performance evaluations, strengthen public procurement processes, and better incentivize public officials. The empowerment of state and local government agencies through decentralization, combined with measures to strengthen governance structures and increase transparency, would enhance the accountability of local authorities, and ensure that policies are better adapted to local conditions.<sup>75</sup> Moreover, a more comprehensive KPI framework covering all agency functions would allow the government to better identify key reform areas to improve public-sector productivity.<sup>76</sup> Furthermore, participation in international cooperation forums, such as the Asian Development Bank/OECD Anti-Corruption Initiative for Asia and the Pacific region, would help curb corruption and increase government transparency and efficiency. Finally, Malaysia's relatively-low scores on the WGI voice and accountability indicator could be due to low levels of stakeholder dialogue and a non-inclusive policymaking process.<sup>77</sup> While the government has taken steps to improve consultative processes under the GTP, increased dialogue and cooperation between government agencies and private firms, foreign investors, trade unions, civil society organizations, and the public, could result in better-designed policies and more effective program implementation. Beyond the MPC, multiple institutions and actors are working to improve public-sector efficiency at the federal, state, and local levels. Linking and appropriately sequencing reforms would help increase productivity in the public sector and the economy more generally.<sup>78</sup>

## The Macroeconomic Environment

**A stable macroeconomic environment is an essential precondition for economic growth and plays a vital role in enhancing productivity.** It allows individuals, businesses, and the government to plan more effectively, which in turn increases investment in the economy, and helps to raise productivity. A stable macroeconomic environment stems from stable policies; it improves the allocative efficiency of economic resources, and supports well-functioning markets.

**Both fiscal and monetary policy play a critical role in maintaining macroeconomic stability and reducing volatility in inflation and unemployment levels, interest rates, exchange rates, the balance of payments, and fiscal aggregates.** Sound monetary policies can help manage inflation and ensure efficient

73 Koen, et al. (2017).

74 Asada, Nixon, and Koen (2017).

75 Koen et al. (2017)

76 The GTP introduced clear and quantifiable KPIs for ministers and heads of government agencies to evaluate performance against National Key Result Areas and Ministerial Key Result Areas. However, the current system involves comparatively little assessment of performance in reforming and developing policies and provides only minor policy input to the government.

77 Asada et al. (2017)

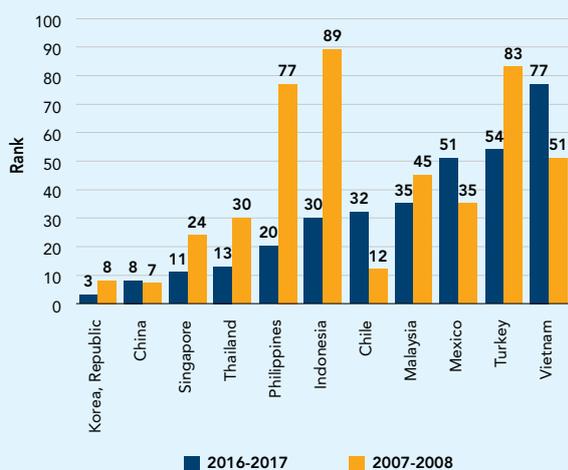
78 Ibid.

pricing.<sup>79</sup> Unpredictable changes in the inflation rate and other forms of price volatility can create systematic errors of perception on the part of employers and employees, which can cause unemployment to deviate from its natural rate.<sup>80</sup> A high inflation rate also affects a country’s terms of trade, creating uncertainty as to firms’ future earnings. Moreover, large swings in the exchange rate and interest rates can generate risks for firms investing in export-oriented and import-dependent industries, reducing investment and production levels. A stable macroeconomic environment helps create a favorable environment for investment, boosting productivity and economic growth. Sustained economic growth in turn provides countries with the fiscal space necessary to address other critical issues, and to invest more freely in infrastructure.

**Malaysia’s macroeconomic environment has weakened slightly recently, compared to its peers, which adversely affects the country’s competitiveness and might have implications for its overall productivity.** Malaysia ranked 35th globally and 8th among comparator countries on the GCI’s macroeconomic environment pillar (Figure 50).

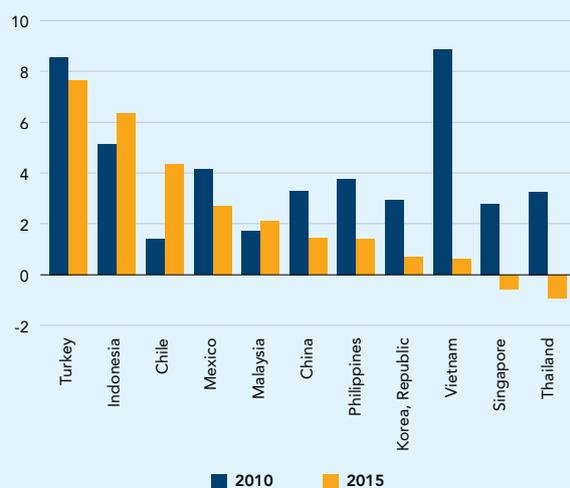
**However, compared to its peers, Malaysia has maintained its inflation rate at relatively manageable levels.** The average annual consumer price index from 1995 to 2015 was 2.6 percent, which is moderate for a rapidly growing economy. Turkey and Indonesia have significantly higher inflation rates, whereas Vietnam, China, and the Philippines show a greater degree of variability (Figure 51). Malaysia’s central bank, Bank Negara Malaysia, has broad responsibilities for establishing the country’s monetary policy, financial sector regulations, and payment systems; as a result, monetary policy not only focuses on price stability, but also takes into consideration financial stability. Bank Negara Malaysia has adopted a discretionary, principles-based approach for conducting monetary policy, using interest-rate targeting through its overnight policy rate, in contrast to the rules-based inflation targeting policy adopted by many OECD countries and several neighboring countries (Indonesia, Thailand, and the Philippines).<sup>81</sup>

**FIGURE 50: GCI Macroeconomic Environment Pillar, Malaysia and Comparators, 2007/8 and 2016/17**



Source: WEF Global Competitiveness Report, 2007-2008 and 2016-2017

**FIGURE 51: Inflation Rates, Malaysia and Comparators, 2010 and 2015**



Source: World Development Indicators

79 Friedman (1977)  
80 Ibid.  
81 Koen et al. (2017)

**Monetary policy changes in major economies such as the United States have had a pronounced effect on capital flows to Malaysia and exchange-rate volatility.** Malaysia experienced significant capital inflows between late 2009 and early 2013 following quantitative and monetary easing by advanced economies. However, this trend began to reverse in 2013, as recent macroeconomic developments in the United States, coupled with falling crude oil prices, triggered substantial outflows of portfolio investments in the latter half of 2015. This contributed to a weakening ringgit and heightened exchange-rate volatility (Figure 52). The Malaysian economy coped relatively well with the massive outflows, with minimal spillover effects on the real economy, due to the country’s flexible exchange rate, adequate buffers, deeper and more diversified financial markets, and a strong banking system.<sup>82</sup> At the same time, foreign-exchange reserves fell from US\$132 billion at end-August 2014 to US\$95.3 billion by end-2015. While reserves have inched up to US\$97.5 billion as of mid-August 2016, and remain sufficient to cover around eight months’ worth of retained imports, higher reserve levels would provide a buffer against rising volatility.

**FIGURE 52: Exchange Rate and Net Portfolio Flows, Malaysia, 2008-2016**



Source: CEIC dataset

**The Malaysian government has maintained its commitment to fiscal consolidation over the past six years, contributing to a stable macroeconomic environment; however, fiscal risks remain.** The government has demonstrated a high degree of policy credibility with respect to its commitment to fiscal consolidation, and this has contributed to a stable macroeconomic environment conducive for business activity. However, risks to fiscal sustainability remain, given external headwinds, as well as the country’s low revenue base and significant expenditure needs. Moreover, consolidation efforts have been pro-cyclical at times.<sup>83</sup> Going forward, continued fiscal discipline will be required to meet consolidation targets, generate fiscal buffers against future macroeconomic shocks, and create the fiscal space needed to address the anticipated costs of a rapidly aging population. A gradual consolidation can be achieved without undermining the country’s economic momentum, and while advancing productivity-enhancing capital investments. A repeat of spending on across-the-board public-sector bonuses and untargeted cash assistance to households should be avoided in favor of reducing deficit and debt levels.

<sup>82</sup> Ibid.

<sup>83</sup> Ibid.

## Conclusions and Policy Recommendations

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**A country's physical and intangible infrastructure has a strong impact on economic productivity and growth.** Labor productivity in Malaysia has declined in recent years, and the economy will need to boost productivity levels to achieve the aim of becoming a high-income country by 2020. Improving the quality of Malaysia's infrastructure – including its roads, highways, and railways; ports and airports; telecommunications structures; and electricity and water networks; as well as its institutions and the macroeconomic environment – would enhance the country's productivity, competitiveness, and overall economic efficiency.

**Over the last few decades, the Malaysian government has invested heavily in building and maintaining the country's infrastructure.** As a result, Malaysia consistently outranks its peers in terms of the quality of its infrastructure, the ease of doing business, and overall competitiveness. While Malaysia's infrastructure is generally of high quality, further reforms could address remaining bottlenecks, facilitate investment and business activity, and spur economic growth. Reinforcing existing infrastructure through proper planning and improved management will be essential. To relieve congestion on roads and highways, the government will need to implement policies that encourage the use of public transportation. Similarly, as Malaysia further integrates into global supply chains, the emphasis should be on improving the last-mile connectivity of ports.

**Several specific policy recommendations follow from the analysis that can contribute to increased economic productivity and growth.** In terms of the country's physical infrastructure needs, congestion is a major problem in several metropolitan cities in Malaysia, and the government should implement policies that discourage private vehicle ownership and use and encourage public transportation. Taxes on motor-vehicle-related expenditures and environmental-related taxes, particularly on motor fuels and vehicles, would both reduce private vehicle ownership and provide a revenue source that could be used to fund public transportation.

**Malaysia is developing as a transshipment center in the ASEAN region, and the volumes of containers in Malaysian seaports are expected to grow and outpace current seaport capacity.** To manage higher container volumes in the future, the Malaysian government must improve seaport capacity and streamline customs regulations and procedures.

**In the telecommunications sector, affordability remains a major issue and the authorities will need to implement policies that facilitate competition and improve infrastructure sharing among service providers, in order to increase affordability and improve broadband access among the underserved.** With respect to electricity and water infrastructure, a move towards more sustainable energy sources could enhance energy security, while reducing non-revenue water through continual maintenance work on water pipelines could improve water management.

**Further reforms could also improve the quality of the country's intangible infrastructure.** The government should take steps to enhance stakeholder involvement in policymaking, involving businesses and foreign investors, civil society representatives, and the general public in the decision-making process. Moreover, the authorities could more regularly and comprehensively monitor and evaluate government programs and strategic plans, as is common in most OECD countries. This should include independent performance audits, which would enhance program effectiveness and planning. Finally, greater transparency is required in the bidding process for public procurements to reduce costs and improve the use of public funds.



**CHAPTER 3**

# The Efficiency of Input and Output Markets in Malaysia: An Empirical and Comparative Analysis

**This chapter evaluates the efficiency of input and output markets in Malaysia, and assesses their impact on productivity growth.** The chapter begins with an empirical analysis of input and output markets in the Malaysian manufacturing sector, and then situates the efficiency of Malaysia's input and output markets in the context of its peers, both in East Asia and worldwide. On the input side, the analysis encompasses Malaysia's financial and labor markets, while on the output side, it examines both the domestic and external markets.

## Resource Allocation and Productivity Gains in the Malaysian Manufacturing Sector<sup>84</sup>

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**The analysis in this section is based on data from the Malaysian manufacturing survey.** It assesses the efficiency of input and output markets in Malaysia, and their impact on the productivity of the manufacturing sector. It then projects the potential productivity gains that would result from Malaysian manufacturing firms achieving the same level of allocative efficiency as firms in the United States.

**As described in Chapter 1, the Malaysian manufacturing sector is characterized by wide variations in firm-level productivity.** An analysis of total factor productivity (TFP) at the firm level confirms this heterogeneity. Differences in revenue-based TFP (TFPR), a measure of value addition, reveal that firms with very low productivity coexist with high-productivity firms, implying inefficiency in the allocation of productive factors.

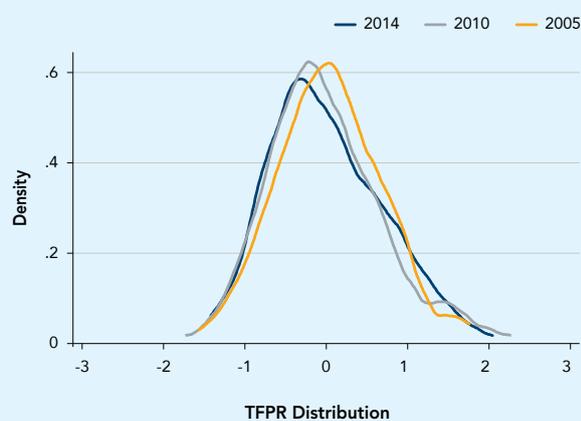
**All other things being equal, alleviating allocative inefficiencies tends to yield greater productivity gains in countries with larger differences in TFPR, though this is not always the case (Figure 53).** The average difference in TFPR between firms in the 25th and 75th percentiles in Malaysia is estimated to be 2.8 times larger than the differences in Turkey (2.6), China (2.3) and India (2.2). Moreover, these differences tend to be most pronounced among high-productivity firms.<sup>85</sup>

**Despite the greater variation in TFPR at the firm level, the productivity gains that could be generated by reducing allocative inefficiency in Malaysia are estimated to be lower than those in India or China, which may reflect differences in their market structures.** Measuring TFP in terms of marginal output (TFPQ) reveals a similar pattern, although the results suggest that distortions are more significant among firms with productivity levels below the sample median (Figure 54).

84 This section is based on the analysis that was originally presented in World Bank (2016a) and utilizes the Malaysian manufacturing surveys for 2005, 2010 and 2014.

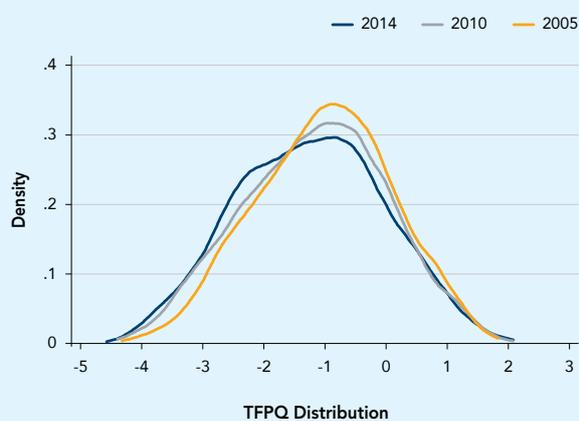
85 Estimates of productivity dispersion for India and China are based on Hsieh and Klenow (2009) and estimates for Turkey are from Nguyen *et al.* (2016).

**FIGURE 53: The widening disparity in TFPR values suggests that the allocation of factors across manufacturing firms has become less efficient over time**



Source: World Bank staff calculations

**FIGURE 54: The variation in TFPQ values confirms that distortions in factor allocation have worsened across manufacturing firms**

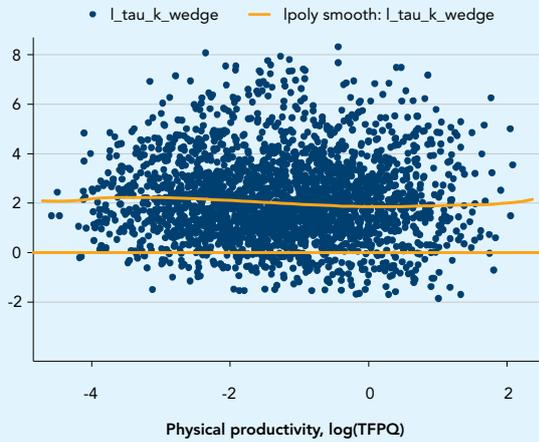


Source: World Bank staff calculations

**Firm dynamics are important in explaining the sources of productivity growth.** Preliminary analysis of data available for multiple manufacturing surveys in Malaysia show that new firms account for slightly more than half of the total firms in each of the two waves of the census periods (2005 and 2010). Based on the census data, the value-added per worker of new entrants declined an average of 5 percent as compared to survivors, which recorded an average increase of 4 percent. However, new firms which enter the dataset are not entirely young firms. They include old ones which enter through DOSM's expanded coverage in each wave of the census years. We would expect new young firms to be less productive in the beginning of their operations. However, we should see net gain in aggregate productivity, if the new entrants are more productive than firms that exit.

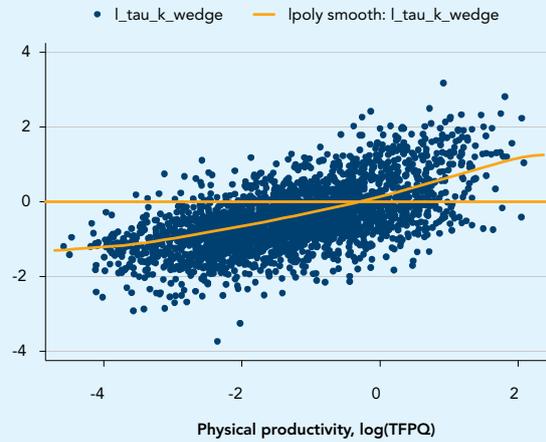
**Distortions in factor markets are not correlated with firm-level productivity, but distortions in output markets are.** While the markets for capital and labor suffer from high distortions at every level of firm productivity, factor-market distortions and firm-level productivity do not appear to be linked (Figure 55). In other words, more-productive firms do not necessarily face greater factor-market distortions than less-productive firms, and vice versa. By contrast, the positive relationship between TFPR and TFPQ in the manufacturing sector suggests that more-productive firms face larger distortions in output markets (Figure 56). This implies that Malaysia's most productive firms could further increase their output if output markets were more efficient. Eliminating output-market distortions, such as competition from government-linked companies, regulatory barriers, and asymmetric tax and subsidy structures, would likely shift the distribution of resources toward more-productive firms, enhancing the aggregate productivity of the manufacturing sector.

**FIGURE 55: Distortions in factor markets do not appear to be correlated with firm productivity...**



Source: World Bank staff calculations  
 Note: Capital wedge represents distortions in the capital market.

**FIGURE 56: ...but distortions in output markets are linked to low productivity.**



Source: World Bank staff calculations  
 Note: Output wedge represents distortions in the output market.

**Completely eliminating all distortions in the Malaysian economy could boost the productivity of manufacturing firms by as much as 75 percent.** Shifting resources toward more-productive manufacturing firms would have a significant impact on the Malaysian economy, as manufacturing accounts for almost one-quarter of GDP. Panel data from 2005, 2010 and 2014 reveal that completely eliminating distortions would increase productivity among manufacturing firms by 75-76 percent, and that raising efficiency to the level that prevailed in the US in 1997 would boost productivity by 22-23 percent (Table 1).

**TABLE 1: Summary of Potential Efficiency Gains**

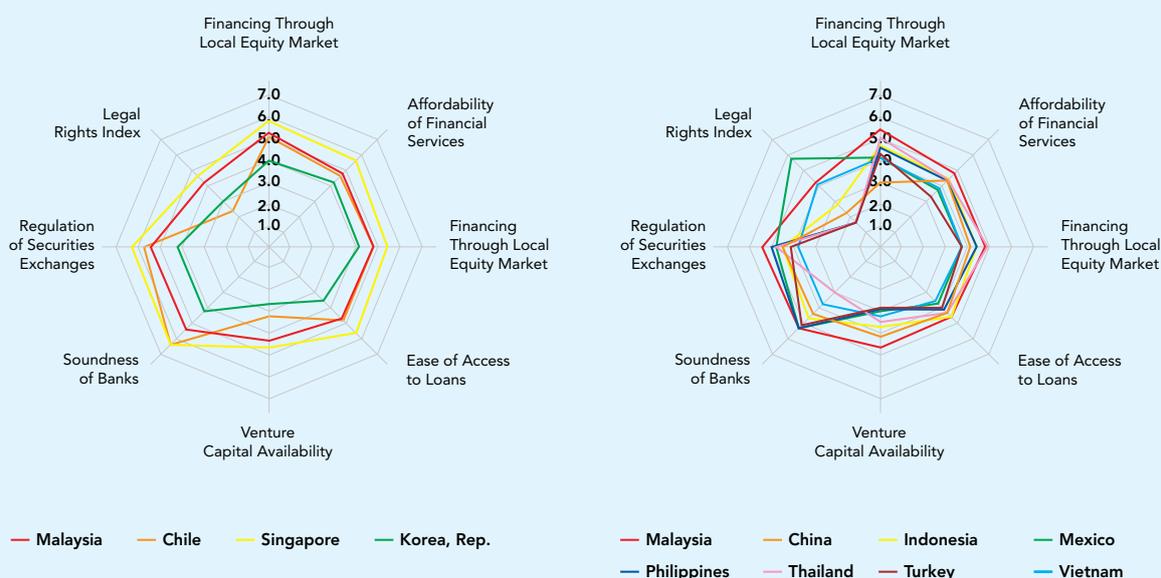
	Complete elimination of distortions	US efficiency level in 1997
2005	74.95	22.43
2010	75.95	23.13
2014	75.65	22.92

Source: World Bank staff calculations

## Financial-Market Efficiency

**An efficient financial market must be well-developed, competitive and stable.**<sup>86</sup> Malaysia performs relatively well on most international indices of financial-sector efficiency, and ranked 13th out of 138 countries in the “Financial Market Development” dimension of the World Economic Forum’s 2016-2017 Global Competitiveness Report (GCR) (Figure 57).<sup>87</sup> Malaysia performed particularly well on indicators of “venture capital availability” (6th), “financial services meeting business needs” (15th) and “affordability of financial services” (17th). While Malaysia lagged Singapore on all indicators of financial market development, it outperformed South Korea, Chile, China, Indonesia, Turkey, Mexico, the Philippines, Thailand, and Vietnam on most indicators.

**FIGURE 57: Malaysia outperforms most comparator countries on indicators of financial-market development**



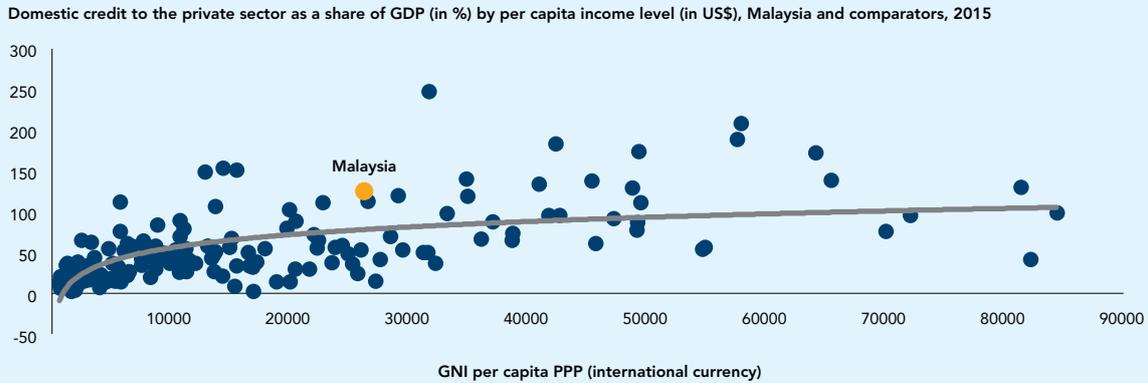
Source: WEF Global Competitiveness Report 2016-17

**The most common measure of financial depth – i.e., the size of the financial sector relative to the economy – is the private-credit-to-GDP ratio.** While bank credit is only one element of the financial sector, the private-credit-to-GDP ratio serves as an adequate proxy for overall financial development. Malaysia’s ratio is high by the standards of comparable countries, reflecting the relative sophistication of its financial sector (Figure 58).

<sup>86</sup> King and Levine (1993) analyze how financial development is associated with future economic growth, physical capital accumulation, and economic efficiency improvements in a broad panel of countries.

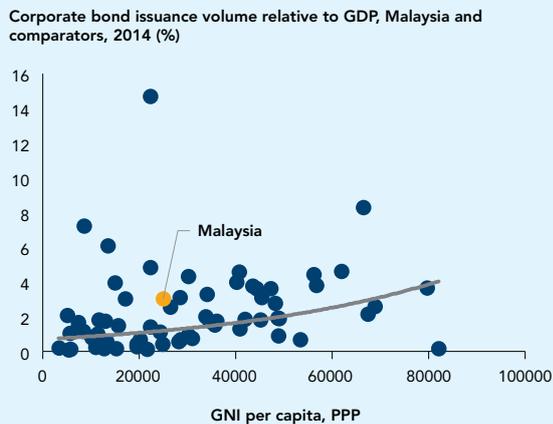
<sup>87</sup> WEF (2017)

**FIGURE 58: Malaysia’s private-credit-to-GDP ratio is high compared to those of its peers, indicating a well-developed financial sector**

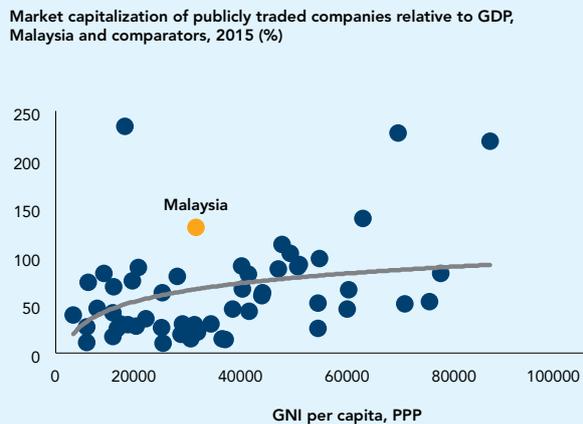


Indicators of the size of the bond market and the stock market underscore the depth of Malaysia’s financial sector. The size of the bond market is measured by the volume of corporate bonds relative to GDP (Figure 59), while the size of the stock market is measured by the market capitalization of publicly-traded firms relative to GDP (Figure 60). In Malaysia, both indicators are high by the standards of comparable countries.

