

# MALAYSIA ECONOMIC MONITOR

JUNE 2017

# Data for Development



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## ABBREVIATIONS

ACSS	ASEAN Community Statistical System
ADAX	ASEAN Data Analytics eXchange
AEM	ASEAN Economic Ministers
AFC	Asian Financial Crisis
ASEAN	Association for Southeast Asian Nations
BDA	Big Data Analytics
BNM	Bank Negara Malaysia
BR1M	1Malaysia People's Aid ( <i>Bantuan Rakyat 1Malaysia</i> )
CBD	Central Business District
CCRIS	Central Credit Reference Information System
CEIC	Census and Economic Information Center
CPI	Consumer Price Index
CPO	Crude Palm Oil
DCA	Department of Civil Aviation
DOSM	Department of Statistics Malaysia
E&E	Electrical and Electronics
EAP	East Asia and Pacific
EDW	Enterprise Data Warehouse
EPU	Economic Planning Unit
EU	European Union
FDI	Foreign Direct Investment
FX	Foreign Exchange
GDP	Gross Domestic Product
GLC	Government-linked Companies
GSBPM	Generic Business Process Model
GST	Goods and Services Tax
HES	Household Expenditure Survey
HIS	Household Income Survey
HRDF	Human Resources Development Fund
HRMIS	Human Resources Management Information Systems
IFMIS	Integrated Financial Management Information Systems
ICT	Information and Communications Technology
IMF	International Monetary Fund
IMDA	Singapore Infocomm Media Development Authority
INTAN	Malaysian National Institute of Public Administration
MAMPU	Malaysian Administrative Modernisation and Management Planning Unit
MATRADE	Malaysia External Trade Development Corporation
MDEC	Malaysia Digital Economy Corporation
MGS	Malaysian Government Securities
MOF	Ministry of Finance
MOOCs	Massive Open Online Courses
MPC	Monetary Policy Committee
MSBR	Malaysia Statistical Business Register
MUC	Main User Committee

MyCoID	Malaysia Corporate Identity
MysIDC	Malaysia Informative Data Centre
MyIPCF	Malaysia Integrated Population Census Framework
NDF	Non-deliverable Forward
NEP	New Economic Plan
NEWSS	National Enterprise-Wide Statistical System
NFPCs	Non-Financial Public Corporations
NICF	Singapore National Infocomm Competency Framework
NSOs	National Statistical Offices
LNG	Liquefied Natural Gas
OBI	Open Budget Initiative
OD4D	Open Data for Development
ODB	Open Data Barometer
ODRA	Open Data Readiness Assessment
OECD	Organisation for Economic Cooperation and Development
OKI	Open Knowledge International
OPEC	Organization of the Petroleum Exporting Countries
PDP	Department of Personal Data Protection
PDPA	Personal Data Protection Act
PIKOM	The National ICT Association of Malaysia
q/q	Quarter-on-Quarter
saar	Seasonally Adjusted Annual Rate
SDGs	Sustainable Development Goals
SEEA	System of Environmental-Economic Accounting
SME	Small and Medium Enterprises
StatsDW	Statistics Data Warehouse
TVET	Technical and Vocational Education and Training
UNECE	United Nations Economic Commission for Europe
y/y	Year-on-Year

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# EXECUTIVE SUMMARY

## RECENT ECONOMIC DEVELOPMENTS AND OUTLOOK

**Malaysia's economic growth expanded strongly in 1Q 2017.** The economic growth has accelerated (1Q 2017: 5.6 percent; 4Q 2016: 4.5 percent, year on year (y/y)), supported by robust private consumption growth, due to stable labor market conditions and continued wage growth, and ongoing government income-support measures. Private investment also supported growth on capital spending in machinery and equipment, following the implementation of several large-scale projects. On the supply side, turnaround in the agriculture sector due to better weather conditions was a key contributor to economic growth. On the external front, gross exports rose on both manufacturing and commodities.

**GDP growth rate for 2017 is expected to accelerate to 4.9 percent, slightly above the government's current projection range of 4.3-4.8 percent.** The Malaysian economy is progressing from a position of strength. Private consumption is expected to remain the main engine of growth, while private investment will also lend steady support to growth, driven by capital spending on major government-led infrastructure projects. Concurrently, improving external demand, supported by an upturn in US GDP growth, and stabilization of global commodity prices is expected to contribute positively to economic growth. The GDP growth rate is projected to remain broadly constant at 4.9

percent in 2018 before rising to 5.0 percent in 2019.

**The current account surplus has declined (1Q 2017: 1.6 percent of GDP; 4Q 2016: 3.8 percent of GDP) due to strong import growth.** Gross imports growth, mainly of capital and intermediate goods, outpaced the significant increase in gross exports, resulting in a lower goods surplus. Also, widening services deficit, on ongoing payments to foreign service providers, particularly in transportation and construction sectors also added to the decline in the current account surplus.