**FIGURE 59: Malaysia’s volume of corporate bonds as a share of GDP is high relative to those of its peers...**



**FIGURE 60: ...and the same is true for the market capitalization of publicly-traded firms as a share of GDP.**

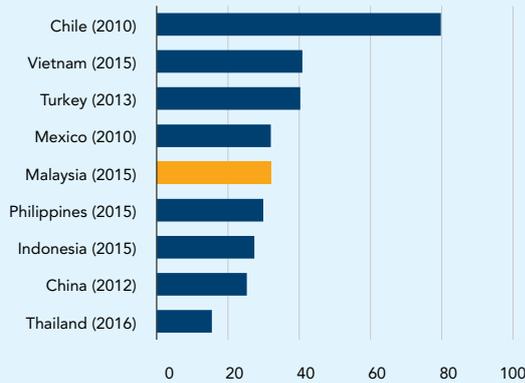


Malaysia’s access-to-finance indicators, including the share of adults with a bank account and the share of firms with a line of credit, are in the middle of the range among comparator countries (Figure 61).<sup>88</sup> In terms of the share of firms with a bank loan or credit line, Malaysia ranks higher than any East Asian comparator except Vietnam, and it outperforms similar regional economies such as the Philippines and Indonesia. In Malaysia, access to finance appears to correlate with firm size, as smaller firms are less likely to report having a bank loan or credit line (Figure 62).

88 Cihak et al (2012)

**FIGURE 61: Malaysia outperforms most regional comparators in terms of the share of firms with access to a bank loan or line of credit...**

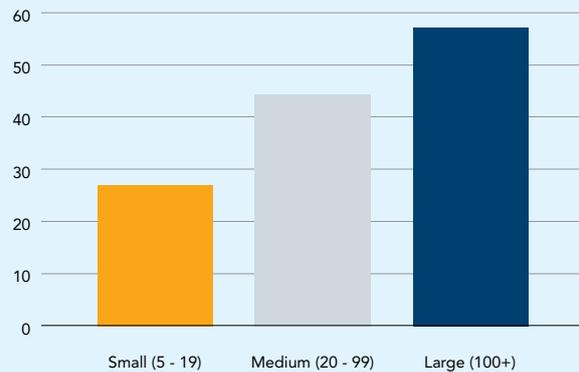
Firms with a bank loan or credit line, Malaysia and comparators, 2015 (%)



Source World Bank Enterprise Surveys

**FIGURE 62: ...and access to finance appears to correlate with firm size.**

Firms with a bank loan or credit line, Malaysia and comparators, (%)

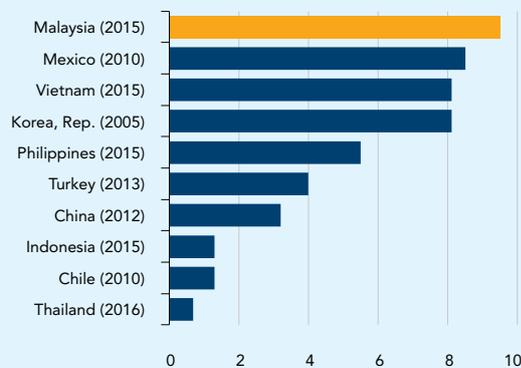


Source: World Bank Enterprise Surveys

In addition to the banking sector, firms can also access finance through the stock market or the bond market. Access to the stock market appears to be high by the standards of comparable countries, as Malaysian firms finance an unusually large share of their capital costs by selling equity (Figure 63). Medium-sized firms in Malaysia finance a larger share of their investment through the stock market than either small firms or large firms (Figure 64).

**FIGURE 63: Malaysian firms finance a larger share of their investment costs by selling equity than firms in comparable countries...**

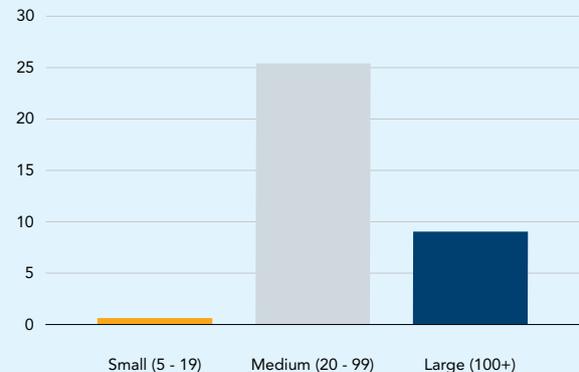
Share of investment financed by equity or stock sales, Malaysia and comparators, 2015 (%)



Source World Bank Enterprise Surveys

**FIGURE 64: ...and medium-sized firms are the most likely to access the stock market.**

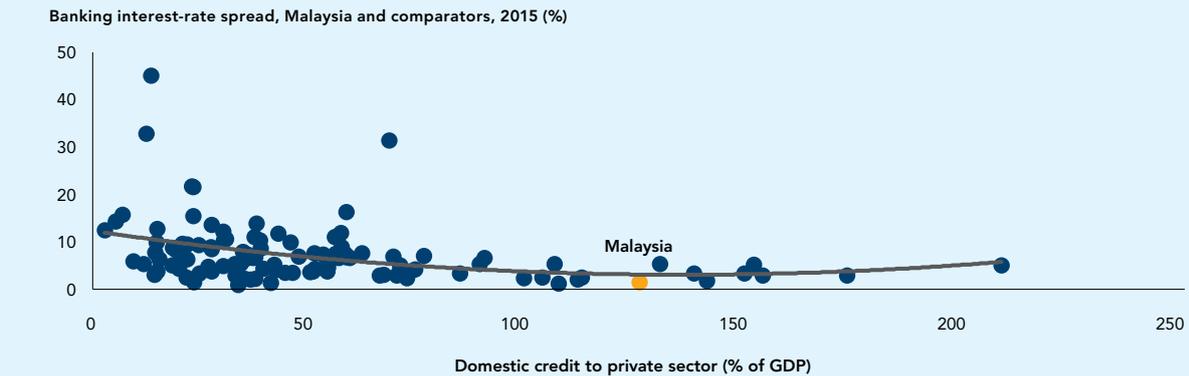
Share of investment financed by equity or stock sales, Malaysia and comparators, 2015 (%)



Source: World Bank Enterprise Surveys

**The interest-rate spread is a key indicator of the overall efficiency of the financial sector.** As the spread can be affected by reserve requirements and other regulations, it reflects the efficiency of the policy environment as well as the private financial market. Malaysia's interest-rate spread is low compared to those of peer countries, and it is low relative to the size of the Malaysian banking sector, as measured by domestic credit to the private sector (Figure 65). This suggests that Malaysia's banking sector is relatively efficient.

**FIGURE 65: Low interest-rate spreads indicate a relatively efficient banking sector**



**While Malaysia's financial sector is relatively well-developed by the standards of comparable countries, recent data reveal a slow but steady deterioration in key indicators.** Between the 2011 and 2016-2017 GCRs, Malaysia's scores fell across all indicators except the legal rights index, which remained unchanged (Table 2). The decline in Malaysia's scores for the extent to which financial services meet business needs, the affordability of financial services, the ease of obtaining financing through local equity markets, and the ease of access to loans, may reflect the decline in Malaysia's real GDP growth rate after 2014, and the central bank's tighter monetary-policy stance.

**TABLE 2: Malaysia's scores on almost all indicators of financial-market development have fallen in recent years**

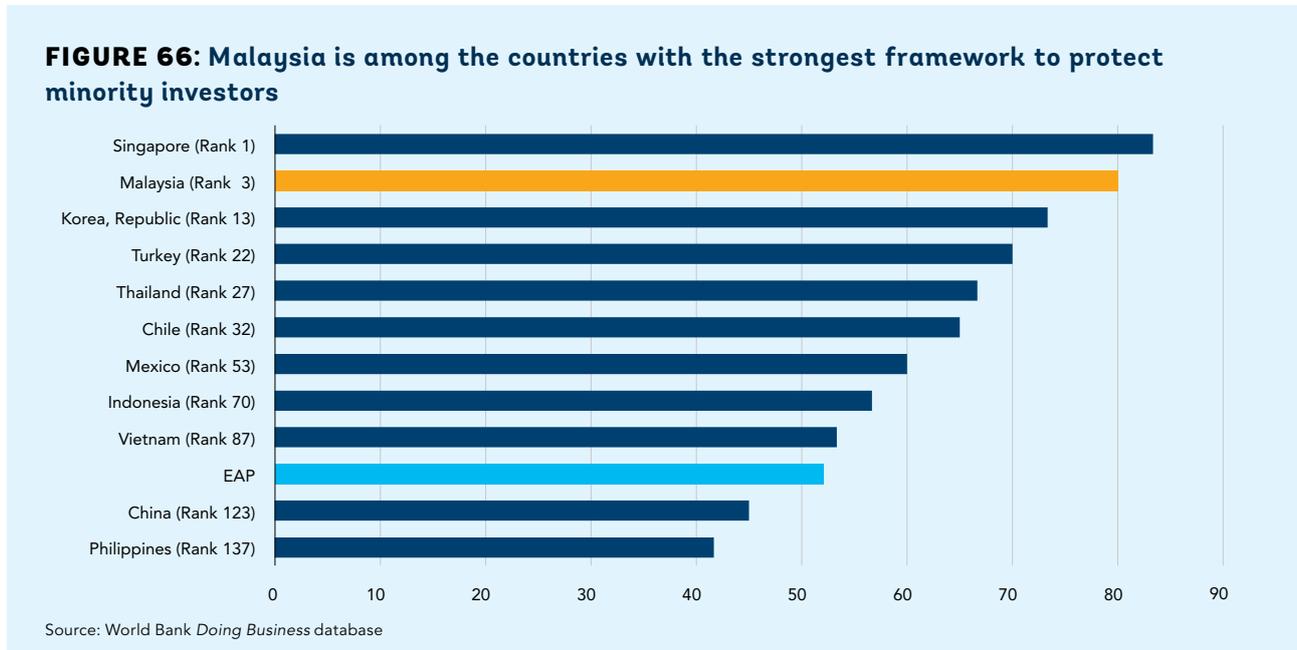
	Overall financial-market development	Financial services meeting business needs	Affordability of financial services	Financing through local equity market	Ease of access to loans	Venture capital availability	Soundness of banks	Regulation of exchanges	Legal rights index
2011 - 12	5.5	5.8	5.5	4.9	4.5	4.1	5.9	5.4	10
2012 - 13	5.4	5.6	5.4	4.9	4.4	4.0	5.7	5.3	10
2013 - 14	5.4	5.5	5.4	4.9	4.4	4.2	5.7	5.3	10
2014 - 15	5.6	5.6	5.6	5.1	4.8	4.6	5.7	5.5	10
2015 - 16	5.2	5.6	5.6	5.0	4.8	4.8	5.5	5.4	7
2016 - 17	5.0	5.4	4.9	4.8	4.7	4.6	5.4	5.3	7

Source: WEF, GCR, 2012 to 2017

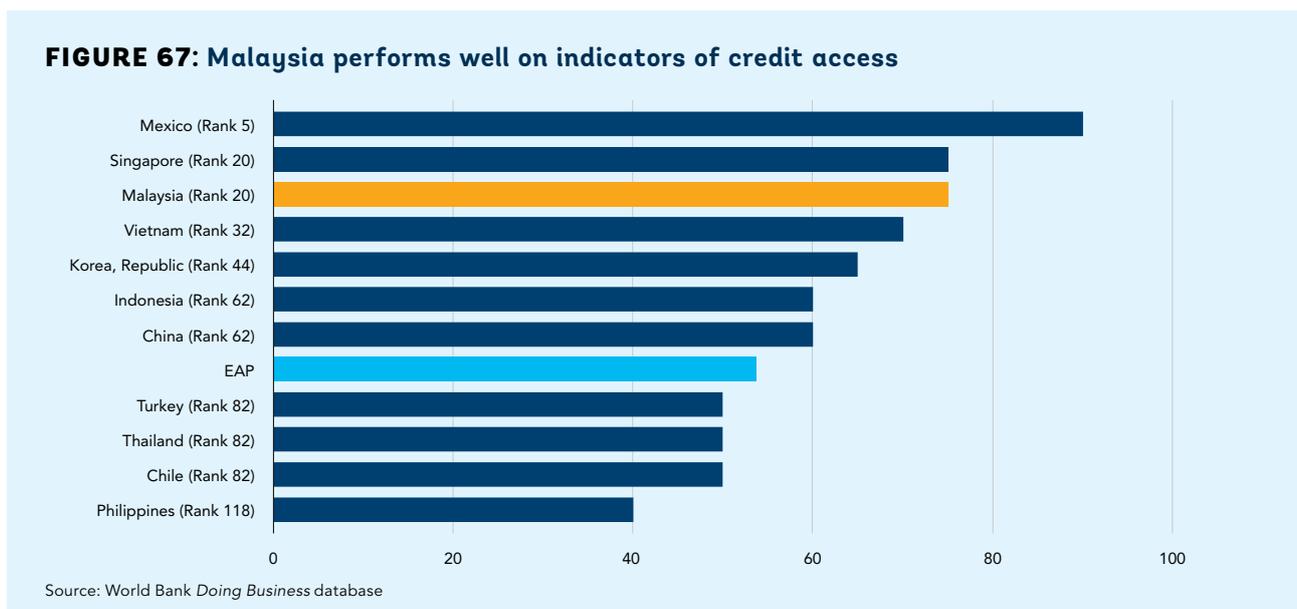


2,731	2,756	727.13	0.87	1.62	0.01	0.01
9,330	4,443	696.63	3.61	0.98		0
3,229	873	15.85	1.98	0.26	0.07	0.14
7,569	1,921	20.30	1.44	0.59	0.05	0.07
85	9,288	11.98	2.06	0.46	10.00	17.9
227	741		0.84	1.22		0
207	1,727		1.24	2.66		0
26,813	12,911	10.62	1.16	1.07	0.24	1.1
	4,653		1.27		0.20	0
214	7,761	63.94	2.55	0.53		0
9,247	879		0.58	0.95		
3,762	12,265	10.17	1.40	1.35	0.07	0
40,441	561,420	28.88	0.95	0.43	5.00	1
2,117	15,035	7.25	1.98	1.05	0.30	0
37,174	4,200	41.75	7.29	0.11	0.03	
2,279	3,927		3.44	0.25		
25,041		4.63	1.06	0.09	0.03	
			0.44	0.13		
				0.69	0.03	

Since 2010, Malaysia has ranked among the top five countries in the World Bank’s Doing Business report on the strength of minority-investor protections (Figure 66). In the 2017 report, it ranked 3rd in the world. The strength of minority-investor protections is estimated based on a survey of corporate and securities lawyers.<sup>89</sup>



Malaysia ranked 20th worldwide on the “getting credit” indicator of the 2017 *Doing Business* report, tying with Singapore and Hong Kong. Malaysia obtained the maximum score for “depth of credit information index,” but it scored relatively poorly on the “strength of legal rights index,” which measures how well collateral and bankruptcy laws facilitate access to credit. (Figure 67). Changes in the methodology for measuring the “strength of legal rights index”<sup>90</sup> caused Malaysia’s “getting credit” ranking to fall from 1st in 2015 to 28th in 2016.

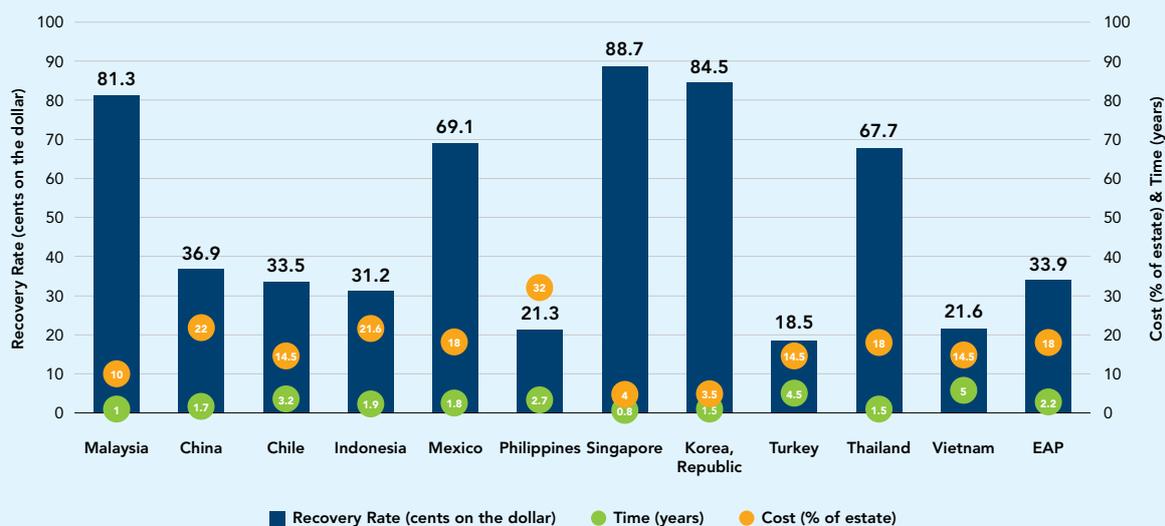


89 The *Doing Business* indicator for minority-investor protection appears to be a more robust measure than the Global Competitiveness Report’s subindex on “regulation of securities exchanges,” as the latter is based on a single survey question.

90 Before 2015, the “strength of legal rights” index was measured on a 0 to 10 scale, and Malaysia obtained the maximum score of 10. After 2015, the scale was shifted to 0 to 12, and Malaysia scored poorly on six new or modified criteria.

A well-functioning financial market requires a robust insolvency system to facilitate the reallocation of assets between less-efficient and more-efficient firms.<sup>91</sup> Malaysia was ranked 46th on the 2017 Doing Business indicator for ease of resolving insolvency, outperforming most comparable countries (Figure 68).

**FIGURE 68: The insolvency process is more efficient in Malaysia than in most comparator countries**



Source: World Bank Doing Business database

Whereas many countries have integrated corporate-rescue mechanisms into their insolvency frameworks, Malaysia’s system tends to liquidate companies by default rather than attempt to restructure viable firms. Creditors in Malaysia can initiate bankruptcy proceedings for a debt default of as little as RM 30,000, and Malaysia’s insolvency system could be improved by introducing a voluntary debt-restructuring scheme similar to the United States’ Chapter 11 bankruptcy law, out-of-court arbitration procedures to facilitate corporate restructuring, and the automatic discharge of debts after a set period of time.<sup>92</sup>

91 World Bank (2017)

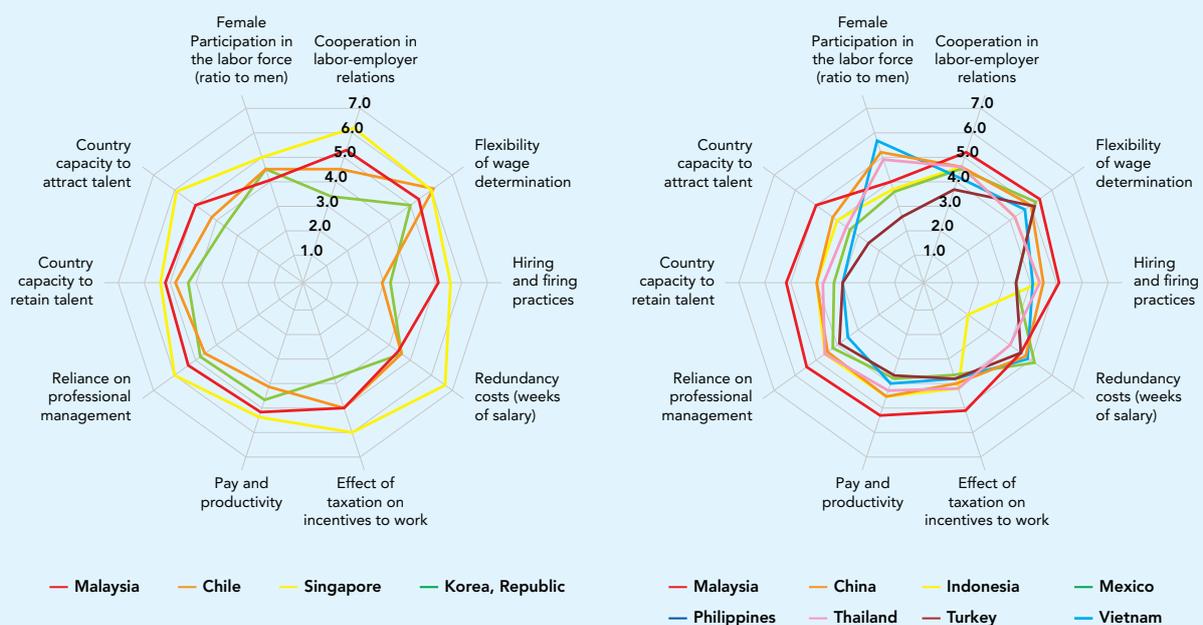
92 OECD (2016)

## Labor-Market Efficiency

An efficient labor market boosts productivity by facilitating the movement of labor to more-productive economic sectors, and by incentivizing human-capital accumulation.<sup>93</sup> An efficient labor market is flexible and responsive: workers are able to move between jobs and sectors relatively easily, and investment in education and training is adequately compensated by higher wages.

In the latest GCR, Malaysia ranked 24th in “labor-market efficiency” (Figure 69). Malaysia performed particularly well on indicators of “pay and productivity” (6th), “country capacity to retain talent” (8th), “hiring and firing practices” (10th), “country capacity to attract talent” (11th), “effect of taxation on incentives to work” (12th) and “cooperation in labor-employer relations” (17th). However, Malaysia performed poorly on indicators of “redundancy costs” (120th) and “female participation in the labor force” (104th).

**FIGURE 69: Overall, Malaysia performs well on measures of labor-market efficiency, but its indicators for redundancy costs and female labor-force participation are poor relative to peer countries**



Source: WEF Global Competitiveness Report 2016-17

Malaysia's strong performance in “hiring and firing practices” implies that its labor market is relatively flexible. Labor-market flexibility is critical to maintain low unemployment, and enable the efficient reallocation of labor across firms and sectors.<sup>94</sup> Unfortunately, redundancy costs in Malaysia are high, which reduces the overall flexibility of the labor market.

<sup>93</sup> See, e.g.: Wadsworth (2002)

<sup>94</sup> Hopenhayn and Roger (1993); World Economic Forum (2015)

**The capacity of the Malaysian labor force to attract and retain talent reflects a close relationship between pay and productivity, which is essential to encourage human-capital formation.** However, the country's low female labor-force participation rate indicates that a large share of the potential workforce is underutilized. Although female labor-force participation was Malaysia's only labor-market indicator that improved between the 2015-15 and 2016-17 GCRs (Table 3), female workers continue to represent a major source of untapped potential.

**The general decline in Malaysia's labor-market indicators may reflect growing economic headwinds in 2016, which have contributed to an increase in the unemployment rate.** Policy changes may have also played a factor, as the decline in "flexibility of wage determination" since the 2012-13 report may be due to the passage of a minimum wage law in 2012.

**TABLE 3: Most of Malaysia's indicators of labor-market efficiency have deteriorated in recent years**

	Overall labor-market efficiency	Cooperation in labor-employer relations	Flexibility of wage determination	Hiring and firing practices	Redundancy costs (weeks of salary)	Effect of taxation on incentives to work	Pay and productivity	Reliance on professional management	Country capacity to retain talent	Country capacity to attract talent	Female labor-force participation (%)
2011 - 12	4.9	5.4	5.0	4.5	75.0	-	5.3	5.5	4.8	4.8	0.57
2012 - 13	4.8	5.2	5.6	4.5	24.0	-	5.3	5.3	4.7	4.7	0.59
2013 - 14	4.8	5.2	5.5	4.5	23.9	5.0	5.2	5.4	4.6	4.6	0.59
2014 - 15	4.8	5.4	5.5	4.9	23.9	5.1	5.4	5.6	5.1	5	0.59
2015 - 16	4.9	5.5	5.5	5.3	23.9	5.2	5.4	5.7	5.3	5.3	0.59
2016 - 17	4.8	5.3	5.4	5.1	29.4	5.1	5.3	5.5	5.3	5.1	0.65

Source: WEF Global Competitiveness Reports, 2012 to 2017

Note: All values reflect the Global Competitiveness Report score for each indicator unless otherwise noted.

**The World Economic Forum's Executive Opinion Survey ranks countries according to a weighted average of the top five obstacles to doing business in the country.** In the 2016 survey, "restrictive labor regulations" were the obstacle cited least often by respondents. Similarly, in the World Bank's Enterprise Survey, just 7.4 percent of Malaysian firms identified labor regulations as the most important constraint on doing business.

**High redundancy costs seem to be a persistent feature of Malaysia's labor market.** Between 2012 and 2016, redundancy costs equaled about 24 weeks' salary, and the GCR consistently ranked Malaysia around 110th worldwide for this indicator. In the most recent report, redundancy costs had increased to 29.4 weeks' salary, and Malaysia's rank for this indicator dropped to 120th. High redundancy costs may reflect Malaysia's lack of an integrated and comprehensive social protection system. High redundancy costs can reduce labor-market efficiency, by distorting firms' incentives to hire new workers. In an effort to lower redundancy costs, the government's 11th Malaysia Plan includes legislative reforms designed to streamline dismissal processes.<sup>95</sup>

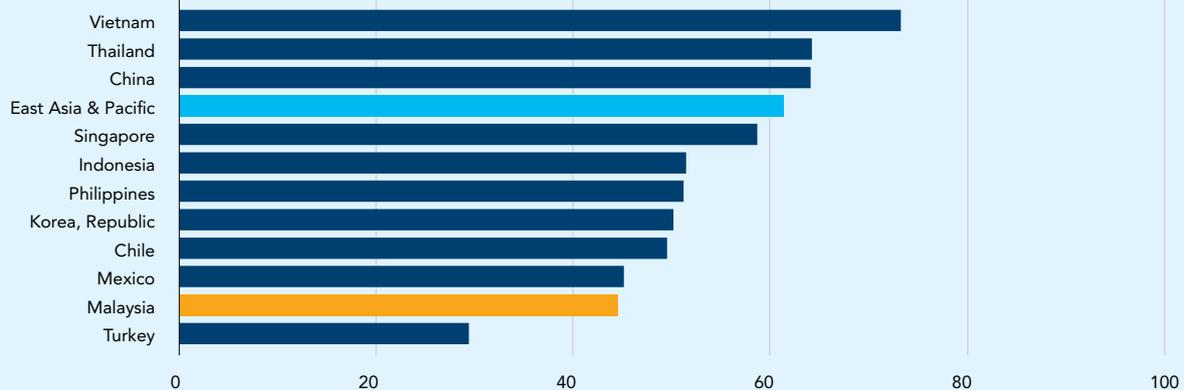
95 OECD (2016)

**Malaysia's female labor-force participation rate is low, and it declines sharply for women over the age of 29 (Figure 70).**<sup>96</sup> In advanced regional economies such as Japan and Korea, female labor-force participation dips among workers in their late 20s and early 30s, then recovers among older workers, as women temporarily leave the labor force to have children, then return later in life. By contrast, Malaysia's female labor-force participation rate declines steadily among older age groups.

**Increasing labor-force participation among women in general, and older women in particular, could greatly boost labor productivity.** The Malaysian government has launched several initiatives to encourage female labor-force participation, including the 1Malaysia Support for Housewives and Flexworklife programs, which support wage employment among women, the Women Entrepreneurial Incubator (Azam Niaga) and 1Nita programs, which support female entrepreneurship, and the Career Comeback program and Resourcing and Retention grants, which support female workers re-entering the labor force.<sup>97</sup> Making quality childcare facilities and early childhood education more accessible and affordable could also help increase female labor-force participation, and adult learning and re-skilling opportunities could facilitate the re-entry of older female workers, who tend to have lower average levels of educational attainment.<sup>98</sup>

**FIGURE 70: Malaysia's female labor-force participation rate is low by the standards of comparable countries**

Female labor-force participation rate (% of female population ages 15+)



Source: WDI

**The Malaysian economy relies heavily on low-skilled foreign workers.** In 2013, the country hosted two million registered foreign workers, representing 17 percent of total employment.<sup>99</sup> When illegal immigrants are included, foreign workers represent 27 percent of total employment in Malaysia. While low-skilled foreign workers have a net positive effect on both employment creation and GDP in Malaysia, the country's system for managing labor immigration is fragmented, and could be better aligned with the national human-resource development strategy.<sup>100</sup>

<sup>96</sup> The data in Figure 18 are from the WDI and differ slightly from International Labor Organization estimates, as well as those used by the Malaysian Department of Statistics, which reported a female labor-force participation rate of 53.7 percent in 2014. The WDI data are used to facilitate cross-country comparisons.

<sup>97</sup> OECD (2016)

<sup>98</sup> Ibid.

<sup>99</sup> EPU (2015)

<sup>100</sup> World Bank (2015)

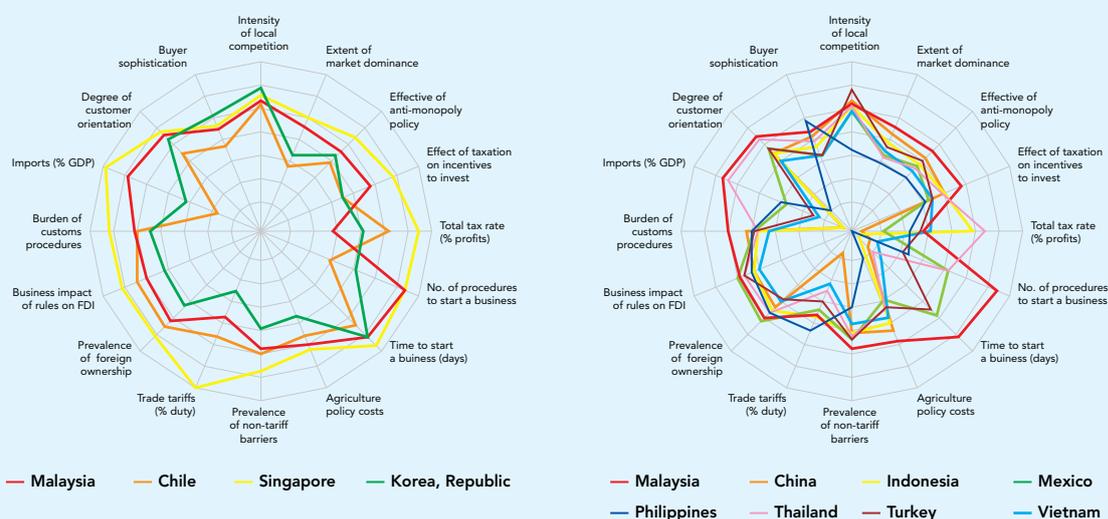
## Output-Market Efficiency

**Competition is vital to the efficiency of output markets for both goods and services.** In Malaysia, the passage of the Competition Act in 2010, and the establishment of the Malaysia Competition Commission in 2011, have created a policy framework for competition that approaches international standards.<sup>101</sup> However, the independence of the Malaysia Competition Commission is questionable, its control over mergers is limited, and it lacks oversight authority in key sectors of the Malaysian economy. Moreover, competition is uneven across sectors. While competition has supported the growth of the country’s large export-oriented manufacturing sector, the services sector lags behind.

**In the 2016-17 GCR, Malaysia ranked 12th for “Goods Market Efficiency.”** The country performed particularly well on indicators of “agricultural policy costs” (8th), “number of procedures to start a business” (11th), “buyer sophistication” (13th), “effect of taxation on incentives to invest” (14th), “time to start a business” (15th) and “extent of market dominance” (16th). However, Malaysia performed poorly on indicators of “intensity of local competition” (40th), “business impact of rules on FDI” (41st), “trade tariffs” (63rd), and “total tax rate” (79th).

**Malaysia’s scores for “Goods Market Efficiency” compared favorably with those of its peers (Figure 71).** While Malaysia lagged behind Singapore in all indicators, it outperformed South Korea, Chile and most middle-income comparator countries on almost all dimensions of goods-market efficiency.

**FIGURE 71: Malaysia outperforms most comparator countries in terms of goods-market efficiency**



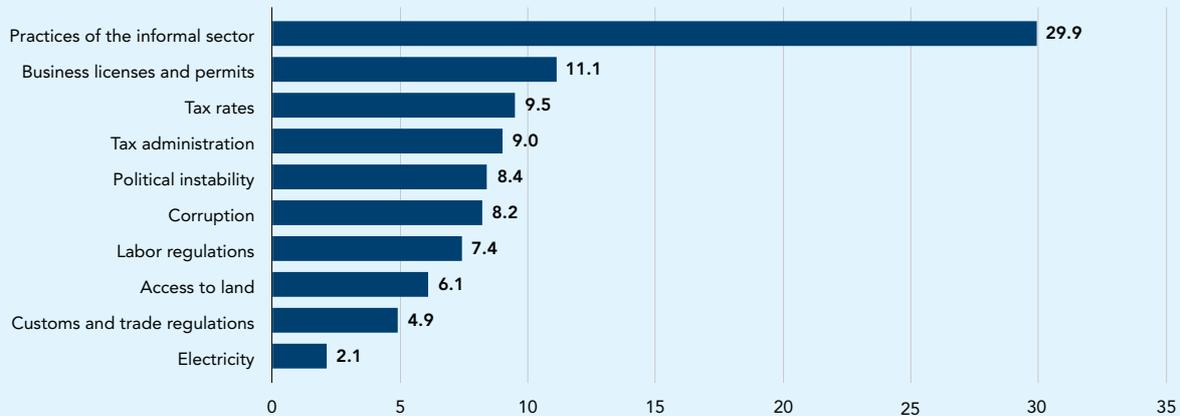
Source: WEF Global Competitiveness Report, 2016-17

**Despite Malaysia’s strong performance on the GCR, the top four obstacles to doing business cited by respondents in the World Bank’s Enterprise Surveys all relate to goods-market efficiency.** These include competition from the informal sector, the cost of obtaining business licenses and permits, high tax rates, and burdensome tax administration (Figure 72). Each of these four obstacles is either directly or indirectly influenced by public policy.

101 OECD (2016)

**FIGURE 72: Malaysian firms most often cite the informal sector, business licensing, tax rates, and tax administration as the main obstacles to doing business**

Constaints cited by firms (%)



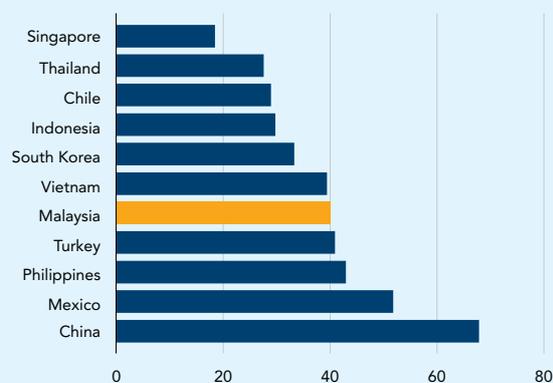
Source: World Bank Enterprise Surveys

**Local markets in Malaysia are not perfectly competitive.** While Malaysia ranked favorably (16th) on the “extent of market dominance,”<sup>102</sup> and “effectiveness of anti-monopoly policy” (22nd), it performs relatively poorly on “intensity of local competition” (40th). Moreover, the country’s scores for all of these indicators have deteriorated since 2015, due in part to the introduction of the Goods and Services Tax (GST), and in part to the worsening macroeconomic environment, which increased firm exits, leaving markets less competitive.

**Malaysia’s tax policies have mixed effects on the efficiency of goods markets.** Firm taxes equal 40 percent of their profits, a high share by international standards, and in the 2017 GCR, Malaysia ranked 79th in the world for tax rates (Figure 73). Firms frequently cite both high tax rates and burdensome tax administration as obstacles to doing business (Figure 74).

**FIGURE 73: Business taxes in Malaysia are high by the standards of comparable countries...**

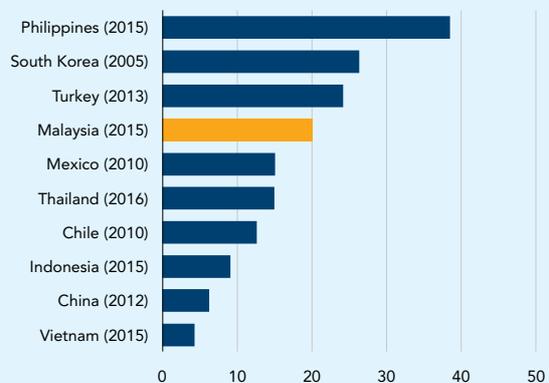
Business taxes as a share of profits (%)



Source WEF GCR 2016-17

**FIGURE 74: ...and Malaysian firms often cite high tax rates as a major constraint on doing business.**

Share of firms identifying tax rates as a major constraint, 2015 (%)



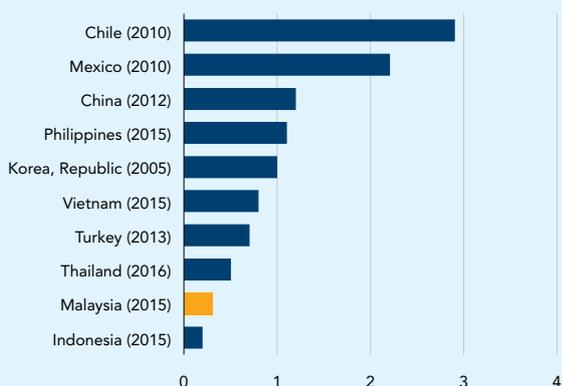
Source: World Bank Enterprise Surveys

102 This reflects the extent to which markets are dominated by a small number of large firms.

While firms in Malaysia spend less time dealing with tax officials than firms in most comparator countries (Figure 75), they are more likely to identify tax administration as a major constraint (Figure 76). This is consistent with the country’s relatively low ranking of 61st on the ease of paying taxes in the World Bank’s 2017 Doing Business report, though Malaysia still outperforms most comparator countries in this aspect of doing business.

**FIGURE 75: Malaysian firms spend less time dealing with tax officials than firms in comparator countries...**

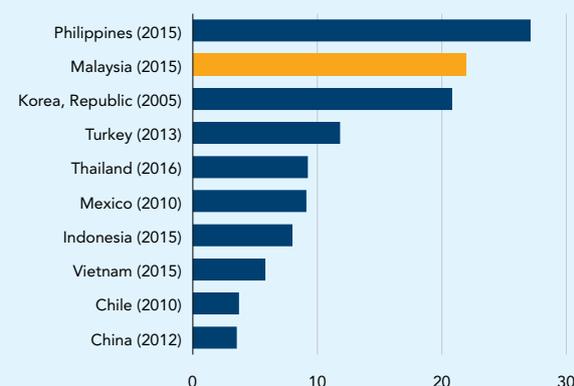
Number of visits or required meetings with tax officials



Source: World Bank Enterprise Surveys

**FIGURE 76: ...yet they are more likely to identify tax administration as an obstacle to doing business.**

Firms identifying tax administration as a major constraint to doing business, 2015 (%)



Source: World Bank Enterprise Surveys

Although Malaysian firms frequently cite tax rates and tax administration as major constraints on doing business, taxation appears to have only a modest effect on investment incentives. In the 2016-17 GCR, Malaysia ranked 14th in terms of the negative impact of taxation on investment incentives (Figure 77). Moreover, Malaysia’s score for this indicator has been trending upward since 2011-12, even as the overall tax rate has gradually increased. This suggests that while lowering tax rates and improving tax administration could have a positive effect on competition, these are not priority reform areas.

**FIGURE 77: Taxation appears to have a modest impact on investment incentives in Malaysia**

Global Competitiveness Report scores and rankings for "Impact of Taxation on Investment Incentives"

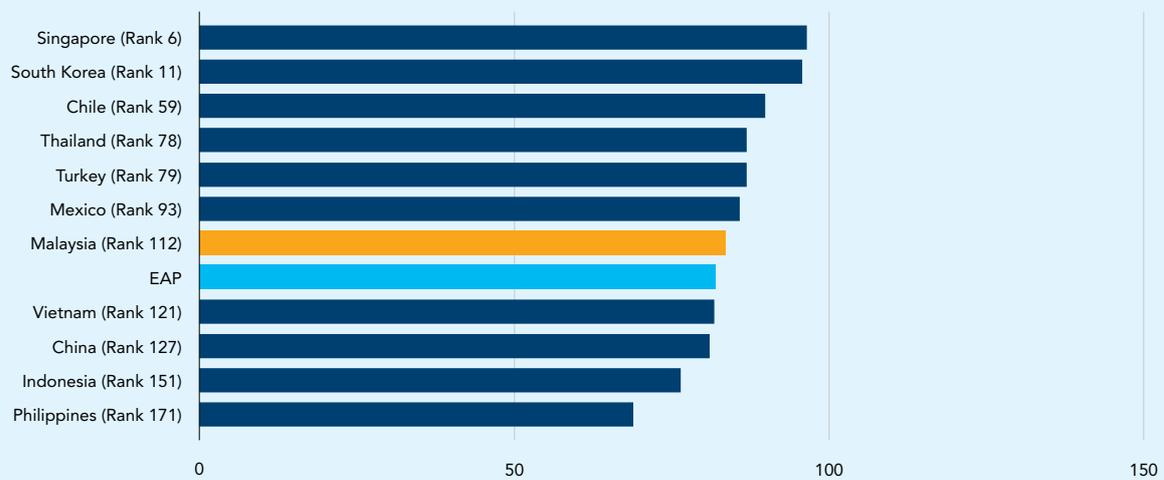


Source: WEF Global Competitiveness Report 2016-17

**Different analytical methodologies yield very different perspectives on the ease of starting a business in Malaysia.** In the 2016-17 GCR, Malaysia ranked among the top countries in the world in terms of “number of procedures to start a business” (11th) and “time to start a business” (15th), reflecting substantial improvements since the 2011-12 GCR. However, in the 2017 Doing Business report, Malaysia ranked 112th in “ease of starting a business” after plummeting from 59th in the 2016 report and 13th in the 2015 report (Figure 78). Cumbersome requirements for GST registration have made starting a business in Malaysia more difficult.<sup>103</sup>

**FIGURE 78: In the most recent Doing Business report, Malaysia performed poorly in terms of the ease of starting a business**

Global Competitiveness Report scores and rankings for "Ease of Starting a Business"



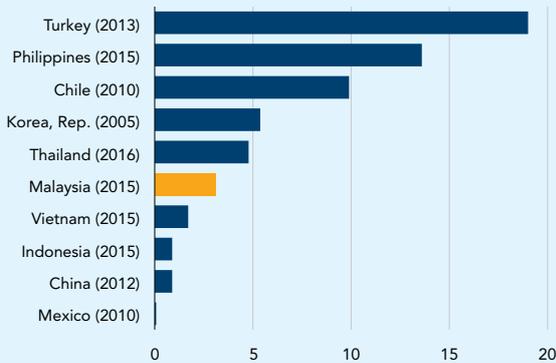
Source: World Bank *Doing Business* database

**The regulatory framework largely determines the ease of starting a business.** According to the World Bank Enterprise Surveys, senior management in Malaysia spend an average of 3.1 percent of their time dealing with government regulations, substantially less than managers in most comparator countries (Figure 79). The regulatory burden appears to increase with firm size in Malaysia, as large firms report spending significantly more time dealing with government regulations (Figure 80).

103 World Bank (2017)

**FIGURE 79: Malaysian firms spend less time dealing with government regulations than firms in comparable countries...**

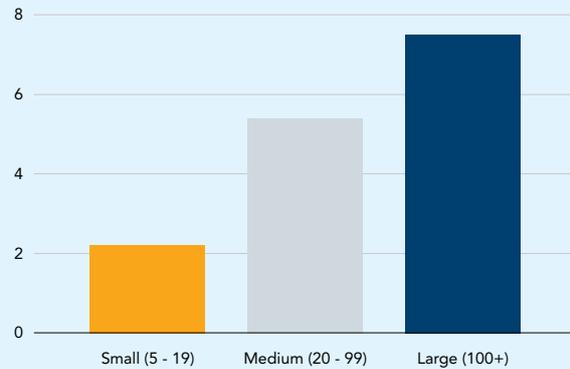
Senior management time spent dealing with government regulations, 2015 (%)



Source World Bank Enterprise Surveys

**FIGURE 80: ...and large Malaysian firms spend more time dealing with government regulations than small firms.**

Senior management time spent dealing with government regulations, 2015 (%)

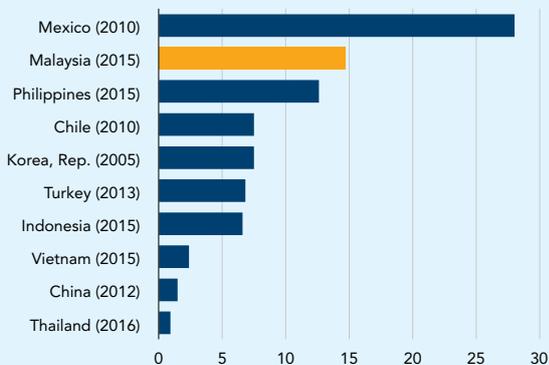


Source: World Bank Enterprise Surveys

**Malaysian firms cite the difficulty of obtaining business licenses and permits as among the top obstacles to starting a business.** Malaysian firms are also more likely to identify business licenses and permits as a major constraint than firms in most comparator countries (Figure 81). However, the time required to obtain operating licenses and construction-related permits in Malaysia is much shorter than the time required in most comparator countries (Figure 82).

**FIGURE 81: Malaysian firms are more likely than firms in comparable countries to cite the difficulty of acquiring permits and licenses as a constraint to starting a business...**

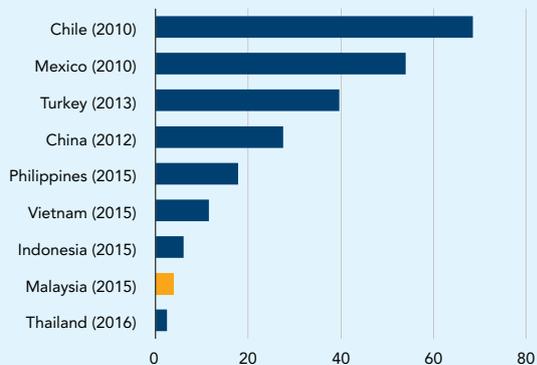
Share of firms identifying business licensing and permits as a major constraint to starting a business, 2015 (%)



Source World Bank Enterprise Surveys

**FIGURE 82: ...even though less time is required to obtain permits and licenses in Malaysia than in comparable countries.**

Number of days required to obtain an operating license, 2015



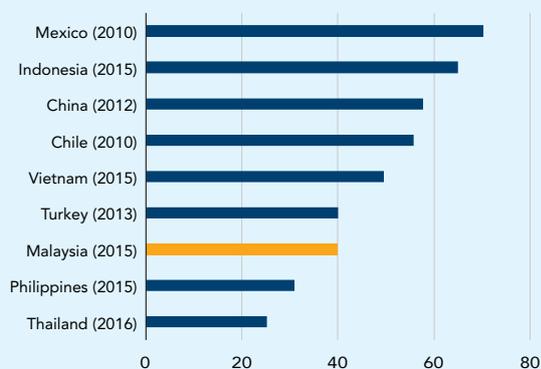
Source: World Bank Enterprise Surveys

**This apparent contradiction between how firms perceive the administrative burden in Malaysia, and how that burden compares to those of similar countries, may be due in part to Malaysia’s close economic links to Singapore, Japan and the United States.** When assessing the administrative costs of doing business, Malaysian firms may be implicitly comparing their situation to that of their counterparts in advanced economies, while firms in peer countries may have a different frame of reference.

**Close to 30 percent of firms surveyed in Malaysia identify competition from the informal sector as the most important obstacle to doing business, yet the share of Malaysian firms that report competing against informal firms is small by the standards of comparable countries (Figure 83).** As with the administrative burden, the difference between how firms perceive informal competition and its actual prevalence may reflect an implicit comparison to advanced economies. Large firms in Malaysia are more likely to identify competition from the informal sector as an important constraint (Figure 84).

**FIGURE 83: The share of firms in Malaysia that report competing against firms in the informal sector is relatively small by the standards of comparable countries...**

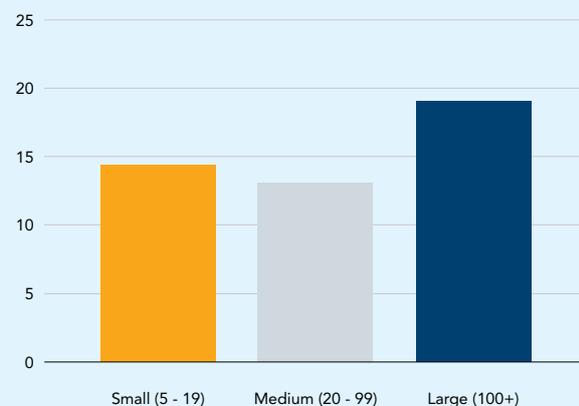
Firms that report competing against unregistered or informal firms (%)



Source: World Bank Enterprise Surveys

**FIGURE 84: ...and larger firms are more likely to identify competition from the informal sector as a constraint to doing business.**

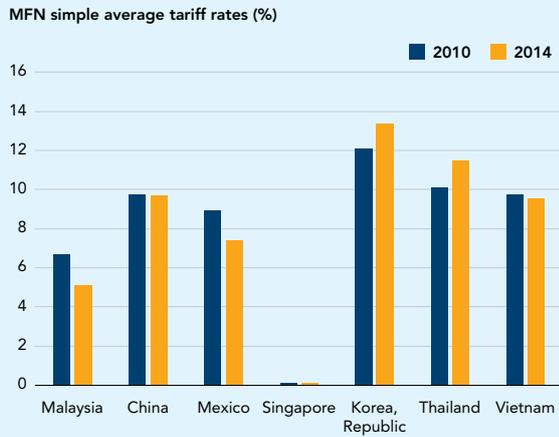
Firms citing competition from the informal sector as a major constraint, 2015 (%)



Source: World Bank Enterprise Surveys

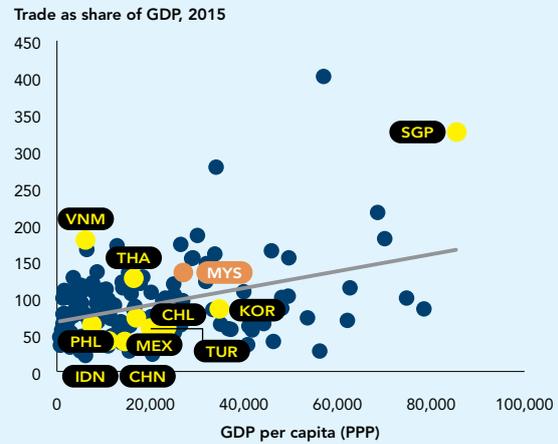
**Malaysia is a highly open economy. It has a relatively liberal trade regime (Figure 85), and it trades more as a share of GDP than most comparator countries (Figure 86).** Malaysia has a diversified export basket (Figure 87), and its largest exports – high-tech manufactured goods – are densely integrated into global value chains (Figure 88). Nevertheless, Malaysia ranked 63rd for trade tariffs in the 2016-17 GCR, despite a general decline in tariff rates. Malaysia’s performance on indicators of nontariff barriers, and the administrative burden of custom procedures, have generally improved over time, despite worsening slightly in 2016-17. Malaysia ranked 41st on rules for FDI, and further regulatory liberalization would encourage more foreign investment.