**The current account surplus is projected to narrow further to 1.6 percent of GDP in 2017.** While the improvement in global growth and external demand would provide a positive tailwind to the current account, this is expected to be partially offset by higher capital and intermediate imports as growth accelerates. The services deficit is also expected to remain at its current level, further lowering the current account surplus.

**Monetary policy is expected to remain accommodative and supportive for growth.** The inflation rate is projected to increase to 3-4 percent in 2017 (2016: 2.1 percent), mainly in the first half of 2017 before gradually subsiding in the second half of the year. No second-round effects are anticipated, as excessive wage pressures remained contained. Credit growth to businesses remained steady in line with better economic environment, while household credit growth continued to moderate.

**Fiscal consolidation is expected to remain on track.** The government remains committed to achieving its deficit target of 3.0 percent of GDP in 2017. The government is expected to continue to work on achieving efficiency in spending, including focusing on more targeted subsidies, and focusing on projects with higher impact, such as public infrastructure for development expenditures. The stabilization of global commodity prices would benefit the government positively, and the Goods and Services Tax (GST) will provide diversification in revenue.

**The higher growth trajectory projected for 2017 opens up room to accelerate reduction in the fiscal deficit.** The acceleration of economic growth in Malaysia opens the space to move fiscal policy into a more neutral stance. Stability in global commodity prices could also increase commodity related revenues, providing additional leeway to consolidate the fiscal deficit at a faster pace. Also, the need of less expansionary fiscal policy can be an opportune time for the government to undertake further reforms to improve public sector efficiency. This could include reforming the civil service pension, gradually eliminating GST exemptions, and broadening the coverage of the personal income tax to further diversify the revenue base.

**Risks to the economy in the short-term stem mainly from external developments.** Many of these risks arise from the growing threats of protectionism. Also, uncertainty regarding the actual US fiscal stimulus and trade policies, and their prospective impact on global economic growth and trade,

could affect business sentiment in the economy. Another possible risk to growth is commodity price volatility, as sudden downward reversal in global commodity prices could affect external demand and limit the policy space, particularly on the fiscal side.

**Focus on implementing further structural reforms to raise the level of potential growth should continue.** The country's macroeconomic management has been constantly proactive and effective in navigating near-term challenges in the economic environment. Of equal importance is the need to accelerate structural reforms in the economy. This include looking into measures to raise the level of productivity, encourage innovation, invest in new skills, leverage digital technologies and continue ongoing efforts to improve efficiency of public service delivery.

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## DATA FOR DEVELOPMENT

The world is witnessing an unprecedented explosion of data. With rapid improvement of technologies, a greater volume and a wider range of data is increasingly available. For the past three decades, computing power has been doubling about every 18 months, generating trillions of gigabytes of data. It is estimated that 90 percent of the data in 2014 was created starting 2012, and it will continue to grow rapidly in the future.

**Data impacts development through various channels: better policy making and public service delivery, empowering homegrown research and enabling private sector economic growth.** The role of reliable data in economic development is increasing. Data improvements are creating opportunities for policymakers, researchers, companies, and citizen groups to make better, more timely and more informed decisions, enhance accountability, and increase economic growth. The public sector is increasingly using data to formulate, monitor and evaluate policies as well as to improve public service delivery. The research communities and academia are using data to undertake empirical analysis that could feed into other parts of the economy. The private sector is using data for product development, market analysis, and evidence-based decision-making or assessment.

- **Effective data management opens new opportunities for policy making and service delivery.** Reliable and timely microdata is an essential ingredient for research and policy analysis, as it permits, for instance, measurement of the distributional impact of public programs, which can contribute to more effective and fair policies. It allows public policies to target households, schools or municipalities, raising possibilities to assess distributional impact, track implementation and monitor results. Access to data, sometimes in real time, can also improve service delivery, as it raises the capacity of citizens to provide feedback, while strengthening government's accountability.
- **Researchers demand more granular data to improve policy analysis in Malaysia.** More open data means more opportunities for more and better research. High-income countries that have higher degree of openness have more publications per capita (1.9 on average, compared to the overall average of 0.8), suggesting that data openness is important for the productivity of research. Malaysia's research publications per capita are however constrained by its low open data scores. This is further confirmed by a survey conducted by the World Bank in Malaysia in September 2016. More than 75 percent of data users that responded to the survey agreed that data availability contributes to Malaysia's research capacity.

However, 89.5 percent of the respondents reported that data were not adequate in terms of granularity needed for rigorous economic research.

- **Good data is increasingly important for private sector development but Malaysia is yet to raise private sector contributions to data dissemination.**

Advances in technology allow rapid information disclosure, enabling businesses to gain different insights on market structure and service delivery. However, a major challenge for the private sector in Malaysia is its reluctance to share data because of privacy policies or corporate competitiveness. If more private and public data could be pooled and shared, public benefits could be generated. The private sector is warming up in adopting big data analytics (BDA) and the Malaysia Digital Economy Corporation (MDEC) is providing a structured BDA framework to increase the adoption rate by un-tapping the value of Big Data.