**FIGURE 85: Malaysia's trade regime is relatively liberal by the standards of comparable countries...**



Source World Integrated Trade Solution (WITS)

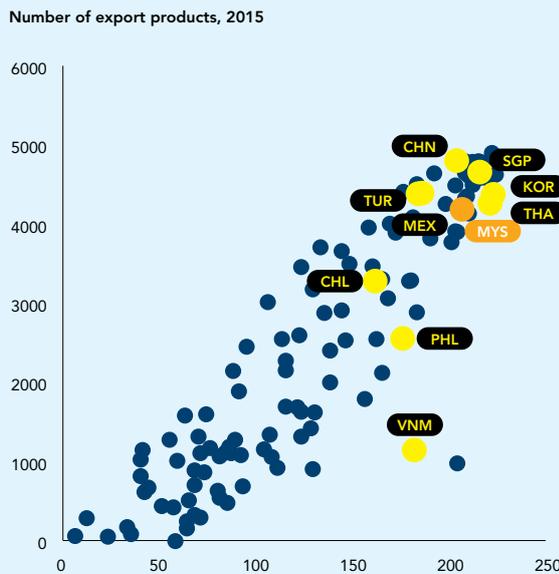
**FIGURE 86: ...and it trades more than most of its peers.**



Source: WITS and WDI

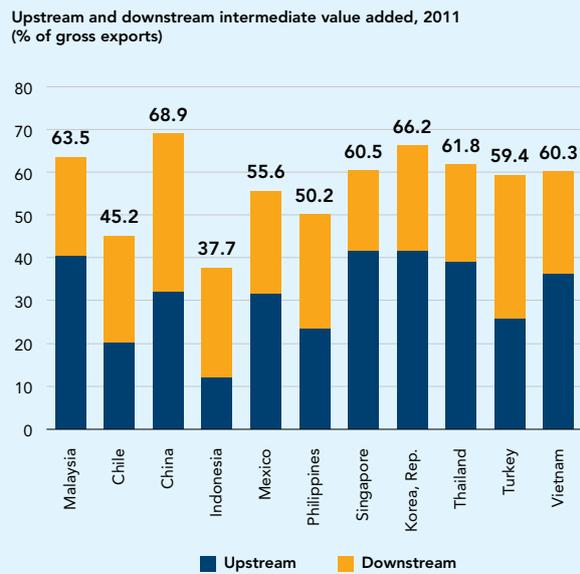
Malaysia performs well in terms of both buyer sophistication and degree of customer orientation, ranking 13th and 18th, respectively, in the 2016-17 GCR. Malaysia's performance on both indicators has broadly improved over time, despite a slight decrease in business sophistication in 2016-17.

**FIGURE 87: Malaysia has a relatively high degree of export diversification...**



Source WITS

**FIGURE 88: ...and Malaysian firms are well-integrated into global value chains.**



Source: Calculations based on OECD-WTO Trade in Value Added database

## Conclusions

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**Malaysia's financial sector is relatively efficient by the standards of comparable countries.** While some indicators have deteriorated in recent years, this trend appears to reflect slowing GDP growth and tighter monetary policies in a more challenging macroeconomic environment. The banking sector, stock market, and bond market are all deep relative to Malaysia's GDP, and the banking sector has a low interest-rate spread. Household access to finance is high, while firm access to bank credit is comparable to that of peer countries. However, a robust insolvency system is crucial to ensure that capital moves easily from less-efficient to more-efficient firms, and Malaysia's insolvency system is weak by international standards. Prospective reforms include the creation of a voluntary debt-restructuring scheme, the establishment of out-of-court arbitration procedures to facilitate corporate restructuring, and the automatic discharge of debts after a given period.

**Malaysia's labor market is also relatively efficient overall.** There are few impediments to hiring and firing workers; firms have a strong capacity to attract and retain talent; pay and performance are closely related; and worker-employer relations are generally cooperative. While most indicators of labor-market efficiency have marginally worsened over the past year, this likely reflects a more adverse macroeconomic climate marked by higher unemployment. However, Malaysia's high redundancy costs and low female labor-force participation rate are more serious structural issues that require policy intervention. Reforming the social-protection system to ensure that retrenched workers have adequate financial resources could help reduce redundancy costs. Moreover, allowing greater flexibility in working hours, expanded work-from-home options, enhanced access to quality childcare, and an increased supply of adult learning and re-skilling opportunities, could boost female labor-force participation. Due to the large share of immigrant workers – both legal and illegal – in the Malaysian labor force, reforming the country's fragmented economic immigration-management system should be regarded as a top priority.

**While Malaysia's goods markets are generally efficient, alleviating constraints on the entry of firms (both foreign and domestic) could increase competition.** Despite Malaysia's relatively-high overall tax rate, and the large share of firms that cite tax administration as a major constraint to doing business, taxation appears to have a very modest impact on investment incentives. Malaysia's domestic market is generally competitive and supported by an effective anti-monopoly policy, but the perceived intensity of local competition is relatively low. Liberalizing rules regarding the entry of foreign firms into the domestic market could increase competition and sharpen efficiency incentives. Malaysia's regulatory burden, as measured by the number of procedures and time required to start a business, is relatively low and has lessened over time, though mandatory GST registration seems to have made starting a business more difficult over the last two years, and processes for obtaining business licenses and permits could be further streamlined. Malaysia's trade regime has facilitated the development of a diversified export basket, and enabled domestic firms to forge strong links to global value chains.



**CHAPTER 4**

# The Evolution of Innovation in Malaysia: Policies, Institutions and Outcomes

**Innovation is a critical component of productivity at the firm, sector, and country level.** The OECD defines innovation as “the implementation of a new or significantly-improved product (good or service), or process, a new marketing method, or a new organizational method in business practice, workplace organization; and external relations.”<sup>104</sup> This chapter examines the impact of innovation on productivity growth in Malaysia. The analysis begins by reviewing the evolution and salient features of Malaysia’s policy and institutional framework for innovation. It identifies key challenges, and highlights areas for reform. The chapter then briefly examines the characteristics of innovative firms in Malaysia, and it concludes by comparing the effectiveness of Malaysia’s innovation policies and institutions against those of comparator countries.

## Innovation Policies and Policy Actors in Malaysia

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**Malaysia’s innovation policies have changed over time to reflect its evolving economy.** The country’s innovation policies initially focused on the production of primary commodities and agricultural production, areas in which Malaysia had a comparative advantage. As the country began to industrialize, innovation policies increasingly focused on manufacturing and services.

**While large-scale foreign direct investment was indisputably positive for Malaysia’s economy, it had the unintended side effect of reducing incentives for domestic innovation.** Domestically-driven industrialization would have intensified innovation incentives, but trade protection encouraged domestic firms to focus on domestic consumers rather than attempting to compete in export markets. Meanwhile, export-oriented foreign firms, such as auto manufacturers, were integrated into global value chains but developed few linkages to the domestic economy. Greater domestic connectivity would have boosted demand for local innovation, but the enclave nature of foreign firms, and their tendency to import productive technologies, reduced incentives to innovate. The government, recognizing that Malaysia’s shift from labor-intensive primary-sector activities to heavy industrialization had spurred only a modest increase in technological development, steadily increased spending on public institutions and programs designed to support innovation.

**As the Malaysian economy industrialized, research and development institutions and innovation programs proliferated.** However, a number of factors have reduced the effectiveness of local innovation initiatives, including (i) limited connectivity between innovation-focused agencies and institutions; (ii) relatively-low investment in research and development (R&D) among small and medium enterprises (SMEs); (iii) the lack of a coordinated national science, technology and innovation (STI) policy; (iv) the inefficient implementation of individual STI strategies and programs; (v) poor prioritization of research funding; (vi) weak oversight and evaluation mechanisms; and (vii) uneven innovation incentives across sectors.

**Malaysia’s policy and institutional framework for STI is highly fragmented, with numerous agencies implementing different strategies financed by different sources.** STI institutions do not always coordinate their efforts, resulting in overlapping mandates. For example, the 10th Malaysia Plan does not clearly define the responsibilities of public research organizations, their respective implementation strategies, or their common objectives. The Malaysian Industry-Government Group for High Technology (MIGHT), and the National Innovation Agency, execute complex programs involving various ministries and public agencies, as well as universities and other research institutions. The large number of actors involved in STI increases the risk of redundancy.

104 See: OECD (2005) and OECD (2010).

**Multiple financing schemes support R&D, and the fragmentation of research funding, reduces its effectiveness.** Numerous institutions and programs provide research grants, and financing is not consolidated or harmonized, which makes information about grants difficult to acquire, and increases the complexity of the application process. In turn, the low profile of research grants, and the lengthy and confusing processes required to obtain them, discourages firms and innovators from seeking out research funding.

## BOX 4

# The Knowledge Economy in Malaysia

Malaysia's knowledge economy encompasses a diverse array of public institutions and private firms, which work together to develop new technologies and adapt them to the demands of a dynamic marketplace. The knowledge economy encompasses:

**Universities:** The government is committed to supporting academic research and promoting greater linkages between academic institutions and the private sector. It is also working to strengthen the protection of intellectual property, and fostering collaborative R&D efforts between the public and private sectors to create and commercialize new technologies.

**Human-Resource Development and Training:** The Malaysian Institute of Human Resource Management was established in 1975, and remains the preeminent authority in the field of human-resource development and training. The institute has trained more than 20,000 professionals, and it offers consultation and support services for both organizations and individuals.

**Financing:** Financial challenges remain a major obstacle to innovation. SMEs mainly use their own capital to finance investment, and many lack access to external financing. Since 2009, the government has attempted to reduce financial obstacles, by offering a tax

exemption to venture capital firms that invest at least 30 percent of their funds in start-ups or firms at early stages of development. In addition, the 11th Malaysia Plan will introduce new financing mechanisms through SME partnership programs, which will combine equity and loan-financing features and provide up to 100 percent of margin financing.

**Engineering Consultancies:** Engineering consultancy firms assist firms in adapting new technologies. The Kazan Smart City, designed by two Malaysian companies, received the Russian 2013 FIABCI Prix d'Excellence award for Master Planning in 2013. The project was developed using the latest advancements in urban planning and engineering, and it was designed to spur investment in technology, medicine, education and tourism.

**Technology Incubators:** The Innovation Incubation Centre and the MAD Incubator are Malaysia's major technology incubators. The Innovation Incubation Centre supports technological entrepreneurship in the renewable energy, information technology, biotechnology and engineering industries. The MAD Incubator is Southeast Asia's largest private business incubator, and it has nurtured the development of more than 500 entrepreneurs across the region since 2009.

Source: Authors

**Frequent organizational restructuring also negatively impacts the effectiveness of innovation policies, as building mutual understanding and trust requires time and effort.** For instance, MIGHT was originally under the purview of the Ministry of Science, Technology and Innovation (MOSTI). In 2011, MIGHT was transferred to the Prime Minister's Department under the Science Advisor to the Prime Minister.

**Malaysia's STI sector includes numerous actors with similar objectives and mandates, which creates redundancy and inefficiency.** Several STI advisory councils have overlapping functions. For instance, the National Science and Research Council formulates national R&D priorities, while the National Innovation Council formulates national STI policies. Moreover, the Global Science and Innovation Advisory Council is also tasked with providing strategic advice on STI.

**Rationalizing the institutional framework for STI could enhance the effectiveness of STI policy.** Efforts to consolidate the sector are underway. The Malaysian Innovation Agency (AIM) harmonizes the programming of 15 agencies and nine ministries. Chaired by MOSTI, AIM reviews all agency budgets to identify duplicative spending. The recently established National Science Council, chaired by the Prime Minister, and the Research Management Agency, endorsed by the 11th Malaysia Plan, aim to align the strategic orientation of the various STI committees, coordinate government-wide STI policy, and manage the allocation of research funding. Reducing administrative fragmentation could greatly enhance the efficiency of Malaysia's STI sector.

**The private sector is not well-integrated into Malaysia's institutional framework for STI.** The government continues to dominate innovation policy, and areas in which the private sector could play an important role, such as private venture capital and equity capital financing, are underdeveloped.<sup>105</sup>

**Recent years have seen an increase in the level of university R&D spending, the number of academic researchers, the number of patents, and the range of academic publications.** However, there is considerable scope to improve the overall quality of academic R&D. There are few platforms for conducting interdisciplinary research, which is critical to innovation. The number of publication citations remains low, collaboration with the private sector is rare, and many research outcomes are not commercialized. The Malaysian Palm Oil Board has the country's highest innovation-commercialization rate at 30.6 percent. Malaysian firms still have difficulty sourcing scientists and engineers from the local labor market, and a lack of highly-skilled local staff is a barrier to innovation in the manufacturing and services sectors.

105 OECD (2016)

**BOX 5**

## **Innovation Policy and Support for SME Development**

**A series of interviews with a small sample of SME owners revealed that lack of funding and limited information on how to apply for funding were among the key challenges to innovation among SMEs.** Only a few of the innovators in Malaysia leverage public resources to develop their ideas and commercialize their findings. Fees for service registration also represent a barrier to innovation among SMEs. Moreover, many grant amounts are not sufficient to cover the total cost of innovation.

**Consolidating information on all available grants, and their respective requirements, in a single administrative office could greatly increase the efficiency of the grant process.** Lack of public awareness regarding the grant process is a major obstacle to innovation, and many potential innovators are unaware of both the funding opportunities available, and the agencies that could assist them in obtaining grants. Applicants often do not understand the grant application guidelines, and fail to provide a strong justification for their projects. Moreover, the individuals and committees tasked with allocating grants may not adequately understand the applicant's industry or sector, and therefore may not fully appreciate the project's value.

**Education and training can enhance innovation capability.** Teaching critical thinking, systems analysis, design theory, information-technology skills, and entrepreneurship, could better equip SME owners and managers with the knowledge base necessary to successfully innovate. Some of these subjects are now being taught through programs such as Genovasi, IB, i-Think and UReka.my, with support from the National Innovation Agency.<sup>106</sup>

Source: Authors

**Most of the commercialization of R&D occurs in public universities, but scientists and researchers have a limited ability to profit from the innovations they create.** While steps have been taken to enable scientists and researchers working in academia to benefit from the products of their research, these measures have not been consistently applied. In some cases, university staff have opted to leave their positions to pursue commercial start-ups. Greater private-sector participation in academic research would increase the dynamism of the STI sector and enhance incentives to innovate. Stronger intellectual-property protections would encourage researchers and doctoral students to focus on areas of practical commercial relevance.

106 "Six Approaches to Innovation." *Agensi Inovasi Malaysia*. N.p., n.d. Web. 21 Mar. 2017.

## Characteristics of Innovative Firms in Malaysia

Since 1995, MOSTI and the Malaysian Science and Technology Information Centre (MASTIC) have periodically conducted a National Survey of Innovation (NSI).<sup>107</sup> The most recent NSI was conducted in 2009-2011. It involved 1,682 firms in the manufacturing and services sectors.<sup>108</sup> 70 percent of the respondent firms met the survey definition of “innovative,” while 30 percent did not. This was a significant improvement from the previous survey (2005-2008), in which only 52 percent of respondent firms met the definition of innovative.<sup>109</sup>

**Large firms tended to innovate the most, while small firms tended to innovate the least.** Access to finance likely influences this correlation, as large firms tend to have more capital to invest in innovation.<sup>110</sup> Access to human capital may also favor innovation among large firms. A larger pool of workers with different backgrounds and skills may promote collaboration, while a more granular division of labor facilitates technical specialization. Large firms are also more likely to be located in cities, where they have access to a large skilled workforce. The most recent NSI found that innovative firms are most often located in Selangor and Kuala Lumpur, Malaysia’s two largest urbanized states/territories.

**Although the previous NSI found similar levels of innovation in the manufacturing and services sectors, the most recent NSI found that services-sector firms were more likely to innovate.** The travel and tourism industry was found to be the most innovative services subsector. However, most services-sector firms spent RM 10,000 or less on innovation activities, while most manufacturing firms spent more than RM 1 million. Moreover, manufacturing firms were three times more likely to innovate by creating wholly new products, while services firms were more likely to innovate by adapting existing products and technologies.

**In both the manufacturing and services sectors, foreign-owned companies tend to be more innovative.** This may reflect their access to superior technology, production techniques, or management capabilities.<sup>111</sup>

## Innovation in Malaysia in Comparative Perspective

**Malaysian firms perform well compared to other ASEAN countries in terms of nontechnical innovation.**<sup>112</sup> Malaysian firms are more likely to introduce nontechnical innovations into their existing operations, including new or improved distribution, organizational, and marketing methods (Figure 89). However, Malaysian firms are less likely to use technical innovation to introduce a new or significantly improved process or production technique than firms in other ASEAN countries. In general, few Malaysian and ASEAN firms spend resources on R&D.

107 Malaysia’s NSI uses the OECD classification of innovation, which distinguishes between “product,” “process,” “marketing,” and “organizational” innovation, and which ranks innovations according to their degree of novelty.

108 National Survey of Innovation 2009-2011 (2012)

109 National Survey of Innovation 2005-2008 (2009)

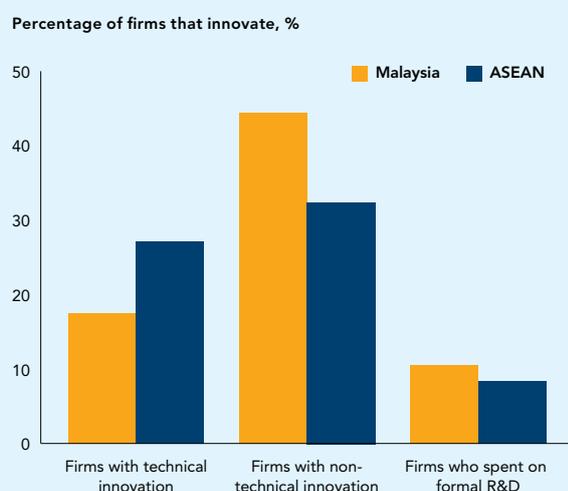
110 World Bank (2010)

111 Further details on the NSIs are presented in Annex 3.

112 World Bank Enterprise Surveys, 2015.

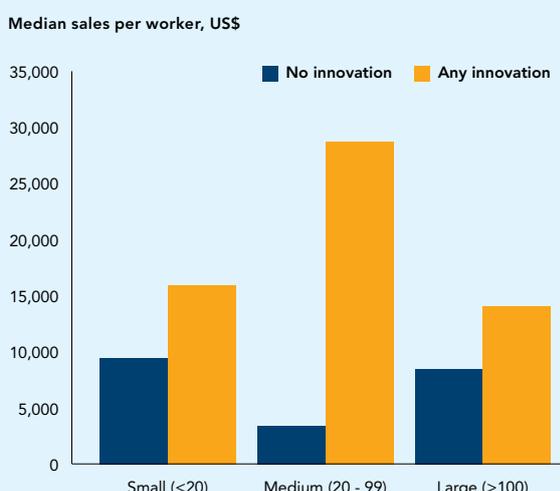
**Malaysian firms that innovate tend to be more productive.** Malaysian firms that have introduced technical innovations generally have higher levels of TFP, and firms that have introduced nontechnical innovations usually have higher rates of labor productivity (Figure 90). Firms that invest in R&D, or provide formal training to their workforce with the specific purpose of encouraging innovation, also have higher rates of labor productivity. The increase in productivity associated with both technical and nontechnical innovation is particularly significant for medium-sized firms. Large firms and exporting firms tend to be more innovative than small firms and non-exporting firms. In Malaysia, large firms are more likely to engage in all three types of innovation: non-technical, technical and R&D. A similar pattern is observed in the other ASEAN countries.

**FIGURE 89: Malaysian firms primarily focus on nontechnical innovation...**



Source: World Bank Enterprise Surveys

**FIGURE 90: ...and productivity is positively associated with all types of innovation.**



Source: World Bank Enterprise Surveys

**The Global Innovation Index (GII) and the Global Competitiveness Index (GCI) can be used to compare the effectiveness of innovation policies and institutions in Malaysia against comparator countries and to evaluate their evolution over time.**<sup>113</sup> The GII has been used to assess the innovation capabilities and performance of countries around the world since 2007. The GII ranks global economies based on over 80 indicators in areas such as R&D, education, information technology and business sophistication. Its indicators are grouped under seven pillars. Five pillars comprise the Innovation Input Sub-Index and capture elements of the national economy that enable innovation: (i) institutions; (ii) human capital and research, (iii) infrastructure, (iv) market sophistication and (v) business sophistication. Two pillars comprise the Innovation Output Sub-Index: (i) knowledge and technology outputs and (ii) creative outputs.

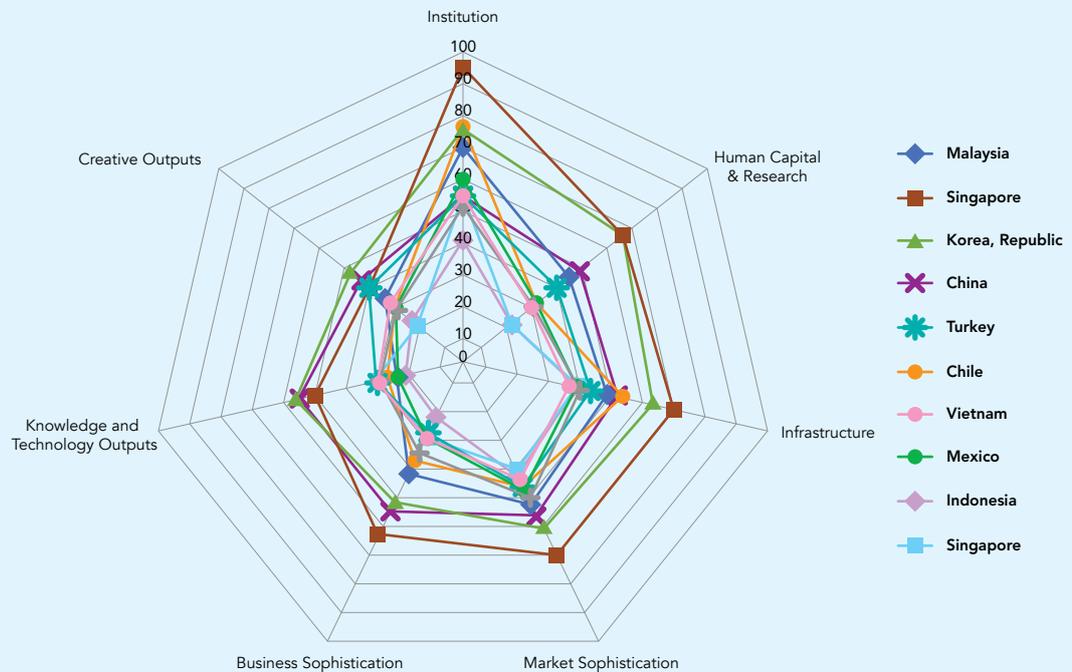
**Malaysia ranked 35th out of 128 economies in the 2016 GII.** Despite a slight decline in its overall ranking, Malaysia remained among the top performing upper-middle-income economies, outperforming many of its wealthier peers (Table 4 and Figure 91). Malaysia's scores for human capital and research, infrastructure and market sophistication improved, reflecting the country's efforts to boost innovation.

113 The GII is co-published by the World Intellectual Property Organisation, Cornell University, and INSEAD.

**TABLE 4: GII Rankings, Malaysia and Comparators, 2016**

Country	2016 Rank
Singapore	6
Republic of Korea	11
China	25
<b>Malaysia</b>	<b>35</b>
Turkey	42
Chile	44
Thailand	52
Vietnam	59
Mexico	61
Philippines	74
Indonesia	88

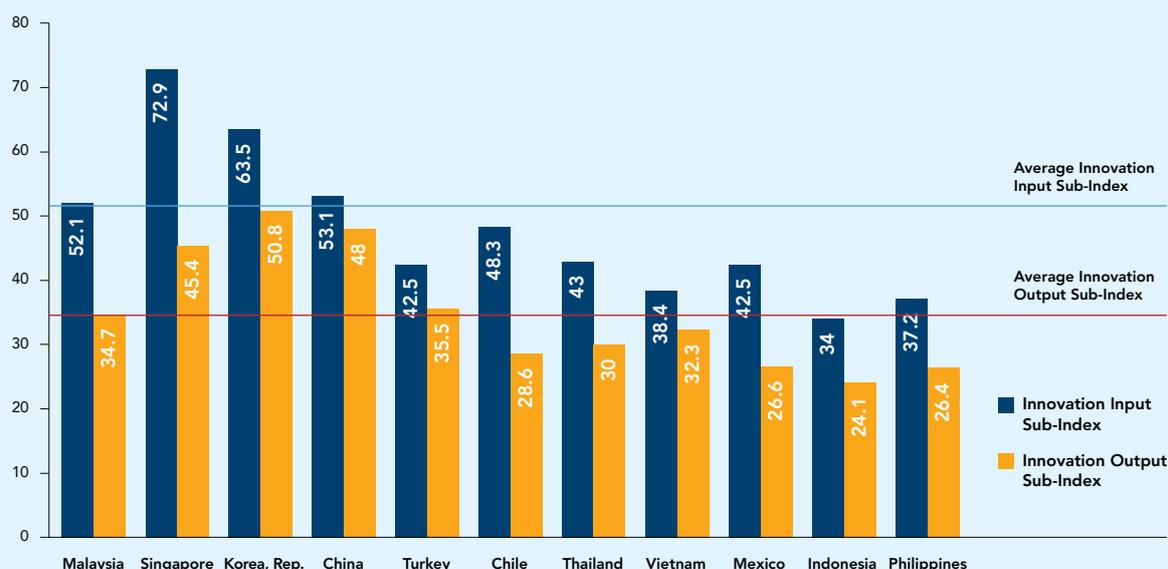
**FIGURE 91: GII Scores, Malaysia and Comparator Countries, 2016**



Source: Global Innovation Index

**Malaysia’s innovation input indicators are above the average for comparator economies, while its innovation output indicators are close to the average.** Singapore performs best on the Innovation Input Sub-Index, followed by Korea and China. Korea performs best on the Innovation Output Sub-Index, followed by China and Singapore (Figure 92).

**FIGURE 92: GII Innovation Input Sub-Index and Innovation Output Sub-Index Scores, Malaysia and Comparator Countries, 2016**



Source: Global Innovation Index

**The innovation-efficiency ratio is defined as a country’s output sub-index score over its input sub-index score.** The ratio reveals how much innovation output a given country generates per unit of input (Table 5). The countries with the highest innovation-efficiency ratios in the GII 2016 were Switzerland (0.94), Sweden (0.86) and the United Kingdom (0.83). Malaysia’s innovation efficiency ratio was 0.67, comparable to the ratios of peer countries such as Singapore (0.62), Indonesia (0.71) and the Philippines (0.71). It should be noted that the innovation-efficiency ratio does not measure total innovation output, only output relative to input.

**TABLE 5: Innovation-Efficiency Ratio, Malaysia and Comparators**

Country	Innovation-Efficiency Ratio
<b>Malaysia</b>	<b>0.67</b>
Singapore	0.62
Korea, Republic	0.80
China	0.90
Turkey	0.84
Chile	0.59
Thailand	0.70
Vietnam	0.84
Mexico	0.63
Indonesia	0.71
Philippines	0.71

Malaysia’s global ranking slid from 31st in the GII 2011 to 35th in the GII 2016 (Table 6). The country’s average score also declined slightly, from 44.1 in 2011 to 43.4 in 2016, and both the innovation input sub-index and the innovation output sub-index scores fell during the period (Table 7 and Figure 93). It should be noted that some sub-indexes were altered slightly between the 2011 and 2016 iterations of the GII.

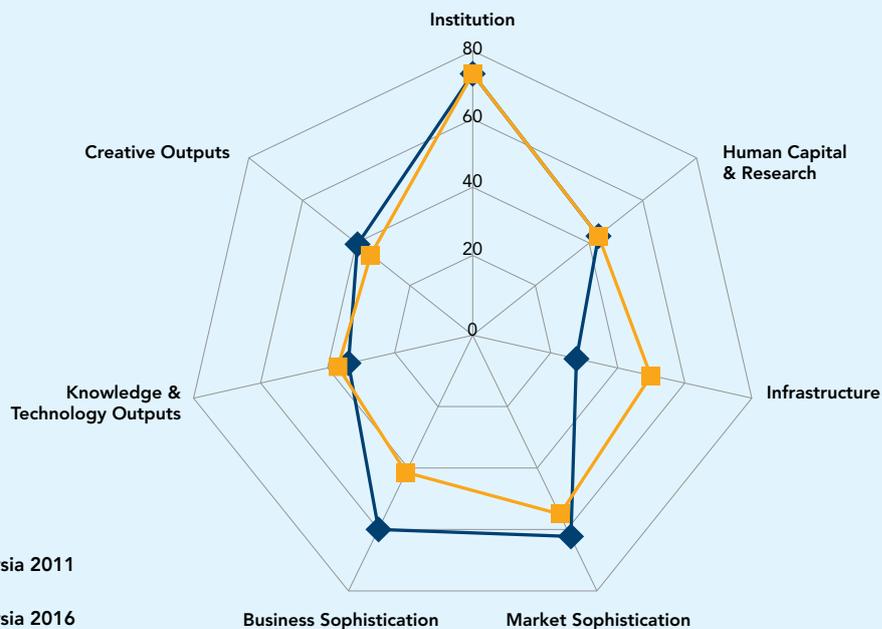
**TABLE 6: GII Rankings, Malaysia, 2011 and 2016**

Year	Rank	Average GII Score	Innovation-Efficiency Ratio	Innovation Input Sub-Index	Innovation Output Sub-Index
Malaysia 2011	31	44.1	0.67	52.9	35.2
Malaysia 2016	35	43.4	0.67	52.1	34.7

**TABLE 7: Malaysia’s GII 2011 and GII 2016 Scores by Pillar**

Year	Institution	Human capital & research	Infra-structure	Market sophistica-tion	Business sophistica-tion	Knowledge & technology outputs	Creative outputs
2016	70.9	43.3	49.2	55	41.8	33.4	35.9
2011	70.5	43.5	30.1	62.1	58.5	30.4	39.9

**FIGURE 93: Malaysia’s 2011 and 2016 GII Scores by Pillar**



Source: Global Innovation Index

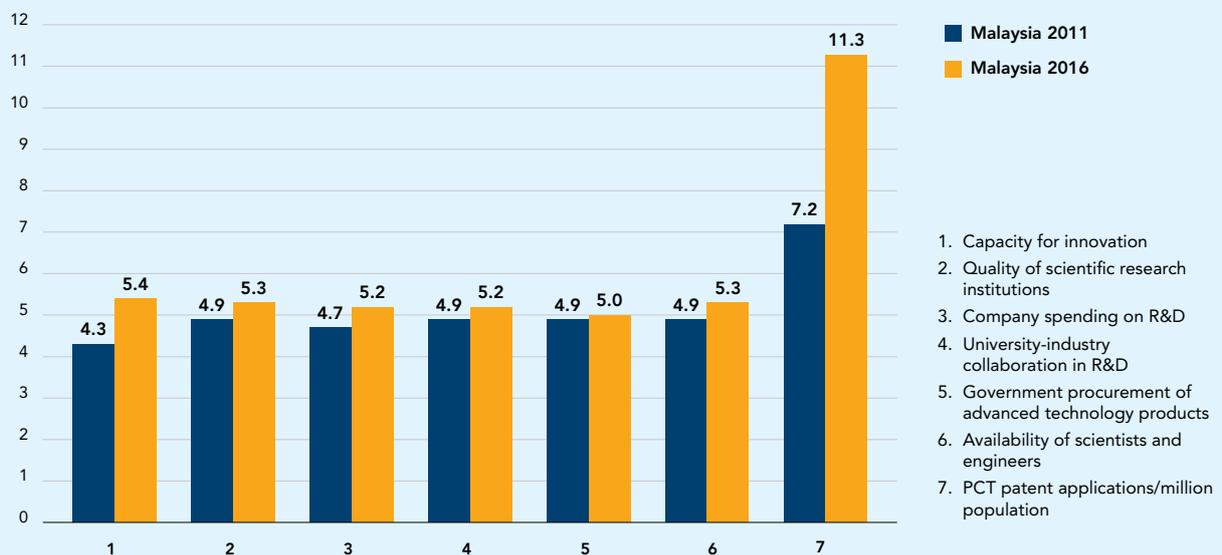
**Malaysia ranked 25th out of 138 countries in the 2016 GCI.** For 35 years the GCI series has shed light on the determinants of economic growth and competitiveness in the global economy. Innovation is one of the 12 dimensions of competitiveness measured by the GCI (Table 8).

**Malaysia’s 2011 and 2016 GCI scores indicate that its economy is becoming more innovative.** Malaysia’s scores for all seven GCI innovation indicators rose between 2011 and 2016, with “capacity for innovation” and “patent applications per capita” showing particular improvement (Figure 94). Among comparator countries, only Singapore and Korea ranked higher on these indicators (Table 9). However, Malaysia’s overall GCI score is gradually declining, underscoring the importance of reforms designed to promote competitiveness.

**TABLE 8: GCI 2016 Rankings, Malaysia and Comparators**

Countries	Rank 2016
Singapore	2
<b>Malaysia</b>	<b>25</b>
Korea, Republic	26
China	28
Chile	33
Thailand	34
Indonesia	41
Mexico	51
Turkey	55
Philippines	57
Vietnam	60

**FIGURE 94: Malaysia’s GCI Scores for Innovation, 2011 and 2016**



Source: Global Competitiveness Index

**TABLE 9: GCI Scores for Innovation Indicators, Malaysia and Comparator Countries, 2016**

Countries	1	2	3	4	5	6	7
Malaysia	5.4	5.3	5.2	5.2	5	5.3	11.3
Singapore	5.2	5.8	5	5.5	4.9	5.2	139.5
Korea, Republic	4.8	4.6	4.5	4.4	3.7	4.4	233.2
China	4.4	4.5	4.4	4.3	4.4	4.7	15.2
Turkey	4.1	3.3	3.3	3.5	3.4	4.3	9.2
Chile	3.9	4.3	2.9	3.5	2.7	4.7	7.5
Thailand	4.1	4.1	3.6	3.8	3.3	4.1	1.4
Vietnam	4	3.4	3.5	3.3	3.8	3.8	0.2
Mexico	4.1	4.3	3.2	3.6	3	4.1	2
Indonesia	4.7	4.4	4.4	4.4	4.3	4.5	0.1
Philippines	4.4	3.8	3.7	3.5	3.1	3.8	0.3

Source: Global Competitiveness Index

Notes: (1) Capacity for innovation; (2) Quality of scientific institutions; (3) Company spending on R&D; (4) University-industry collaboration in R&D; (5) Government procurement of high-tech products; (6) Availability of scientists and engineers; (7) PCT patent applications per million people.

## Conclusions

**While Malaysia's success in promoting innovation is comparable to that of peer countries, policymakers have considerable scope to enhance the impact of pro-innovation policies.** Efforts to deepen linkages between foreign and domestic firms could accelerate technology transfer, and greater trade openness could encourage domestic firms to innovate by intensifying competitive pressures.

**Consolidating the STI sector under the authority of a single government agency could streamline policy implementation to foster innovation.** Aggregating information on research grants and other forms of financial support could boost innovation among entrepreneurs and SMEs. Encouraging collaboration between universities and the private sector could promote the development of new commercial technologies, and strengthening intellectual-property protections could incentivize research in areas with commercial applications. Malaysia's recent efforts to build its capacity to support innovation have achieved mixed results, and a well-coordinated, demand-driven approach could both accelerate innovation and enhance the contribution of pro-innovation policies to productivity and competitiveness.



**CHAPTER 5**

# Education Policies and Outcomes: The Challenges of Adapting Skills to Productivity

**This chapter describes the evolution of Malaysian educational policies, examines challenges in promoting equitable and demand-driven student outcomes, and compares Malaysia's experience to that of its regional and international peers.**

Investment in human capital is a key driver of economic growth, as education and training largely determine the productivity of the labor force. High-income countries tend to have higher levels of education attainment, and empirical evidence indicates that this relationship is at least partially causal – i.e., that greater investment in education leads to faster growth.<sup>114</sup> Malaysia has long maintained high levels of education spending, which have enabled it to achieve near-universal access to primary education and widespread access to secondary education. However, the Malaysian educational system has considerable scope to improve its quality, equity and relevance to the market.

## The Evolution of Malaysian Educational Policies Since Independence

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**Malaysia has repeatedly revised its educational and skills-development policies to meet the changing demands of its economy.** The Razak Report of 1956 laid the groundwork for Malaysia's first National Education Policy. The Education Ordinance of 1957 established a national education system based on a domestically-oriented curriculum, as opposed to the Eurocentric curriculum that characterized education in the colonial period.<sup>115</sup> In line with the contemporary political climate, Malaysian education policy initially concentrated on nation building, but over time its focus gradually shifted to economic development.

**The overall structure of the formal education system has remained largely unchanged since independence, but the delivery of education services has evolved substantially since the 1950s.** The most recent round of education reforms occurred in October 2011, when the Ministry of Education (MoE) began to comprehensively revise the Malaysian educational system in accordance with the National Educational Blueprint for 2013-2025.<sup>116</sup> This reform program will occur in three stages, the first of which (2013-2015) is already complete. Stage two (2016-2020) is currently underway, and the government is laying the groundwork for stage three (2021-2026). Box 7 describes the specific reforms implemented at each stage.

<sup>114</sup> See, e.g.: Schultz (1961); Blaug (1992); Cohn and Johnes (1994); Carnoy (1995a); Psacharopoulos (1996a); and Yussof (2001).

<sup>115</sup> The National Education Policy stated that its aim was to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God, and Malaysian citizens who are knowledgeable and competent and who are responsible and capable of achieving high levels of personal well-being and contributing to the harmony and betterment of the family, the society and the nation at large. (National Education Philosophy, 1988).

<sup>116</sup> Malaysia Education Blueprint (2013).

**BOX 6**



## The Formal Education System in Malaysia

**Malaysia's formal education system closely reflects the British distribution of school levels:**

- i. Pre-school (0-6 years old)
- ii. Primary education (7-12 years old)
- iii. Lower secondary education (13-15 years old)
- iv. Upper secondary education (16-17 years old)
- v. Tertiary education (18 years old and above)

**Government schools offer free primary, lower secondary and upper secondary education, but only primary education is compulsory.** National schools (sekolah kebangsaan) teach in Bahasa Malaysia, while national-type schools (sekolah jenis kebangsaan, SJKs) teach in Mandarin or Tamil. After six years, all students take the Primary School Assessment Test (Ujian Pencapaian Sekolah Rendah, UPSR) to gain a primary education certificate. Depending on the UPSR results, graduates of national-type schools may be required to take an additional year of schooling to gain proficiency in Bahasa Malaysia and become eligible for secondary education.

**After completing three years of lower secondary education, all students take an examination to receive their lower education certificate.** Based on the results of this examination, students are then enrolled in academic, technical, vocational or Koranic schools. Upper secondary education lasts two years. Students on the academic and technical tracks take the Malaysian Certificate of Education (Sijil Pelajaran Malaysia, SPM) examination, while those on the vocational track take the Malaysian Certificate of Vocational Education examination.

Source: Malaysia Education Policy Review Abridged Report. 1st ed., 2013

## BOX 7

## The Three Reform Stages under the National Education Blueprint (2013-2025)

### **Stage 1 (2013-2015): Support teacher training, focusing on core pedagogical skills.**

Reforms undertaken during this stage aim to rapidly improve the skills of the existing pool of teachers, enhance school leadership quality by strengthening the system for appointing and training principals, raise student literacy rates both in Bahasa Malaysia and English, and promote numeracy through intensive remedial programs. The MoE will also empower state and district officers to improve the quality of frontline school support. By the end of the first stage, the MoE will ensure that all teachers, principals and schools have achieved a minimum quality standard.

### **Stage 2 (2016-2020): Accelerate the pace of structural reform.**

Measures implemented during this stage include moving all 410,000 teachers and 10,000 principals into a new career-track system, restructuring the federal, state and district education offices to conform with the revised roles established during stage one, and introducing a standard secondary and revised primary curriculum that reflect the knowledge, skills, and values necessary to thrive in today's global economy.

### **Stage 3 (2021-2025): Pursue educational excellence through increased operational flexibility.**

By the beginning of the third stage, all schools, teachers and principals should be performing well above the minimum standard. The MoE will therefore focus on increasing operational flexibility to cultivate a peer-led culture of professional excellence. The MoE will also shift most schools to a school-based management model, and it will scale up successful models of instructional innovation. The goal of these reforms will be to create a self-sustaining system that is capable of rapid innovation.

Source: National Education Blueprint (2013)

**The role of English as an instructional language has evolved over time.** Since independence, much of Malaysia's population has been bilingual in Bahasa Malaysia and English, with Tamil and Mandarin also widely spoken. Beginning with the 1957 reform, these four languages were used in schools that catered to different ethnolinguistic groups. In 1970, however, English was replaced by Bahasa Malaysia in all primary schools. The policy seems to have had a positive effect on the job and wage prospects of ethnic Malay students.<sup>117</sup> Given that the fraction of the student population was already at around 100 percent, no change occurred, as well as the fraction that was literate, but overall educational improvement was attained.

**By 2003 English was reintroduced as the language for teaching science and mathematics in primary and secondary schools.** The stated objective of this reform was to promote greater scientific achievement and improve English language fluency. However, the initial outcomes of this policy were negative, as standardized scores in sciences and math fell consistently.<sup>118</sup>

<sup>117</sup> World Bank (2014b).

<sup>118</sup> Ibid.

## Technical and Vocational Education and Training in Malaysia

**Technical and Vocational Education and Training (TVET) includes various types of formal and informal learning designed to equip workers with the knowledge and skills demanded by the labor market.<sup>119</sup>**

During the implementation of the 10th Malaysia Plan 2011-2015, the country successfully mainstreamed TVET and expanded access to quality TVET programs.<sup>120</sup> The Department of Skills Development, part of the Ministry of Human Resources, established 22 industry-led bodies to align the TVET curriculum with industry requirements and design occupational skills standards. The industry-led bodies developed a total of 582 standards and 16 occupational analyses for reference by TVET institutions. In addition, the National Dual Training System has provided industry-oriented workforce training to over 63,000 workers since its introduction in 2004. Another 38,000 workers, including 12,835 new labor-market entrants, benefited from TVET projects executed under the 10th Malaysia Plan. Annual enrolment in TVET programs increased from 113,000 in 2010 to 164,000 in 2013.

### BOX 8

## The Five Pillars of Malaysia's TVET System

**The first pillar of Malaysia's TVET system is public higher education, which caters mainly to students who passed their SPM examination.** This includes polytechnics and community colleges run by the Ministry of Higher Education, technical schools run by the MoE, and training institutions run by the Ministry of Human Resources, the Ministry of Entrepreneurial Development and the Ministry of Youth & Sports.

**The second pillar is the Malaysian Skills Qualification Framework,** a five-tiered skill-certification system based on the National Occupational Skills Standard, which was introduced by the National Vocational Training Council in 1993.

**The third pillar is company-based training financed by the Human Resource Development Fund,** which was established in 1993 to promote workforce training.

**The fourth pillar is private higher education,** which largely consists of institutions governed by the Private Higher Education Institutions Act of 1996 and accredited by the National Accreditation Board.

**The fifth pillar is continuing education and training,** which focuses on adult education, skills upgrading, retraining, and career advancement.

Source: Pang (2010)

<sup>119</sup> According to UNESCO (2016), TVET involves "in addition to general education, the study of technologies and related sciences as well as the acquisition of practical skills, attitudes, understanding, and knowledge relating to occupations in various sectors of economics and social life."

<sup>120</sup> The 11th Malaysia Plan (2015)

**The conversion of 72 vocational schools and eight technical schools run by the MoE into vocational colleges, and the establishment of eight new colleges, significantly altered the TVET system.** These new institutions offer students the opportunity to begin TVET education as early as age 16, and to graduate with a diploma. From 2011 to 2014, 19,747 students reportedly enrolled in these institutions, and the first cohort of 2,700 students graduated in 2016. The vocational college curriculum is also offered in partnership with other public TVET institutions, including Institut Latihan Perindustrian, which operates under the Ministry of Human Resources. The establishment of eight new satellite campuses boosted the capacity of the Centre for Instructor and Advanced Skill Training, and the number of certified vocational instructors rose from 1,460 in 2010 to 3,060 in 2014.

**The 11th Malaysia Plan 2016-2020 estimates that 60 percent of the 1.5 million jobs that will be created during its implementation period will require TVET-related skills.** Meeting this demand will require Malaysia to increase annual TVET enrolment from 164,000 in 2013 to 225,000 in 2020. Recognizing the importance of TVET, the government will focus on four key objectives: (i) improving labor-market efficiency to accelerate economic growth, (ii) transforming TVET to meet industry demand, (iii) strengthening lifelong learning to promote skills enhancement, and (iv) improving the quality of education to support better student outcomes and higher institutional quality. The 2017 budget allocated RM 4.6 billion to TVET institutions, with the express goal of enabling the domestic workforce to meet the requirements of industry.<sup>121</sup>

**Despite improvements in the quality and quantity of TVET programs, graduates often have difficulty finding permanent employment.** In addition, higher-wage jobs increasingly require more sophisticated technical specialization. As a result, investment in TVET yields lower returns than other forms of higher education.<sup>122</sup> As in many other areas of public policy in Malaysia, TVET programs suffer from administrative fragmentation. Numerous ministries and public agencies are active in the sector, which includes more than 1,000 public and private TVET institutions offering programs of varying standards. Limited coordination reduces the effectiveness of TVET policies, programs and institutions.

**Survey data indicate an ongoing disconnect between workforce skills and employer demand.** Industry feedback consistently reveals a disconnect between the knowledge, skills, and attitudes that graduates possess, and those required by employers.<sup>123</sup> Collaboration between private firms and TVET institutions is insufficient to develop high-quality programs. Moreover, many students regard TVET as less attractive than other education options.<sup>124</sup>

121 Prime Minister of Malaysia, Budget Speech (2016).

122 World Bank (2014b).

123 The 11th Malaysia Plan (2015).

124 TVET Malaysia (2016).

## Promoting Equity in Educational Attainment

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**Challenges also remain in achieving equitable student outcomes.** States with a higher proportion of rural schools, like Sabah and Sarawak, tend to underperform states with fewer rural schools.<sup>125</sup> Students in urban schools score an average of four percentage points higher on the UPSR examination than students in rural schools, and this gap widens to eight percentage points for the SPM examination. However, these gaps have narrowed by five percentage points and two percentage points, respectively, over the past six years.

**The UPSR achievement gap between national schools and SJKs has also narrowed over time.** Over the past five years, the gap between national schools and Tamil-language SKJs fell from eight percentage points to four percentage points. The gap between national schools and Mandarin-language SJKs is insignificant.

**By contrast, the gender gap is large and has widened over the past five years.** Girls consistently outperform boys at every level. The gap is narrowest at the UPSR level and increases steadily through the university level, where female students comprise approximately 70 percent of all students. While this phenomenon is not unique to Malaysia, policymakers must take steps to ensure that the improving performance of female students does not reflect declining educational attainment among male students.

**Socioeconomic status continues to drive the largest equity gap in educational attainment.** This gap is evident across three dimensions of socioeconomic status: the highest level of educational attainment by the student's parents, the average household income level in the student's home state, and the percentage of students in the state receiving basic financial assistance under the Poor Students' Trust Fund (Kumpulan Wang Amanah Pelajar Miskin). In all cases, the evidence consistently demonstrates that students from lower-income backgrounds are less likely to perform as well as students from middle- or high-income backgrounds.<sup>126</sup>

## The Role of the Private Sector as an Education Provider

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**While public schools provide most education services in Malaysia, the private sector plays an increasingly important role.** Private schools have proven abler to adapt their curricula to changing employer requirements, and they offer students greater flexibility through part-time courses and online programs. Private higher-education institutions (PHEIs) focused on pre-university programs in the 1970s, twinning, external degrees and professional programs in the 1980s, and 3+0 programs and local degrees in the late 1990s. In the 2000s, PHEIs became change agents promoting the democratization and internationalization of Malaysian higher education.<sup>127</sup>

**The implementation of the New Economic Policy (NEP) in 1970 greatly influenced the development of PHEI.** The NEP introduced a racial quota system for admission to PHEIs, and it restricted the ability of

125 EPU (2015).

126 Ibid.

127 Arokiasamy and Ong (2008). Twinning and 3+0 programs refer to college education in Malaysia in conjunction with a university abroad, by which students obtain college degrees that are validated by the university abroad together with a local university. Twinning usually implies studying abroad for at least a year, while 3+0 is only local but under the same arrangement with a university abroad.

PHEIs to confer degrees. The objective of the quota system was to increase the participation of “Bumiputra” (members of ethnic groups indigenous to Malaysia) in higher education. In the 1970s and 1980s, the quota system prompted many non-Bumiputra students to seek higher education overseas. PHEIs began providing pre-university courses for students planning to study abroad, as well as TVET courses for students planning to remain in the country. Numerous professional degree programs, such as the Malaysian Institute of Certified Public Accountants and the Chartered Institute of Management Accountants, were established during this period. Foreign universities also offer external degree programs for Malaysian students. For example, the University of London offers an external law degree, and the Association of Chartered Certified Accountants in the United Kingdom offers external degrees in accounting.

**The growth of these and other private institutions has expanded access to higher education.** Private institutions generally impose lower entry requirements and offer more diverse programs, including specialized programs not offered by PHEIs and internationally-accredited programs. Private institutions also allow students greater flexibility to work and study at the same time through part-time or online courses, variable study durations, and other options for obtaining a degree at a pace convenient for the student. Private institutions are now located across Malaysia, and many offer online or distance-learning programs.

## The Role of Education in an Evolving Global Economy

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**In a dynamic global marketplace, the ability to access information, communicate across languages, and utilize and create new technologies, are critical to productivity.** Workers skilled in ICT are in high demand, both in Malaysia and worldwide, yet education systems have been slow to adapt to this demand. International trade has also increased the economic value of language skills, especially English, as well as other global languages such as Arabic and Spanish, and major regional languages such as Japanese and Chinese.

**In addition, entrepreneurial skills play a crucial role in business formalization and private-sector competition.** Entrepreneurship requires so-called “higher-order skills,” including the ability to apply knowledge creatively and solve complex problems.<sup>128</sup> Both employers and entrepreneurs increasingly require a combination of technical skills and “soft skills,” such as teamwork, leadership and communication. Malaysia, like developed and developing countries around the world, must continuously adapt its education system to meet the needs of a fast-paced global economy.

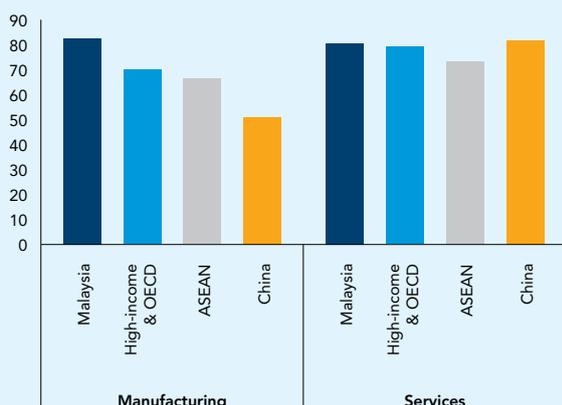
<sup>128</sup> Sondergaard and Murthi (2012).

## Education and Skills Development in Malaysia in Comparative Perspective

**Malaysian workers are more educated, on average, than workers in comparator countries.** The most recent World Bank Enterprise Surveys found that 81 percent of Malaysian employees had completed secondary education, compared to 76 percent in high-income and OECD economies, 71 percent in ASEAN economies, and 66 percent in China. The share of workers with secondary education was especially high among Malaysian manufacturing firms, while the share among firms in the services sector was similar to that of comparator countries. Within Malaysia’s manufacturing sector, the average education level among production workers was similar to that of their counterparts in comparator countries (Figure 96).

**FIGURE 95: Malaysia’s manufacturing firms have a larger share of workers with secondary education...**

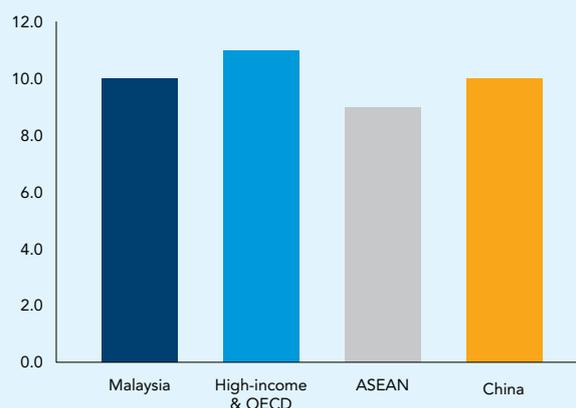
Share of secondary educated workers, % of total workers



Source: World Bank Enterprise Surveys

**FIGURE 96: ...but the average education level among production workers is similar to that of other countries.**

Avg. no. of years of education for production workers in manufacturing



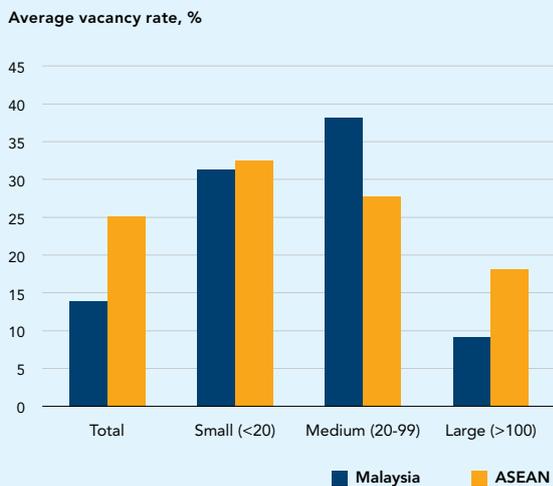
Source: World Bank Enterprise Surveys

**Malaysian firms report lower vacancy rates than firms in other ASEAN countries.**<sup>129</sup> In Malaysia, only 14 percent of surveyed firms reported having vacancies in the last two years, compared to 25 percent of surveyed firms in other ASEAN countries. Furthermore, vacancies in other ASEAN countries represented, on average, 17 percent of a firm’s current size, while in Malaysia vacancies represented just 11 percent. This low vacancy rate may indicate that the Malaysian labor market is less dynamic than others in the region (Figure 97). Medium-sized firms in Malaysia reported higher vacancy rates than firms in other ASEAN countries, while large Malaysian firms reported significantly lower vacancy rates.

<sup>129</sup> The vacancy rate is calculated as the number of vacancies divided by firm size. Comparable statistics are not available for China or for high-income and OECD economies.

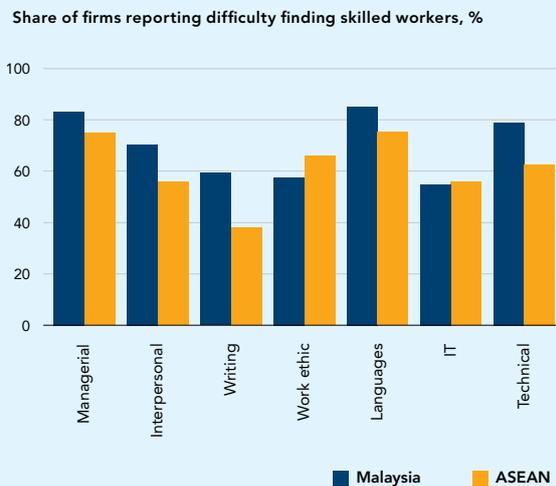
**Despite their lower vacancy rates, Malaysian firms are more likely to face difficulties in identifying workers with specific skills.** Between 79 and 85 percent of firms with vacancies reported that finding workers with the necessary technical, managerial, or foreign-language skills was either “difficult” or “very difficult” (Figure 98). Small domestically-owned firms were more likely to report such difficulties than large firms with at least a 10 percent foreign-ownership stake. Firms that reported having vacancies within the past two years experienced lower rates of labor productivity while trying to fill these vacancies. After controlling for several firm characteristics, firms that reported hiring problems had much lower labor-productivity levels than firms that reported no hiring problems.<sup>130</sup>

**FIGURE 97: Malaysian firms have lower average vacancy rates than ASEAN comparators...**



Source: World Bank Enterprise Surveys

**FIGURE 98: ...but they report having greater difficulty identifying workers with adequate skills.**



Source: World Bank Enterprise Surveys

130 Firms reported the following problems: there were few or no applicants; applicants lacked required skills; applicants expected higher wages than the establishment could offer and applicants did not like the firm’s working conditions.

The regression covariates include the sector, region, experience level of the top manager, and whether the establishment exports, is foreign-owned, or is part of a multi-establishment firm.

## BOX 9

## Further Evidence of Skills Mismatches in the Malaysian Labor Market

**Alternative measures of skills mismatch in the Malaysian labor market complement the data obtained from the Enterprise Surveys.** The average education level of the Malaysian labor force has increased considerably in recent decades. While tertiary school enrolment in Malaysia is still well below the OECD average, the share of the workforce with tertiary education increased markedly between 1990 and 2014. Among Malaysian workers between the ages of 25 and 35, only three percent had completed a university degree in 1990. By 2014, this share had risen to 17 percent.<sup>131</sup> In 2013, Malaysia's tertiary school enrolment rate was 38 percent, slightly above the average of 37 percent for upper-middle-income countries, but still well below the OECD average of 70 percent.

**Recent trends in the Malaysian labor market confirm that skills mismatches could slow the country's transition to high-income status.** The 2011 National Economic Return Survey found that many Malaysian firms report skill deficits in the labor force. More than 15 percent of surveyed employers reported a lack of technical skills in the workforce. There is also evidence that firms that innovate, export, and invest in research and development are generally more likely to report difficulty finding skilled workers.<sup>132</sup> This skills gap is confirmed by a Grant Thornton International Business Report survey, which found that 62 percent of Malaysian firms reported having difficulty finding skilled workers, slightly lower than the averages for Australia (68 percent) and Canada (65 percent), but higher than those for Japan and Singapore (both 56 percent).

**The apparent skills mismatch in the Malaysian labor market are not the result of inadequate government spending on education and training.** In fact, Malaysia spends more on education and TVET programs than many comparable countries. In 2013, the Malaysian government spent RM54 billion, or six percent of GDP, on education and training, 22 percent of which went to public universities, as well as over RM4.1 billion on post-secondary TVET programs. The National Economic Return Survey found that more than two-thirds of registered firms spent funds on staff training, and firms that trained their staff reported greater skill deficits. This correlation suggests that firms resort to training to overcome skill deficits. An initial analysis shows that training is positively correlated with worker productivity after controlling for firm and worker characteristics, and that training by institutions other than the firm led to substantially higher productivity gains than in-house training.

**The survey also showed that both fast-growing firms and firms reporting shortages of skilled workers were more likely to recruit new workers.** More job openings were reported for professional and technical workers than for unskilled workers, and most firm-sponsored training was for workers in technical positions. Thus, it appears that firms are attempting to close their skill deficits through a combination of training and recruitment.

Source: Authors

<sup>131</sup> These figures are based on Labor Force Survey data.

<sup>132</sup> High-flying firms are defined as firms that innovate, export, and invest in research and development.

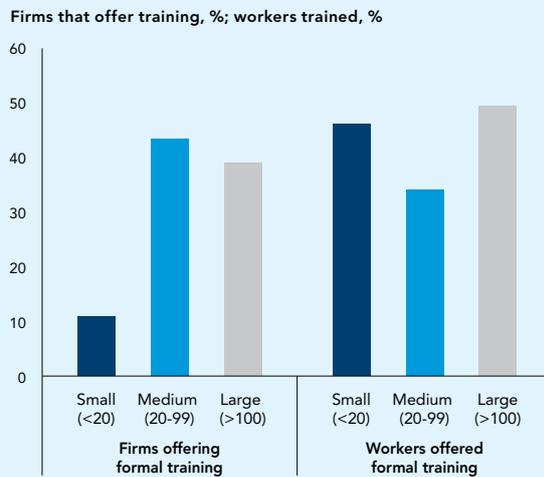
**Malaysian firms are less likely to train their workers than firms in other countries.** Only 19 percent of Malaysian firms provide formal worker training, slightly less than the ASEAN average and far below the rates of high-income and OECD economies and China (Figure 99). In addition, Malaysian manufacturing firms that provide training report offering it to only 44 percent of their workers, compared to 85 percent of workers in China, 60 percent in other ASEAN countries and 57 percent in high-income and OECD economies. Small firms are also much less likely to offer formal training than medium-sized and large firms. Only 11 percent of small firms in Malaysia train their workers, compared to 44 percent of medium-sized firms, and 39 percent of large firms (Figure 100). Small and medium enterprises (SMEs) that offer formal training tend to have higher rates of labor productivity (Figure 101) and total factor productivity (TFP) (Figure 102).

**FIGURE 99: Malaysian firms are less likely to provide training and tend to train fewer workers**



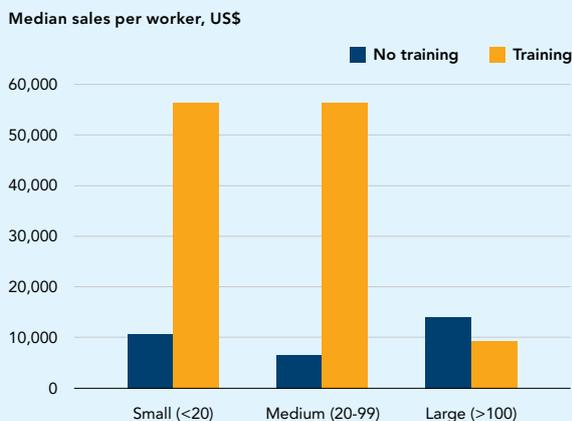
Source: World Bank Enterprise Surveys

**FIGURE 100: Small Malaysian firms are especially unlikely to train their workforce**



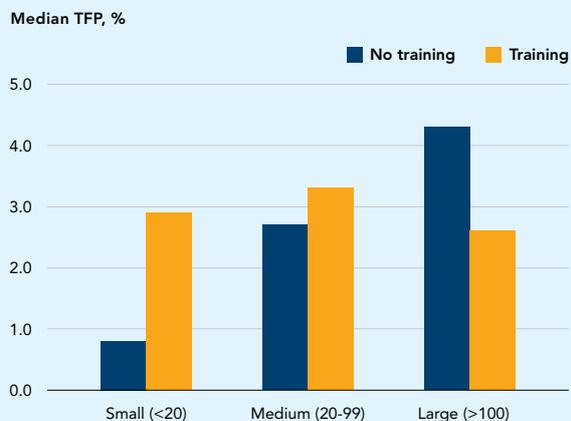
Source: World Bank Enterprise Surveys

**FIGURE 101: Malaysian SMEs that provide training tend to have higher labor productivity...**



Source: World Bank Enterprise Surveys

**FIGURE 102: ...as well as higher TFP relative to firms that do not offer training.**



Source: World Bank Enterprise Surveys

## Malaysia's Educational Outcomes in International Perspective

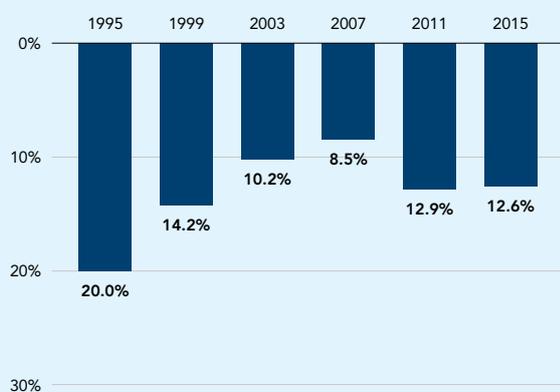
Over the past two decades, international student assessments such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) have emerged as a means of directly comparing the quality of educational outcomes across different systems. These assessments examine a variety of cognitive skills, such as applied knowledge and reasoning. The TIMSS is based on the mathematics and science curricula of schools around the world. It assesses students in Grades 4-8 (the Malaysian equivalent is Primary Four through Form Two) on two dimensions of learning: knowledge of content, such as algebra and geometry; and cognitive skills, such as critical thinking. The TIMSS was introduced in 1995. Today, over 59 countries administer in the assessment, which is conducted every four years. Malaysia has administered the TIMSS since 1999, although only Eighth Grade (Form Two) students participate.

When Malaysia first administered in TIMSS in 1999, its average student score was higher than the international average for both mathematics and science. By 2011, the most recent TIMSS for which data are available, its average score had slipped to below the international average for both mathematics and science, with a commensurate drop in Malaysia's global ranking. Critically, 35 percent and 38 percent of Malaysian students failed to meet the minimum proficiency levels in mathematics and science, respectively, up from seven percent and 13 percent in 1999. These students were assessed as possessing only limited mastery of basic mathematical and scientific concepts.

Malaysia's science scores have significantly improved in absolute terms since 1995, but since 2007 Malaysia's scores have fallen slightly relatively to those of the world's best-performing country. The

**FIGURE 103: Science scores have improved in relative terms since 1995...**

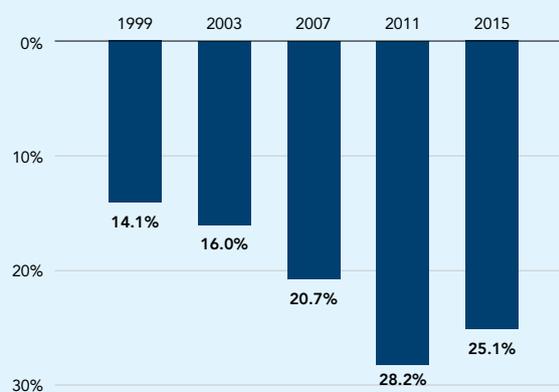
Average eighth-grade science scores in Malaysia versus the average scores of the best-performing country (% deviation)



Source: TIMSS

**FIGURE 104: ...while math scores have fallen both in absolute and relative terms.**

Average eighth-grade math scores in Malaysia versus the average scores of the best-performing country (% deviation)



Source: TIMSS

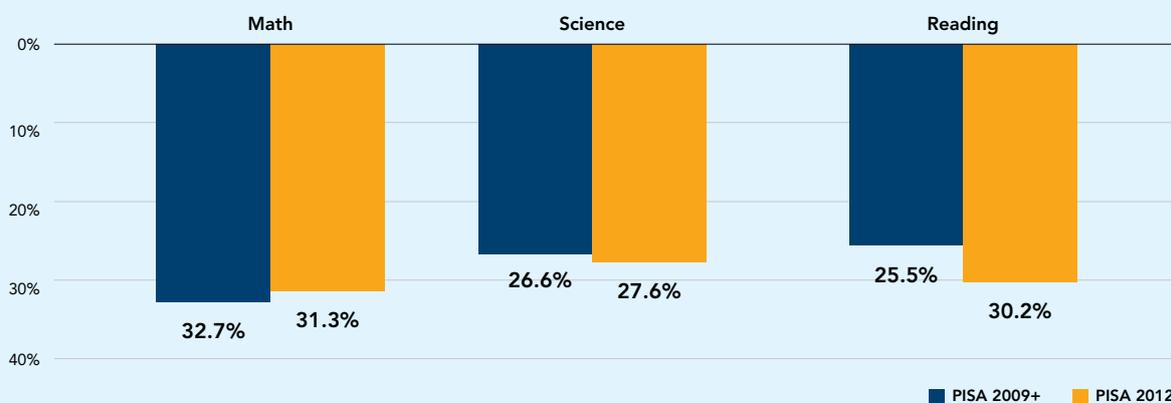
country's mathematics scores, however, declined steadily between 1999 and 2011, and improved only slightly in 2015. As noted above, the 2003 change in language policy had a clear negative effect on both science and mathematics scores, as the language used to teach those subjects, English, was not the native language of most students.<sup>133</sup> The government reversed its language policy in 2012, and while the 2015 scores for both mathematics and science show improvement, the effects of this policy change remain inconclusive.

**The PISA is another widely recognized international assessment.** Coordinated by the OECD and conducted every three years, the PISA evaluates proficiency in reading, mathematics and science among 15-year-old students. Its focus is not on curriculum content, but on students' ability to apply their knowledge in real-world settings. Not all participants are OECD members, and 74 countries took part in the most recent assessment in 2009. Malaysia participated for the first time in 2010 as part of the 2009 PISA assessment cycle.

**The results of the 2009+ PISA were discouraging.**<sup>134</sup> Malaysia ranked in the bottom third of participating countries and well below the OECD average (Figure 105). Almost 60 percent of Malaysian students failed to meet the minimum proficiency level in mathematics, while 44 percent and 43 percent did not meet the minimum proficiency levels in reading and science, respectively. A difference of 38 points on the PISA scale is equivalent to one year of schooling. A comparison of scores shows that 15-year-olds in Singapore, South Korea, Hong Kong and Shanghai are performing as though they have had three or more years of schooling than 15-year-olds in Malaysia.

**The 2012 PISA showed only a marginal improvement in mathematics proficiency and a further decline in science and reading proficiency.** While Malaysia's mathematics score improved, it remained over 30 percent below the score for the top-performing country. Meanwhile, science and reading scores fell, with the reading score dropping by an especially significant margin.

**FIGURE 105: Malaysia's mathematics scores improved marginally between the 2009 and 2012 PISAs, but its science and reading scores fell**



Source: OECD and PISA

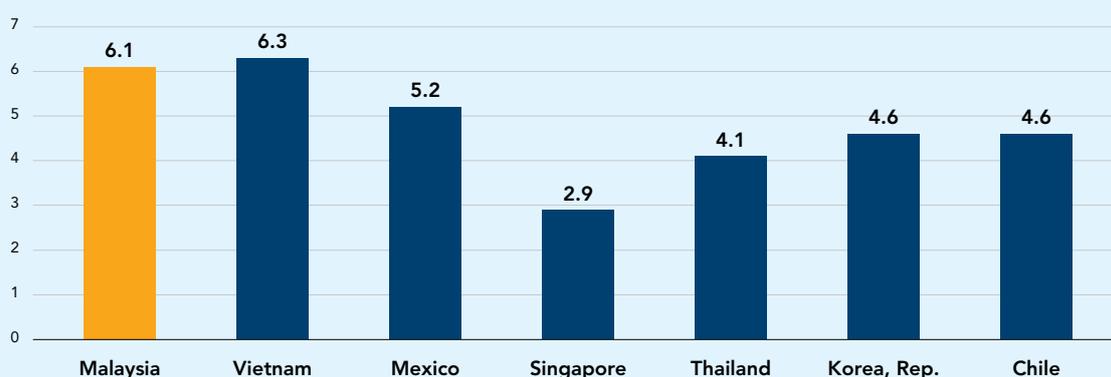
<sup>133</sup> World Bank (2014b).

<sup>134</sup> The term 2009+ refers to the fact that Malaysia, with some other countries, were included in the 2009 assessment with an exam that was actually taken in 2010.

## Public Spending and Educational Outcomes

**Public education spending in Malaysia reached 6.1 percent of GDP in 2013, one of the highest levels in the region and second only to Vietnam.** Public education spending has been consistently high since the 1980s, at around 5-6 percent of GDP. One-third of public education spending, or 2.1 percent of GDP, is devoted to tertiary education. This is atypical in the region, as most of Malaysia’s peer countries spend a plurality of their education budget on secondary education, except for Singapore. By contrast, Vietnam devotes almost half of its education budget to secondary education.<sup>135</sup>

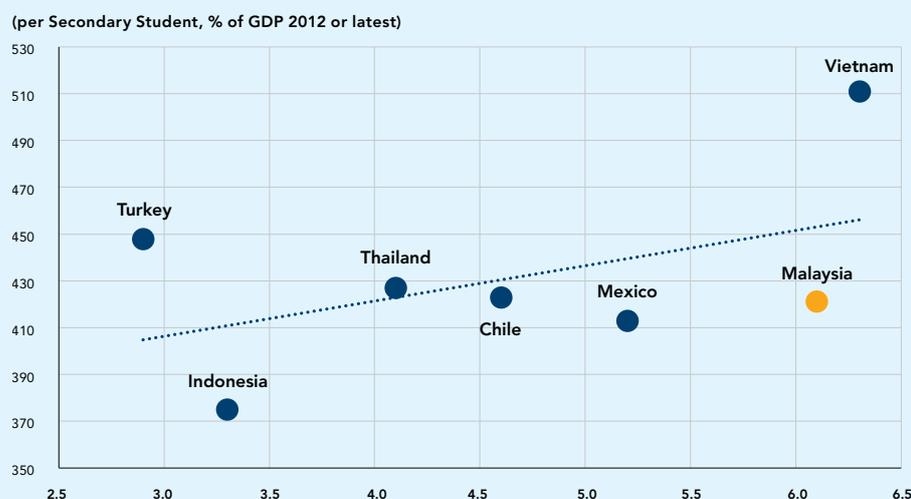
**FIGURE 106: Government Expenditure on Education, by Country (% GDP, 2013 or latest)**



Source: WDI

**Educational outcomes are based on broad indicators, but they systematically correlate with the amount of resources spent on education.** Higher levels of educational attainment are also reflected by an increase in the average number of years of completed formal education, from 10.2 in 2005 to 11 in 2016. Primary enrolment is nearly universal, while the lower secondary enrolment rate is high at around 83 percent.<sup>136</sup> The tertiary enrolment rate has gradually increased, rising from 37 percent in 2015 to 39 percent in 2016.

**FIGURE 107: PISA 2012 Mathematics Score vs. Government Spending on Education**



Source: World Bank, OECD  
 Note: Singapore and Republic of Korea are excluded due to high outlier effect

<sup>135</sup> World Bank, 2013.

<sup>136</sup> In Malaysia, lower secondary enrolment encompasses 1st Form through 4th Form in the British system, or 9th Grade through 10th Grade in the US system. Most lower secondary students are between the ages of 13 and 15.



## Conclusions

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**While Malaysian workers are more educated than workers in many comparable countries, Malaysian firms are more likely to report having difficulty finding workers with appropriate skills.** Malaysian firms report relatively low vacancy rates, but vacancies are most common for positions requiring skilled workers. This skills gap persists even though Malaysia spends more on education and TVET programs than many comparable countries.

**While the quality and quantity of higher-education and TVET programs are improving, graduates continue to struggle to find permanent employment, as their skills do not always suit employer demand.** Industry surveys reveal a clear disconnect between the knowledge and skills demanded by firms and those possessed by the workforce. In a global marketplace driven by rapid technological advancement and tightening global connectivity, sophisticated technical skills are increasingly crucial to competitiveness and growth. As the Malaysian economy becomes increasingly knowledge intensive, a persistent skills mismatch could slow the country's transition to high-income status. In this context, the Malaysian educational system must continually strive to enhance the quality and relevance of its curricula.

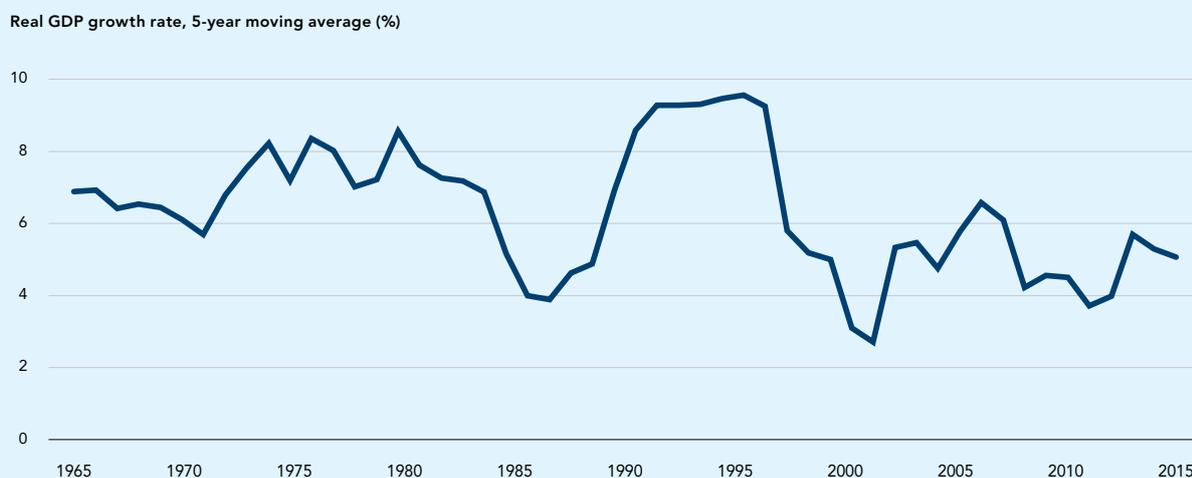
**Comparable countries, both in the region and worldwide, have demonstrated that greater educational outcomes can be achieved at a similar level of per-student spending.** The relatively-poor performance of Malaysia's educational system compared to other countries that spend a similar amount per student suggests that educational spending is poorly allocated. Policymakers should therefore strive to enhance the efficiency of education spending, while keeping total expenditures close to their current levels.



# Conclusions and Policy Recommendations

**Malaysia has experienced a long period of robust economic growth while implementing ambitious development policies that have fostered the rise of new industries.** Export-led industrialization, supported by rising productivity, enabled Malaysia’s rapid economic expansion. However, between the 1998 AFC and the 2008 GFC, both economic and productivity growth began to slow (Figure 109). Despite the country’s strong track record of adapting to changing international conditions, and the government’s reputation for maintaining a sound macroeconomic framework, investing in infrastructure and human capital, and fostering an enabling business environment, policymakers now face the considerable challenge of shifting from a growth model based on factor accumulation to one based on persistent and sustainable increases in productivity.

**FIGURE 109: Malaysia’s economy has enjoyed a long period of robust expansion, but its growth rate has slowed since the AFC**



Source: World Development Indicators

## The Challenges of Raising Productivity

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**Factor accumulation has driven Malaysia's growth over the last three decades.** Malaysia's labor and real capital stocks each grew at an annual rate of 2.0 percent during the period, similar to the rates observed in high-income countries. Investment in infrastructure and private-sector development contributed to physical capital formation, and a growing working-age population boosted the human capital stock. Meanwhile, total factor productivity (TFP) grew at a broadly-stable rate of around 1.8 percent, reflecting the economy's flexibility and expanding range of investment opportunities.

**Although Malaysia's productivity growth rate is high by the standards of comparable countries, it has failed to match the pace of countries that have achieved high-income status.** While Malaysia, Korea and Singapore experienced similar rates of factor accumulation during the past 30 years, TFP growth in Malaysia averaged 1.8 percent, compared to 2.2 percent in both Korea and Singapore. Similarly, while labor productivity growth in Malaysia has been broadly stable and more robust than in other emerging economies, it has failed to keep pace with growth rates in Hong Kong, Korea and Singapore.

**Productivity growth in Malaysia has declined since the 2008 global financial crisis, due in part to weakening external demand.** The impact of the 1998 AFC and the 2008 GFC substantially slowed the growth of labor productivity in Malaysia. While productivity growth rebounded following the 1998 crisis, robust employment creation in the wake of the 2008 crisis has not been sufficient to return labor-productivity growth to its pre-crisis levels. The World Bank Enterprise Surveys show that large firms have led the slowdown in labor-productivity growth. As many large firms are export-oriented manufacturers, this trend appears to reflect a substantial post-crisis decline in global demand for manufactured goods, a risk to which the Malaysian economy is particularly exposed.

**As factor accumulation is expected to slow in the future, accelerating productivity growth will be crucial for Malaysia to achieve convergence with high-income economies.** With headwinds inhibiting further capital accumulation and an aging population slowing the expansion of the labor force, productivity will increasingly drive economic growth. A combination of rising TFP, greater female labor-force participation, and continued investment in physical and human capital will be necessary for Malaysia to converge with high-income economies by 2050. The productivity targets established under the government's 11th Malaysia Plan reflect these objectives.

**Malaysia is within reach of a productivity renaissance.** While productivity growth in Malaysia remains well below the levels achieved by high-income countries, particularly in the services sector, the government has demonstrated a credible commitment to achieving the country's full productivity potential. At the national level, the authorities have adopted policies designed to promote macroeconomic stability, enhance the business and investment climate, foster the development of human capital, and encourage innovation. At the sector level, the government is striving to improve the efficiency of input and output markets, support the growth of a dynamic services sector, and further increase the stock of human capital by encouraging greater female participation in the labor force. In this context, the following section presents a set of policy recommendations and institutional reforms designed to inform a productivity-focused economic agenda.

## Policy Recommendations

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### Physical Infrastructure

**In recent decades, Malaysia has invested heavily in building and maintaining its infrastructure.** Malaysia consistently outranks its peers, in terms of both the overall quality of its infrastructure, and the contribution of infrastructure to economic competitiveness. While Malaysia's infrastructure is generally of high quality, further reforms could address remaining bottlenecks, facilitate investment, encourage business activity, and spur economic growth.

**Road congestion is a major problem in many large Malaysian cities.** To manage the rising traffic volumes generated by the ongoing growth of urban centers, the government should implement policies that discourage private vehicle ownership and incentivize the use of public transportation. Establishing or increasing vehicle-related taxes, including fuel taxes and environmental taxes, would both reduce private vehicle ownership and provide a revenue source that could be used to fund public transportation.

**Accelerated productivity growth will require improved management of Malaysia's transportation, telecommunications and utility infrastructure.** As Malaysia continues to integrate into global supply chains, policymakers will need to devote greater attention to improving the last-mile connectivity of ports. To cope with rising container volumes, the government will need to improve seaport capacity and streamline customs regulations and procedures. In the telecommunications sector, the authorities will need to implement policies that facilitate competition, and improve infrastructure sharing among service providers, to reduce prices and expand broadband access. Increasing the share of electricity generated from sustainable sources would enhance Malaysia's energy security, while better maintenance of water networks could improve water management and reduce technical losses.

### Public Institutions

**Further reforms could improve the quality of Malaysian policymaking and strengthen its public institutions.** The government can enhance stakeholder involvement in the policy process by holding regular consultations and participatory forums with domestic firms and business associations, foreign investors, civil-society representatives, and the public. In addition, more regular and comprehensive monitoring and evaluation of government programs and strategic plans could improve their efficiency, and independent performance audits could enhance program planning and implementation. Finally, greater transparency in the bidding process for public procurement could help reduce costs and enhance the efficiency of public investment.

### Factor-Market Efficiency

**While Malaysia's financial sector is relatively efficient by the standards of comparable countries, strengthening mechanisms for resolving insolvency could facilitate the reallocation of capital to more-productive activities.** The banking sector, stock market and bond market are all deep relative to Malaysia's GDP, and the banking sector has a low interest-rate spread. Household access to finance is high,

while firm access to bank credit is comparable to the level of peer countries. While some financial indicators have deteriorated in recent years, this trend appears to reflect slowing GDP growth and tighter monetary policies in a more challenging macroeconomic environment. However, a robust insolvency system is crucial to ensure that capital moves easily from less-efficient to more-efficient firms, and Malaysia's insolvency system is weak by international standards. Prospective reforms include the creation of a voluntary debt-restructuring scheme, the establishment of out-of-court arbitration procedures to facilitate corporate restructuring, and the automatic discharge of debts after a given period.

**Similarly, while Malaysia's labor market is relatively efficient overall, reforms aimed at reducing redundancy costs, increasing female labor-force participation and reforming the country's system for managing immigrant workers could enhance both labor productivity and TFP.** While most indicators of labor-market efficiency have marginally worsened over the past year, this likely reflects a more adverse macroeconomic climate marked by higher unemployment. However, Malaysia's high redundancy costs and low female labor-force participation rate are more serious structural issues that inhibit the reallocation of labor and slow the growth of the human-capital stock. Reforming the social-protection system to ensure that retrenched workers have adequate financial resources could help reduce redundancy costs. Moreover, allowing greater flexibility in working hours, expanded work-from-home options, and enhanced access to quality childcare, could boost female labor-force participation. Expanding the supply of adult learning and re-skilling opportunities is especially critical to facilitate the re-entry of adult women into the labor market. Due to the large share of immigrant workers – both legal and illegal – in the Malaysian labor force, reforming the country's fragmented economic immigration management system should be regarded as a top priority.

**While Malaysia's goods markets are generally efficient, alleviating constraints on the entry of foreign firms could increase competition in key sectors.** Liberalizing rules governing the entry of foreign firms could intensify local competition and sharpen efficiency incentives. Malaysia's regulatory burden is relatively low and has lessened over time, and few firms cite the country's relatively-high tax rates as a major obstacle to doing business. However, mandatory sales-tax registration has increased the administrative cost of starting a business, and processes for obtaining business licenses and permits could be further streamlined. Malaysia's trade openness has promoted export diversification and enabled domestic firms to integrate into global value chains. Although average tariff rates have fallen over time, there is scope for further reductions, and easing regulations on foreign direct investment could boost the gains from trade, and increase Malaysia's attractiveness as a destination for foreign capital.

## Innovation

**While Malaysia's success in promoting innovation is comparable to that of peer countries, policymakers have considerable scope to enhance the impact of pro-innovation policies.** Efforts to deepen linkages between foreign and domestic firms could accelerate technology transfer, and greater trade openness could encourage domestic firms to innovate by intensifying competitive pressures. Further reducing tariffs, and reforming regulations on foreign direct investment, could enable Malaysia to accelerate trade-related technology transfer.

**Consolidating innovation policy under the authority of a single government agency could help to foster innovation.** Aggregating information on research grants and other forms of financial support could boost innovation among entrepreneurs and small firms. Encouraging collaboration between universities and the private sector could promote the development of new commercial technologies, and strengthening

intellectual-property protections could incentivize research in areas with commercial applications. Malaysia's recent efforts to build its capacity to support innovation have achieved mixed results, and a well-coordinated, demand-driven approach could both accelerate innovation and enhance the contribution of pro-innovation policies to productivity and competitiveness.

## Education

**While the Malaysian workforce is relatively well-educated, firms often have difficulty finding workers with specific skills.** Although the quality and quantity of higher-education and vocational training programs in Malaysia is improving, graduates continue to struggle to find permanent employment, as their skills do not always suit employer demand. In a global marketplace driven by rapid technological advancement and tightening global connectivity, sophisticated technical skills are increasingly crucial to competitiveness and growth. As the Malaysian economy becomes increasingly knowledge intensive, a persistent skills mismatch could slow the country's transition to high-income status. In this context, the Malaysian educational system must continually strive to enhance the quality and relevance of its curricula.

**Comparable countries, both in the region and worldwide, have demonstrated that greater educational outcomes can be achieved at a similar level of per-student spending.** The relatively-poor performance of Malaysia's educational system, compared to other countries that spend a similar amount per student, suggests that educational spending is poorly allocated. Policymakers should strive to enhance the efficiency of the education budget, while keeping total expenditures close to their current levels.

## Raising Economic Productivity to Achieve High-Income Status

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**Malaysia's transition from low-income to upper-middle-income status has been a remarkable success.** However, Malaysia's GDP growth rate is slowing, and the economic model that drove the country's transition to middle-income status will not sustain robust growth indefinitely.<sup>137</sup> Only a few countries that have achieved middle-income status have gone on to converge with high-income countries. Indeed, only one country classified as "middle income" in 1975, South Korea, has since reached high-income status.

**As the role of factor accumulation diminishes, economy-wide productivity will become increasingly crucial to growth.** More efficient investment in human capital, and continued infrastructure development, will be necessary to sustain robust growth as the gains from low labor costs and knowledge spillovers are gradually exhausted. Rapidly expanding the tertiary education system will be critical to equip workers with the skills to succeed in an increasingly dynamic, technology-driven economy that relies on highly skilled workers and technical professionals to produce cutting-edge goods and services.

<sup>137</sup> For a discussion of the conceptual appropriateness of the so-called "middle-income trap," see World Bank (2016c).

**Malaysia has leveraged a strong macroeconomic-management framework and a high degree of trade openness to expand the tradable sector.** Malaysia is now one of the most sophisticated exporters of manufactured goods in the world. Agricultural exports have also performed well, and the country boasts a dynamic oil and gas sector. Modern technology has made services increasingly tradable.<sup>138</sup> Like goods, modern services can now be unbundled and reorganized into a multi-country value chain, and unlike goods, they can be traded across borders electronically through global telecommunications networks. However, the contribution of the services sector to economic growth continues to lag.

**Malaysia's strategy for reaching high-income status by 2020 is set forth in its Economic Transformation Programme (ETP), Strategic Reform Initiatives, and Government Transformation Programme.** The ETP is expected to accelerate public investment in large infrastructure projects by state-owned enterprises. The program is also supporting increased private investment in manufacturing and mining in targeted growth corridors. Under the ETP, the government has liberalized regulations on industrial and service activities to attract skilled workers and encourage capital mobility.

**The New Economic Model for Malaysia, prepared by the National Economic Advisory Council, underscores the importance of transforming the country's main growth drivers.** The strategy ascribes the country's weakening economic performance in the years following the AFC to low and stagnant private investment. Meanwhile, commodities, which have benefited from price increases during the last half decade, have increased their share in total exports. The strategy calls for reforms to accelerate the growth of services as the basis for sustainable long-term economic growth.

**The Malaysian Government created the Malaysia Productivity Corporation (MPC), previously known as the National Productivity Corporation, in 1962.** MPC is in charge of measuring productivity across sectors and time in Malaysia, as well as providing policy advice to the government and the private sector on issues of productivity and competitiveness. MPC publishes a comprehensive report every year, where the evolution of productivity across sectors and policies are presented.

**Recently the government created a Productivity Council chaired by the Prime Minister with the aim of emphasizing the political and economic importance of productivity growth.** The World Bank has been invited to participate in the Productivity Council, and it is the only non-government agency in this role. The Bank has also acted as a reviewer and provided analytical advice to the recent Productivity Blueprint published by the government.

**The World Bank has initiated a long-term agenda in the study of productivity in Malaysia, of which this report is an example.** The DEC (World Bank research group) has published some innovative work on productivity, and is working with the Department of Statistics and the Economic Policy Unit in analyzing panel data on the Malaysian manufacturing sector. Some preliminary aspects of this work are included in this report. In addition, the World Bank is discussing with the government the possibility of generating a survey to measure productivity in the services sector.

<sup>138</sup> Ghani (2017).

# Annex 1: Main Determinants of Economic Productivity<sup>139</sup>

**Innovation includes both the creation of new technologies and the adoption of existing technologies, both of which contribute to economic productivity.** A relatively-small number of advanced economies develop most of the world's new technologies. Among advanced economies, the creation of new technologies – measured in terms of the amount invested in research and development (R&D), the number of patents awarded, and the number of scientific and technical articles published – is closely correlated with productivity growth. However, most countries focus on adapting innovations to their local context. Consequently, the impact of innovation on productivity often primarily reflects the success with which a given country incorporates new technologies into domestic value chains.

**Openness to international trade and foreign investment can affect a country's rate of technological uptake.** The literature reveals a clear and consistent relationship between trade and technology transfer,<sup>140</sup> with developing countries typically reaping the greatest benefits from trade.<sup>141</sup> Greater trade openness exposes domestic producers to new goods, services, and production methods, while international competition sharpens incentives to embrace new technologies. The impact of foreign investment on technology transfer is somewhat more ambiguous. Some studies have shown that foreign direct investment increases productivity by enabling foreign firms to restructure production processes, integrate subsidiaries into global value chains, and directly incorporate new technologies into local production.<sup>142</sup> However, other research has found that foreign-owned firms tend to crowd out domestic producers and dominate local input and output markets, offsetting the benefits of technology transfer and diminishing the productivity of domestic firms.<sup>143</sup>

**Educational attainment is critical to productivity.** Education not only directly contributes to labor productivity, it also promotes the development of new technologies and facilitates technology transfer, magnifying the impact of innovation on TFP.<sup>144</sup> Most innovations are developed by highly-educated professionals working in scientific or academic institutions, and an educated workforce is necessary to make effective use of newly developed or imported technologies. The ability of workers to interact with new technologies reflects their general education level, often measured in terms of years of formal schooling, as well as on-the-job training and experience. Education and innovation are closely complementary, and this relationship runs both ways: skilled workers are more productive when they have access to advanced technology, and advanced technology is more productive when it is utilized by skilled workers. Because innovation in less-developed countries occurs primarily through technology transfer via trade, educational attainment in less-developed countries only increases TFP when trade openness exceeds a minimum threshold. Below this threshold, educational attainment is correlated with lower levels of TFP, as limited trade slows technology transfer, preventing educated workers from fully realizing their productive potential.<sup>145</sup>

139 This annex is based on the analysis presented by Kim and Loayza (2017).

140 Coe, Helpman, and Hoffmaister (1997); Miller and Upadhyay (2000); Dollar and Kraay (2004); Maiti (2013).

141 Coe and Helpman (1995); Mendi (2007).

142 Matthias Arnold and Javorcik (2009); Fernandes and Paunov (2012); Newman *et al* (2015).

143 Aitken and Harrison (1999); de Mello (1999); Elu and Price (2010); Xu and Sheng (2012); Girma, Greenaway, and Wakelin (2013).

144 Benhabib and Spiegel (1994); Griffith, Redding, and Reenen (2004); Benhabib and Spiegel (2005); Bronzini and Piselli (2009); Erosa, Koreshkova, and Restuccia (2010).

145 Miller and Upadhyay (2000).

**Numerous studies have shown that the efficiency of capital and labor markets is often the most important determinant of variations in TFP.**<sup>146</sup> A country's regulatory environment can have a major impact on the allocative efficiency of factor markets.<sup>147</sup> Barriers to hiring and firing can slow the reallocation of workers between firms and sectors, and stringent employee protections can discourage firms from adopting labor-saving technologies that would increase productivity.<sup>148</sup> Regulations affecting corporate governance and market competition can alter innovation incentives, and influence the rate of technological adaptation.<sup>149</sup> Finally, the overall quality of the business climate, and particularly the institutional framework for enforcing contracts and resolving insolvency, can either facilitate or inhibit the reallocation of physical and financial capital from less-productive firms and sectors to their more-productive counterparts.

**Infrastructure has positive direct and indirect effects on productivity.** Providing firms with access to water and sanitation, transportation, and telecommunication networks greatly magnifies their productive capacity. High-quality infrastructure also reduces economy-wide transaction costs, encourages participation in the formal labor market, and promotes improved health and educational outcomes.<sup>150</sup> The relative abundance of physical infrastructure has had a major impact on the growth rates of individual countries and entire global regions.<sup>151</sup> However, while a growing stock of infrastructure is associated with productivity gains, the same is not necessarily true for infrastructure investment, as the effectiveness of the public administration largely determines the quantity, quality, and economic value of the infrastructure that investment produces.<sup>152</sup>

**The strength of a country's institutional framework is closely correlated with productivity.** Institutional strength reflects indicators of governance quality, political stability, respect for the rule of law, public-expenditure efficiency and the absence of corruption. These elements of institutional strength have been shown to increase productivity across a wide range of countries.<sup>153</sup> While the impact of strong institutions on productivity is independent of other factors such as geography and culture,<sup>154</sup> strong institutions enable firms to fully leverage each country's absolute advantages in production.<sup>155</sup> The strength of public institutions is not necessarily related to the size of the government, and a larger public sector may either accelerate or hinder growth, depending on the nature of the government's relationship with the economy.<sup>156</sup>

146 Jerzmanowski (2007).

147 Hsieh and Klenow (2009).

148 Haltiwanger, Scarpetta, and Schweiger (2008); Bartelsman, Gautier, and De Wind (2016).

149 Nicoletti and Scarpetta (2003); Arnold, Nicoletti, and Scarpetta (2008).

150 Straub (2008).

151 Aschauer (1989); Hulten (1996); Canning and Pedron (2008); Calderón and Servén (2010 and 2012).

152 Straub (2008).

153 Barro (1991); Chanda and Dalgaard (2008).

154 Acemoglu, Johnson, and Robinson (2004).

155 Easterly and Levine (2003); Rodrik, Subramanian, and Trebbi (2004).

156 Ghali (1999); Dar and AmirKhalkhali (2002).

# Annex 2: Public Development Expenditures on Infrastructure, 1965-2010

(Current Prices, RM Millions)

Sector	1MP (1966-1970)	2MP (1971-1975)	3MP (1976-1980)	4MP (1981-1985)	5MP (1986-1990)	6MP (1991-1995)	7MP (1996-2000)	8MP (2001-2005)	9MP (2006-2010)
Transport	544.9	1234.0	2842.8	12966.0	11216.4	11594.7	20484.2	30936.5	30304.4
Communications	152.0	174.9	1152.1	5034.0	4304.3	71.0	39.6	NA	NA
Electricity	530.6	122.7	1205.3	4828.7	7013.7	17580.8	26107.2	27960.9	29783.9
Oil & Gas					2923.1	10814.8	30400.0	48300	43800
Water Supply	150.8	163.1	377.2	3393.6	2467.0	2671.9	2382.7	3882.9	8203.6
Rural Water								733.9	1206.5
Sewerage	9.6	8.6	69.1	393.9	57.2	124.8	665.3	1347.9	3132.8
<b>Total Development Expenditures on Infrastructure</b>	1387.9	1703.3	5646.5	26616.2	27981.7	42858.0	80079.0	113162.1	116431.2
<b>Total Development Expenditures</b>	6887	14046	24243	62743	35300	54705	99037	170000	200000
<b>Infrastructure's % Share of Development Expenditures</b>	20.2	12.1	23.3	42.4	79.3	78.3	80.9	66.6	58.2

Source: Lee (2011)

Notes: MP = Malaysia Plan; 9MP figures refer to allocation and not actual expenditures; prior to 8MP expenditure figures on rural water supply included under water supply; NA = not available.

# Annex 3: A Historical Review of Malaysia Innovation Strategies, Plans and Policies

Plans and Policies	Description and Characteristics
<b>10th Malaysia Plan (2011-2015)</b>	Plan aimed to “unleash productivity-led growth and innovation.” It focused on four key dimensions: (i) shaping a supportive ecosystem for innovation; (ii) creating innovation opportunities; (iii) putting in place innovation enablers; and (iv) funding innovation.
<b>11th Malaysia Plan (2016-20)</b>	Out of the seven focus areas announced in the Plan, innovation has been identified as a game changer to boost economic growth, by fostering an inclusive society that balances geographical development and wealth. It focuses on three key dimensions: (i) enterprise innovation; (ii) social innovation; and (iii) innovation in the manufacturing sector.
<b>National Policy on Science, Technology and Innovation (NSTIP) 2013-20</b>	The NSTIP was established in 2013. It provides strategic guidelines for Science, Technology and Innovation (STI) policies and investments designed to facilitate Malaysia’s transition to become an innovation-led economy by 2020. It has six strategic thrusts: (i) advancing scientific and social research, development and commercialization; (ii) developing, harnessing and intensifying talent; (iii) energizing industries; (iv) transformation of STI governance; (v) promoting and sensitizing STI; and (vi) enhancing strategic international alliances.
<b>Science to Action (S2A) Program (2013-2020)</b>	In November 2013 the S2A Program was approved to implement the strategies and framework of the NSTIP into specific action measures. The S2A Program comprises three main components: (i) Science to Industry; (ii) Science to Well-Being; and (iii) Science to Governance.
<b>Third Industrial Master Plan (IMP3) (2006-2020)</b>	Driven by the Ministry of International Trade and Industry, the Third Industrial Master Plan (IMP3) (2006-2020) aims for Malaysia to achieve global competitiveness and industrial growth by 2020. One of the key strategies is to leverage innovation in the manufacturing and services sectors. The Master Plan operates on 10 strategic thrusts, two of which relate to innovation: (i) facilitating the development and application of knowledge-intensive technologies; and (ii) developing innovative and creative human capital (including in ICT). The Plan also emphasizes the need to encourage higher-level creativity, innovation, and other enabling skills in the educational, technical and vocational training systems.
<b>Knowledge-Based Economy Master Plan (2002-2020)</b>	The Master Plan was established in 2002. It focuses on seven critical areas, including human resource development, information structures, incentives, science and technology development, reorientation of the private and public sectors, as well as addressing the challenges of digitalization. The document also provides 136 recommendations to foster a knowledge-based economy.
<b>2nd National Science and Technology policy</b>	Launched in 2003, the policy emphasizes growth and competitiveness. The policy’s objectives are to enhance national capacity in R&D, increase R&D spending to at least 1.5 percent of GDP by 2020, and enhance national capability in STI by fostering a competent workforce comprising a minimum of 60 researchers, scientists, and engineers per 10,000 labor force by 2010. The policy aims to: (i) increase the national capability and capacity for R&D, technology development, and acquisition; (ii) encourage partnerships between public-funded organizations and industry; (iii) enhance the transformation of knowledge into products, processes, services, or solutions; (iv) position Malaysia as a technology provider in key strategic knowledge industries such as biotechnology, advanced materials, advanced manufacturing, microelectronics, information and communication technologies, aerospace, energy, pharmaceuticals, nanotechnology, and photonics; (v) foster societal values and attitudes that recognize science and technology as critical to future prosperity, including the need for life-long learning; (vi) ensure that the utilization of STI emphasizes approaches that are in conformity with sustainable developmental goals, including alignment with societal norms and ethics; and (vii) develop new knowledge-based industries.
<b>Malaysia Education Blueprint (2013-2025)</b>	The strategy in the blueprint is described in three waves: (i) strengthening the foundations of existing programs and encouraging enrolment in the science stream for secondary school students and post-secondary school students; (ii) from 2016, engaging the support of a broader group of stakeholders, including in the informal-learning sector, to implement the program on a wider scale; and (iii) from 2021-2025, reviewing and evaluating the strategies and implementation imposed, in order to develop a roadmap for the growth of innovation.
<b>SME Masterplan (2012-2020)</b>	The SME Corporation was established in 2009 and mandated to be a centralized body responsible for coordinating SME development, in conjunction with about 15 ministries and 60 agencies. The Masterplan aims to support local SMEs to reach the global market competitively through four strategic goals: (i) increase business formation, (ii) expand the number of high-growth and innovative firms, (iii) raise SME productivity, and (iv) intensify formalization to promote growth and fair competition. Through the Plan, SME contribution is expected to increase from 32 percent to 41 percent, while the share of employment and exports is projected to increase to 62 percent and 25 percent, respectively.

Policy Actors	Description
<b>Ministry of Science, Technology and Innovation (MOSTI)</b>	MOSTI was created by the federal government in 1973, though it was operating under various names and finally became MOSTI in 2004. The objective behind the creation of the ministry is to improve competitiveness in the fields of science and technology through the generation of knowledge and sustainable development. MOSTI provides grants for research.
<b>National Innovation Agency</b>	The National Innovation Agency was established in 2008 to lead policies and strategies related to innovation. While AIM is driving the push towards commercialization, it has support for programs that are designed to cultivate entrepreneurs, including those operated by the Malaysian Global Innovation and Creative Centre (MaGIC).
<b>Malaysian Foundation of Innovation</b>	Established in October 2008 and approved by the Malaysian Cabinet on 7 November 2008, the Malaysian Foundation of Innovation aims to promote and inculcate creativity and innovation among Malaysian citizens, especially children and youth, women, rural folk, people with disabilities, and non-government organizations. With close support from MOSTI, the Malaysian Foundation for Innovation was established by the government to promote and champion innovation.
<b>Malaysian Global Innovation &amp; Creative Centre (MAGIC)</b>	Announced in October 2013 by the Prime Minister Datuk Seri Najib Razak during the 4th Global Entrepreneurship Summit held in Kuala Lumpur. Cyberjaya plays home to the Centre, as it is progressively becoming the preferred location for the technology-driven start-up community. On April 27th 2014, MaGIC was launched by President Barack Obama and Prime Minister Datuk Seri Najib Razak with 7000 aspiring entrepreneurs in attendance.
<b>National Science &amp; Research Council (NSRC)</b>	Approved by the Cabinet on the 10th of December 2010 to replace the dormant National Council of Science, Research and Development (NCSRD), the NSRC has been mandated to ensure that the country's investments in science and technology are making the greatest possible contribution to a high-value economy, by increasing productivity and environmental quality, stimulating R&D and enhancing the skills of the Malaysian workforce. The NSRC is the focal point to channel science and technology inputs from various governmental organizations, industries, academics, and non-governmental organizations, including business and social associations, to be consolidated as strategic inputs that are neutral, non-biased, and non-ministerial to the Prime Minister and the Government of Malaysia.
<b>Global Science and Innovation Advisory Council (GSIAC)</b>	Initiated by the Prime Minister Datuk Seri Najib Razak to help Malaysia take the quantum leap from a middle-income country to a high-income economy by 2020. It is a joint initiative between MIGHT and the New York Academy of Sciences (NYAS).
<b>Malaysian Industry-Government Group for High Technology (MIGHT)</b>	Established as an independent, industry-driven, non-profit organization in 1993, and formally incorporated as a company limited by guarantee on 15th October 1994. Between 2004 and 2010, MIGHT operated under the purview of the Ministry of Science, Technology and Innovation. In 2011, MIGHT was transferred to the Prime Minister's Department under the Science Advisor to the Prime Minister. It is subscribed to by private and public-sector membership and has no shareholders. It exists to serve the needs of its members who represent industry, government and academia. MIGHT also acts as a key interlocutor, bringing together policy and technology to advance high-technology interests in Malaysia.
<b>Cradle Fund</b>	Cradle Fund, an agency under the Ministry of Finance, Malaysia (MOF), is a not-for-profit organization that has managed the RM100 million Cradle Investment Programme since its inception in 2003. An additional RM50 million was recently added under the 10th Malaysian Plan. It seeks to secure funds for entrepreneurs to advance their ideas. Its objectives are to create an ecosystem that supports a strong and innovative business-building environment for technology entrepreneurs, achieve commercialization efficiency and sustainable entrepreneurship for budding technology entrepreneurs, and represent government efforts to boost the quantity and quality of innovations and technology start-ups.
<b>PlaTCOM Ventures</b>	PlaTCOM Ventures was set up in 2014 as an AIM initiative that supports both technology transfer and commercialization, including the country's first intellectual property (IP) trading platform, known as Innovation Business Opportunities (IBO), and the High Impact Programme 2 (HIP2), which assists SMEs wanting to take their ideas to the market.

# Annex 4: Summarized Findings of the National Surveys of Innovation 5 (2005-2008) and 6 (2009-2011)

NSI 6 (2009-2011)	NSI 5 (2005-2008)
<b>Characteristics</b>	
<b>Firm size</b>	
<ul style="list-style-type: none"> <li>• Companies in manufacturing and services sectors introduced both new/significantly improved products and services. In the manufacturing sector, companies of all sizes introduced more improved products, and companies in the services sector introduced more improved services. Additionally, large companies (27.71 percent) in the manufacturing sector introduced more new products than medium (16.25 percent) and small companies (13.75 percent). While in the services sector, interestingly, medium-sized companies (29.38 percent) introduced more improved services, compared to large (10.26 percent) and small-size companies (22.94 percent).</li> <li>• While the methods of manufacturing or producing goods or service introduced in medium-sized companies recorded the highest percentage of 15.82 percent in the manufacturing sector, the small-sized companies recorded the highest percentage of 16 percent in the services sector. For new/improved logistics, delivery or distribution method, large-sized companies recorded the highest percentage of 8.13 percent in the manufacturing sector, and small-sized companies recorded the highest percentages of 15.07 percent in the services sector. Also, in other improved supporting activities in innovation processes, such as maintenance systems or operations for purchasing, accounting or computing activities, large-sized companies recorded the highest percentage of 15.97 percent in the manufacturing sector and small-sized companies recorded the highest percentage of 16.13 percent in the services sector.</li> <li>• For methods of product design or packaging, large firms recorded the highest percentage of 13.84 percent, followed by medium-sized firms then small firms. As against small-sized companies with the highest percentage of 27.81 percent in the services sector, followed by medium firms and lastly large firms. On new or significantly improved product distribution or placement, large-sized companies recorded the highest percentages with 10.73 percent in the manufacturing sector, and small-sized companies recorded the highest percentages with 9.23 percent in the services sector. For new or significantly improved product promotion and pricing, large-sized companies recorded the highest percentage with 16.78 percent in the manufacturing sector, and 10.79 percent was achieved in the services sector by small-sized companies.</li> <li>• The findings indicate that large firms in the manufacturing sector recorded the highest percentage of 13.28 percent in new or significantly improved methods in companies' business practices, as compared to small-sized companies that recorded the highest percentage of 15.73 percent in the services sector. On new or significantly improved workplace organization, large-sized companies recorded highest with 12.41 percent in the manufacturing sector, and small-sized companies recorded highest with 15.49 percent in the services sector. For new or significantly improved workplace external relations, large-sized companies recorded the highest percentage with 12.26 percent in the manufacturing sector, and small-sized companies recorded the highest with 13.66 percent in the services sector.</li> </ul>	<ul style="list-style-type: none"> <li>• Large firms innovate the most, with 74.26 percent being innovators, followed by medium-sized firms (49.42 percent) then small firms (36.75 percent).</li> <li>• In terms of product innovation, while large firms innovate products new to the market equally to innovation new to the firm only, medium-sized and small-sized firms tend to be actively involved in product innovation new to the firm only, as compared to new to the market.</li> <li>• All three types of firms, large, medium and small sizes, tend to carry out process innovation in terms of methods of manufacturing or producing goods or services the most, compared to other types of process innovation.</li> <li>• Among the large establishments, about 37.74 percent of the improvements were in product designs, while the other two categories showed less improvement in terms of percentage. The medium-sized companies showed 38.46 percent improvement in the area of product designs and 34.07 percent in product placement. However, the smaller companies showed a more significant figure, at 38.51 percent improvement for innovation in product placement and 34.46 percent for product design and packaging.</li> <li>• All three firm sizes tend to be involved in organizational innovation in terms of methods in the firm's business and workplace organization, with workplace external relations, significantly, the least innovated.</li> </ul>

NSI 6 (2009-2011)	NSI 5 (2005-2008)
<b>Years of establishment/age of company</b>	
<ul style="list-style-type: none"> <li>In the manufacturing sector, most innovative companies (25.62 percent) were established between 2005-2008 (3-6 years old).</li> <li>In the services sector, most innovative companies (27.15 percent) were established between 2001-2004 (7-10 years old).</li> </ul>	<ul style="list-style-type: none"> <li>In both manufacturing and services sectors, most innovative companies as well as non-innovative companies were established between 1991-2000 (8-17 years old), also recording the highest number of total firms. No observable differences on the effect of year of establishment and innovation performance.</li> </ul>
<b>Ownership structure</b>	
N/A	<ul style="list-style-type: none"> <li>In manufacturing, foreign-owned companies innovate more (61.9 percent) compared to locally-owned companies (48.7 percent). Similarly, in the services sector, the higher the foreign equity, the higher percentage of innovation.</li> </ul>
<b>Forms of company</b>	
<ul style="list-style-type: none"> <li>In both manufacturing and services sectors, innovative actors are of Private Limited (Sdn. Bhd.) at 70.56 percent and 59.35 percent respectively, followed by sole proprietorship, public limited, and the lowest form of innovative companies is partnership business, with 5.17 percent manufacturing and 6.13 percent for the services sector.</li> </ul>	<ul style="list-style-type: none"> <li>In manufacturing, public limited (Bhd.) firms show highest percentage of innovators with 77.14 percent, followed by private limited at 54.71 percent, partnership (39.19 percent) and sole proprietorship the least at 30.82 percent.</li> <li>In the services sector, private limited companies and public limited companies tend to innovate more.</li> </ul>
<b>Location (State in Malaysia)</b>	
<ul style="list-style-type: none"> <li>Highest rate of innovative respondents to be from the state of Selangor (22.5 percent), followed by Kuala Lumpur (11.29 percent) and Sarawak (10.27 percent), the lowest rate being from Perlis (1.61 percent).</li> <li>Highest rate of non-innovative respondents also came from Selangor (14.48 percent), followed by Sarawak (12.50 percent) and Kuala Lumpur (10.71 percent).</li> </ul>	N/A
<b>Business sector (Manufacturing vs. Services)</b>	
<ul style="list-style-type: none"> <li>62 percent of innovators are from the services sector, while 38 percent are from the manufacturing sector.</li> <li>58 percent of non-innovators are from the manufacturing sector, while 42 percent are from the services sector.</li> </ul>	<ul style="list-style-type: none"> <li>Percentage of innovative companies in the manufacturing sector (51.52 percent) is almost identical to that in the services sector (51.28 percent).</li> </ul>

# Annex 5: How to Measure the Capital and Output Wedge to Look for Allocative Inefficiency<sup>157</sup>

In a distortion-free environment, it is assumed that firms in the same industry,  $s$  have same capital/labor ratio.

$$\frac{1-\alpha_s}{\alpha_s} = \frac{wL_{si}}{RK_{si}} \quad \text{for all } i \text{ in the same } s$$

Where capital share,  $\alpha_s$ , and labor share,  $1-\alpha_s$  are taken from the U.S. manufacturing sectors,  $w_{si}$  and  $R$  are the cost of one unit of labor and capital respectively.  $K_{si}$  and  $L_{si}$  are the firm's capital and labor respectively.

- Any variations in the capital and labor shares is identified as distortions to capital ( $\tau_{ksi}$ ) and output ( $\tau_{ysi}$ ).

$$1-\tau_{ysi} = \frac{\sigma}{\sigma-1} \frac{w_{si}L_{si}}{(1-\alpha_s)P_{si}Y_{si}}$$

$$1+\tau_{ksi} = \frac{\alpha_s}{1-\alpha_s} \frac{w_{si}L_{si}}{RK_{si}}$$

Alternatively, the distortions represented by wedges can be seen as:

$$TFPR_{si} \approx R^\alpha w^{1-\alpha} \frac{(1+\tau_{ksi})^{\alpha s}}{(1-\tau_{ysi})}$$

- The distortions to capital and output represented by  $\tau_{ksi}$  and  $\tau_{ysi}$  respectively result in TFPR (any dispersion is indicative of distortions) not being approximated by the marginal cost of capital and labor.

<sup>157</sup> A more detailed analysis is presented in Annex V of the World Bank, Malaysia Economic Monitor, December 2016.

# Bibliography

- Abdelfatah, A. S., Shah, M. Z., & Puan, O. C. 2015. "Evaluating the Sustainability of Traffic Growth in Malaysia." *Journal of Traffic and Logistics Engineering*, 3(1).
- Acemoglu, D., Johnson, S., & Robinson, J. 2001. "The colonial origins of comparative development: an empirical investigation." *American Economic Review*, 91(5), 1369-1401.
- Acemoglu, D., Johnson, S., Robinson, J., & Thaicharoen, Y. 2003. "Institutional causes, macroeconomic symptoms: volatility, crises and growth." *Journal of Monetary Economics*, 50(1), 49-123.
- Adkins, L. C., Moomaw, R. L., & Savvides, A. 2002. "Institutions, freedom, and technical efficiency." *Southern Economic Journal*, 92-108.
- Aidis, R., Estrin, S., & Mickiewicz, T. 2010. "Institutions, finance and the level of development: the impact on entrepreneurship in transition." *Review of economics and institutions*, 1(1).
- Alby, P., Dethier, J. J., & Straub, S. 2010. "Firms operating under infrastructure and credit constraints in developing countries: The case of power generators." *World Bank Economic Review* 27:1, 109-132.
- Arokiasamy, L. and Ong, S. 2008 "The Roles of Private Higher Educational Institutions in Promoting Formal Lifelong Education in Malaysia." *The Journal of International Social Research* Volume 1/4, pp. 77-88. Available at: <http://www.sosyalarastirmalar.com/cilt1/sayi4/sayi4pdf/arokiasamy.pdf> (Accessed: 11 April 2017).
- Asada, H., Nixon, S., & Koen, V. 2017. "Boosting productivity in Malaysia." OECD Economics Department. Working Papers, No. 1370. Paris: OECD Publishing.
- Aschauer, D. A. 1989. "Is public expenditure productive?" *Journal of monetary economics*, 23(2), 177-200.
- Aschauer, D. A. 1990. "Highway capacity and economic growth." *Economic perspectives*, 14(5), 4-24.
- Besley, T., & Ghatak, M. 2010. "Property Rights and Economic Development." In D. Rodrik & M. Rosenzweig (Eds.), *Handbook of Development Economics* (Vol. 5, pp. 4525-4595). The Netherlands: North-Holland.
- Busse, M., & Hefeker, C. 2007. "Political risk, institutions and foreign direct investment." *European journal of political economy*, 23(2), 397-415.
- Calderón, C., Moral-Benito, E., & Servén, L. 2015. "Is infrastructure capital productive? A dynamic heterogeneous approach." *Journal of Applied Econometrics*, 30(2), 177-198.
- Canning, D. 1999. *Infrastructure's contribution to aggregate output* (Vol. 2246): World Bank Publications.
- Cherif, Reda and Fuad Hasanov. 2015. "The Leap of the Tiger: How Malaysia Can Escape the Middle-Income Trap". IMF Working Paper. WP/15/131. June 2015.
- Cihak, Martin; Demircuc-Kunt Asli; Feyen, Erik; Levine, Ross. 2012. "Benchmarking Financial Systems around the World." World Bank Policy Research Working Paper 6175.
- Cissokho, L., & Seck, A. 2013. "Electric power outages and the productivity of small and medium enterprises in Senegal." *Investment Climate and Business Environment Research Fund Report*, 77, 13.
- Davidavičienė, V. 2008. "Change management decisions in the information age." *Journal of business economics and management* (4), 299-307.
- Easterly, W., & Levine, R. 2003. "Tropics, germs, and crops: how endowments influence economic development." *Journal of Monetary Economics*, 50(1), 3-39.
- Friedman, M. 1977. "Time perspective in demand for money." *The Scandinavian Journal of Economics*, 79(4), 397-416.
- Fujita, M., & Thisse, J.-F. 2002. *Economics of agglomeration: cities, industrial location, and globalization*: Cambridge university press.
- Fujita, M., Krugman, P. R., Venables, A. J., & Fujita, M. 1999. *The spatial economy: cities, regions and international trade* (Vol. 213): Wiley Online Library.
- Ghani, Ejaz S. 2017. "Structural Transformation and Growth: Lessons from Malaysia". Unpublished manuscript. The World Bank. May 2017.
- Graham, D. J. 2007. "Agglomeration, productivity and transport investment." *Journal of transport economics and policy (JTPE)*, 41(3), 317-343.
- Gramlich, E. M. 1994. "Infrastructure investment: A review essay." *Journal of economic literature*, 32(3), 1176-1196.
- Hall, R. E., & Jones, C. I. 1999. "Why do some countries produce so much more output per worker than others?" *The Quarterly Journal of Economics*, 114(1), 83-116.
- Holtz-Eakin, D. 1994. "Public-Sector Capital and the Productivity Puzzle." *The review of economics and statistics*, 76(1), 12-21. doi:10.2307/2109822.
- Holtz-Eakin, D., & Schwartz, A. E. 1995. "Spatial productivity spillovers from public infrastructure: Evidence from state highways." *International Tax and Public Finance*, 2(3), 459-468.
- Hopenhayn, H. and R. Rogerson. 1993. "Job Turnover and Policy Evaluation: A General Equilibrium Analysis". *Journal of Political Economy* 101 (5): 915-38.
- Institute of Strategic and International Studies (ISIS). 2002. *Knowledge-based Economy: Master Plan*. Kuala Lumpur, Malaysia.
- Jeevan, J., Ghaderi, H., Bandara, Y. M., Saharuddin, A. H., & Othman, M. R. 2015. "The Implications of the Growth of Port Throughput on the Port Capacity: The Case of Malaysian Major Container Seaports." *International Journal of e-Navigation and Maritime Economy*, 3, 84-98.

- Khalid, Nazery. 2014. "Port privatization in the context of a developing nation: The Malaysian experience." Maritime Institute of Malaysia (MIMA) Working Paper.
- Kim, Young E. and Loayza, Norman. 2017. "Productivity and its Determinants: Innovation, Education, Efficiency, Infrastructure, and Institutions." Unpublished Working Paper.
- King, Robert G. and Levine, Ross. 1993. "Finance and Growth: Schumpeter Might be Right." *Quarterly Journal of Economics* 108 (3), 717-737.
- Knack, S., & Keefer, P. 1995. "Institutions and economic performance: cross-country tests using alternative institutional measures." *Economics & Politics*, 7(3), 207-227. doi:10.1111/j.1468-0343.1995.tb00111.x.
- Koen, V., Asada, H., Nixon, S., Habeeb Rahuman, M., & Mohd Arif, A. 2017. "Malaysia's economic success story and challenges." OECD Economics Department Working Papers. France: OECD Publishing.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. 1999. "The quality of government." *Journal of Law, Economics, and Organization*, 15(1), 222-279.
- Lee, C. 2011. "Infrastructure and economic development." In Z. Mahani (Eds.). *Malaysia: Policies and Issues in Economic Development* (pp. 423-436). Kuala Lumpur: Institute of Strategic and International Studies (ISIS) Malaysia.
- Leung et al. 2008. "Firm Size and Productivity." Bank of Canada Working Paper 2008-45. Bank of Canada.
- Levchenko, A. A. 2007. "Institutional quality and international trade." *The Review of Economic Studies*, 74(3), 791-819.
- Lolos, S. E. 2009. "The effect of EU structural funds on regional growth: assessing the evidence from Greece 1990–2005." *Economic Change and Restructuring*, 42(3), 211-228.
- Mačiulytė-Šniukienė, A., & Gaile-Sarkane, E. 2014. "Impact of information and telecommunication technologies development on labor productivity." *Procedia-Social and Behavioral Sciences*, 110, 1271-1282.
- Malaysia, Economic Planning Unit, Prime Minister's Department. 2010. "The Tenth Malaysia Plan."
- Malaysia, Economic Planning Unit, Prime Minister's Department. 2015. "The Eleventh Malaysia Plan."
- Malaysia, Economic Planning Unit, Prime Minister's Department. 2015. "Labor Market for an Advanced Nation", The Eleventh Malaysia Plan Strategy Paper No, 8.
- Mauro, P. 1995. "Corruption and growth." *The Quarterly Journal of Economics*, 681-712.
- Menon, Jayant 1998. "Total Factor Productivity Growth in Foreign and Domestic Firms in Malaysian Manufacturing." *Journal of Asian Economics*, 1998, vol. 9, issue 2, 251-280.
- Malaysia, Ministry of Education. 2013. *Malaysia Education Blueprint 2013-2025*.
- Malaysia, Ministry of Education. 2013. *Malaysia Education Blueprint 2013-2025*. Ministry of Education Malaysia, pp. 25-27. 2013 Available at: [http://www.moe.gov.my/images/dasar-kpm/articlefile\\_file\\_003108.pdf](http://www.moe.gov.my/images/dasar-kpm/articlefile_file_003108.pdf) (Accessed: 10 April 2017).
- Malaysia, Ministry of Education. 1988. *Ministry of Education Malaysia*. Available at: <http://www.moe.gov.my/index.php/en/dasar/falsafah-pendidikan-kebangsaan> (Accessed: 10 April 2017).
- Malaysia, Ministry of International Trade and Industry. 2006. *Third Industrial Master Plan 2006-2020: Malaysia - towards Global Competitiveness*. Kuala Lumpur, Malaysia.
- Malaysia, Ministry of Science, Technology and Innovation. 2002. *Second National Science and Technology Policy*.
- Malaysia, Ministry of Science, Technology and Innovation. 2013. *National Science, Technology and Innovation Policy*.
- Malaysia, Ministry of Science, Technology and Innovation, and Malaysian Science and Technology Information Centre. 2009. *National Survey of Innovation 2005-2008*. 1-101.
- Malaysia, Ministry of Science, Technology and Innovation, and Malaysian Science and Technology Information Centre. 2012. *National Survey of Innovation 2012*: 1-97.
- Malaysia, Secretariat to the Corporate Law Reform Committee, Companies Commission of Malaysia, undated. [online] Available at <http://www.ssm.com.my/files/clrc/articles/CLRCart3.pdf>. [Accessed 2 April 2017].
- Malaysia, SME Corporation. 2012. "SME Masterplan 2012-2020 for Malaysia." In *TECH MONITOR* July-Sept (2012): 38-39. Available at: [http://techmonitor.net/tm/images/c3/12jul\\_sep\\_start-up\\_venture.pdf](http://techmonitor.net/tm/images/c3/12jul_sep_start-up_venture.pdf) [Accessed: 2 April 2017].
- Malaysia, The 2017 Budget Speech. 2016. Prime Minister's Office of Malaysia, p. 21. Available at: <http://www.pmo.gov.my/bajet2017/Budget2017.pdf> (Accessed: 11 April 2017).
- Munnell, A. H. 1992. "Policy watch: infrastructure investment and economic growth." *The Journal of Economic Perspectives*, 6(4), 189-198.
- Nadiri, M. I., & Mamuneas, T. P. 1994. "The Effects of Public Infrastructure and R & D Capital on the Cost Structure and Performance of U.S. Manufacturing Industries." *The review of economics and statistics*, 76(1), 22-37. doi:10.2307/2109823
- Naidu, G. 2007. *Infrastructure development in Malaysia*. Nagesh Kumar, ed.
- Njikam, O. 2009. "Trade Liberalization, Infrastructure and Industrial Performance in Cameroon." Faculty of Economics & Mgt University of Yaoundé.
- North, D. C. 1994. "Institutions and productivity in history." *Economics working paper archive at WUSTL*.
- OECD (Organisation for Economic Co-operation and Development). 2005. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. Paris: OECD Publishing.

## Bibliography

- OECD. 2010. SMEs, Entrepreneurship and Innovation. OECD Studies on SMEs and Entrepreneurship (2010): 1-234.
- OECD. 2016. OECD Economic Surveys: Malaysia 2016: Economic Assessment. Paris: OECD Publishing.
- OECD. 2016. OECD review on innovation policy: Malaysia.
- Olszewski, P., & Tay, R. 1996. "Road Infrastructure Development in Singapore and Malaysia." *Asia Pacific Journal of Transport*, 1(1).
- Qiang, C. Z.-W., Pitt, A., & Ayers, S. 2004. "Contribution of information and communication technologies to growth." World Bank working paper series; no. 24. Washington, DC: World Bank.
- Rodrik, D., Subramanian, A., & Trebbi, F. 2004. "Institutions rule: the primacy of institutions over geography and integration in economic development." *Journal of economic growth*, 9(2), 131-165.
- Rodrik, Dani. 2014. "New Growth Strategies." Presentation at the World Bank conference on New Growth Strategies: Delivering on their Promise? October 2014.
- Romp, W., & De Haan, J. 2007. "Public capital and economic growth: A critical survey." *Perspektiven der Wirtschaftspolitik*, 8(S1), 6-52.
- Schwab, K. 2015. World Economic Forum's Global Competitiveness Report, 2016-2017.
- Serven, L. 2010. "Infrastructure and Growth." Research Brief: Development Research, World Bank Group. June 2010. <http://go.worldbank.org/TQMEWOD650>
- Shah, A. 1992. "Dynamics of public infrastructure, industrial productivity and profitability." *The review of economics and statistics*, 28-36.
- Simón-Moya, V., Revuelto-Taboada, L., & Guerrero, R. F. 2014. "Institutional and economic drivers of entrepreneurship: An international perspective." *Journal of Business Research*, 67(5), 715-721. doi:<http://dx.doi.org/10.1016/j.jbusres.2013.11.033>
- Sondergaard, Lars, and Mamta Murthi. 2012. "Skills, Not Just Diplomas: Managing Education for Results in Eastern Europe and Central Asia." *Directions in Development Series*. Washington, DC: World Bank, 2012.
- Stephen, F. H., Urbano, D., & van Hemmen, S. 2005. "The Impact of Institutions on Entrepreneurial Activity." *Managerial and Decision Economics*, 26(7), 413-419. doi:10.1002/mde.1254
- Straub, S. 2008. *Infrastructure and growth in developing countries* (Vol. 4460): World Bank Publications.
- Straub, S., & Terada-Hagiwara, A. 2010. "Infrastructure and Growth in Developing Asia." ADB Working Paper Series No. 231. November 2010. Manila: Asian Development Bank.
- Study Malaysia. 2016. Technical and vocational education and training (TVET) in Malaysia (2016) StudyMalaysia.com. Available at: <https://www.studymalaysia.com/education/top-stories/technical-and-vocational-education-and-training-in-malaysia> (Accessed: 10 April 2017).
- Syverson, Chad. 2016. "Challenges to Mismeasurement Explanations of the US Productivity Slowdown." NBER Working Paper Series, Working Paper 21974. Cambridge, MA: National Bureau of Economic Research.
- Turner, R. K. 2004. "Economic valuation of water resources in agriculture: From the sectoral to a functional perspective of natural resource management." (Vol. 27). Rome: Food & Agriculture Org.
- UNESCO (United Nations Educational, Scientific and Cultural Organization). 2013. *Malaysia Education Policy Review Abridged Report*. (pp. 12-13). Available at: <http://unesdoc.unesco.org/images/0022/002211/221132e.pdf> (Accessed: 10 April 2017).
- Wadsworth, J. 2002. "Labor Market Efficiency, Equity and Economic Performance." Centre for Economic Performance London School of Economics and Royal Holloway College, University of London.
- World Bank. 2010. "Malaysia Economic Monitor – Growth through Innovation." April 2010. Washington, DC: World Bank.
- World Bank. 2013. "Malaysia Economic Monitor. High Performing Education." December 2013. Washington, DC: World Bank.
- World Bank. 2014. "Doing Business 2015: Going Beyond Efficiency." Washington, DC: World Bank.
- World Bank. 2014a. "Innovating in the Manufacturing Sector in Latin America and Caribbean." *Enterprise Surveys: Latin America and the Caribbean Series Note No. 9* (December 2013). Washington, DC: World Bank.
- World Bank. 2014b. "Developing Skills for Innovation and a High Income Economy in Malaysia." A World Bank Study. Kuala Lumpur: World Bank.
- World Bank. 2015. "Malaysia Economic Monitor: Immigrant Labor." December 2015. Kuala Lumpur: World Bank.
- World Bank. 2016. "Live Long and Prosper." East Asia and Pacific Regional Report. Washington, DC: World Bank.
- World Bank. 2016a. "Malaysia Economic Monitor. The Quest for Productivity Growth." December 2016. Kuala Lumpur: World Bank.
- World Bank. 2016b. "Productivity as the key to economic growth and development." *Research Policy Briefs*; no. 3. Washington, D.C.: World Bank.
- World Bank. 2016c. "The Middle-Income Trap: Myth or Reality." *Research Policy Briefs*; no. 1. March 2016. Washington, D.C.: World Bank.
- World Bank. 2017. "Doing Business 2017: Equal Opportunity for All." Washington, DC: World Bank.
- World Economic Forum. 2015. *Global Competitiveness Report 2015-2016*.
- World Economic Forum. 2016. *Global Competitiveness Report 2016-2017*.
- Yusof, I. 2001. *An Evaluation of the Contributions of Private Sector Provision to the Development of Higher Education in Malaysia*. 1st ed. Available at: <http://etheses.whiterose.ac.uk/3509/1/341794.pdf> (Accessed: 12 April 2017).



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