**Enhanced data is both an input and a result of the digital economy.** Digital data, which in 2013 amounted to 46 billion trillion bytes, overtook analog data around 1998. Data collection, management, and dissemination is evolving rapidly, streaming into a digital economy in today's world, which is expected to add US\$1.4 trillion into the global economy by 2020. Data is also the fuel that runs the digital economy, which in the case of Malaysia is estimated to be 18 percent of GDP. For instance, openly available global

positioning system (GPS) data supported markets for geospatial data and services worth US\$56 billion in 2013 in the United States alone.

**Realizing the potential that data offers for economic development in Malaysia calls for a more cooperative and open data ecosystem, with a key role for various institutions.**

Many developed economies have shown that creating a conducive environment for data sharing leverages the growing opportunities that policy analysis, service delivery or the digital economy offer. Also, it opens new opportunities for collaboration within the public and private sector and across them and the research community. This report aims to assess how the existing data ecosystem functions in Malaysia by understanding how data producers are able to capture its four main roles: collecting data, disseminating data, fostering collaboration among data producers, and engaging data producers with the users and general public.

**The demand for statistical products and services in Malaysia keeps growing in quantity and sophistication.**

The Department of Statistics Malaysia (DOSM), as the primary entity responsible for the collection and dissemination of socioeconomic data and statistics, has evolved to meet the growing information needs for the formulation and monitoring of government policies. Yet, users keep asking for more, more detailed, and timelier statistics, which DOSM aims to serve as part of its modernization efforts under its DOSM Transformation Plan 2015–2020. A main challenge however is the skill mix of DOSM staff, which has not evolved with technological advances and

increasing demands for information: managerial and technical staff positions are about 13 percent of DOSM's staff positions, compared to around 60-70 percent in statistical offices of advanced economies.

**Improving the open data environment will be critical for Malaysia's data ecosystem to match that of high income economies.** Open data, a policy that aims to make government-held data publicly available in formats that can easily be read and used, is a tool for transparency, accountability, and innovation. As of 2016, Malaysia's ranking in the Open Data Barometer (ODB), a global measure of how countries are publishing and using open data, was 53, lower than most advanced economies and many regional economies. Recognizing the room for improvement, the Malaysian Administrative Modernization and Management Planning Unit (MAMPU) has released 1,982 data sets and aims to release 7,000 datasets by 2020. There is a clear government aspiration to be among the top 30 countries in the ODB. Achieving open data in Malaysia is within reach, given the funding and resources allocated, but will require further refinement of legislation and policies for data dissemination.

**Data collaboration among data producers in Malaysia can create an ecosystem that integrates what seems to be a fragmented data microsystem.** The current national statistical system can be described as a "federated system" with multiple production units. Although DOSM is the largest statistical agency in the country, and the Statistics Act gives DOSM wide authority to collect and interpret statistics, the Act does not empower DOSM with any legislated mandate to coordinate or direct

the national statistical system. As a result, databases that are maintained by various ministries are sometimes not fully integrated at the national level, which combined with unclear policies for data dissemination, constrain the amount of data made public.

**User feedback in Malaysia remains key to ensure data relevance.** Civil society, the business community and academia in Malaysia are avid consumers of various types of data. Over time, key institutions, such as DOSM or MAMPU have adapted their means of communication and dissemination with technology, emphasizing online communications to reach a broader public audience. The next frontier is including the private sector and civil society more forcefully to ensure data relevance, and strengthen collaboration with private sector and researchers in data analysis.

**Malaysia's data systems have credibility but could further move into an integrated ecosystem that can properly support Malaysia's development agenda.** The ongoing policy and public service delivery data reforms will strengthen a system that is already very strong and credible. Yet, these efforts need to be matched by a broader ecosystem approach that further facilitates the exchange of granular data among public, private and research community to reap all its potential benefits. Several areas of improvement remain for achieving such a data ecosystem:

- **The statistical infrastructure in Malaysia needs to be restructured to reap efficiency to respond to growing demand.** To respond to this efficiency needs, statistical offices in more-

developed countries have gradually moved from being organized around economic and social statistics (e.g. national accounts) into specialized units (e.g. survey department) that serve multiple statistic outputs. This is complemented with an increased use of administrative data to reduce the need of dedicated surveys. Moving into this organization in Malaysia would likely require a more balanced share between technical and support staff, in line with national statistical offices in other upper-middle- and high-income countries.

- **A clearer legal and policy environment for data management in Malaysia would further facilitate open data dissemination.** Malaysia allocates ample resources for data collection and dissemination that they do not always translate into open data. Data holders are not always confident about the application of general rules and regulations related to privacy and confidentiality, and individual agencies may also face specific internal data management regulations. This creates a fragmented environment for data management, where the majority of data exchanges, whether inter-agency or with non-government stakeholders, are decided on a case-by-case basis, with senior managerial approval necessary for most decisions.
- **Engagement with data users should be continuous and fluid.** Strengthening the interaction between data providers and users in Malaysia would serve to better understand current and future data demands. This

can be complemented with efforts to educate the users and the general public on understanding data. In addition, reinforcing on-going efforts to strengthen data providers' websites could provide complementary sources of information to gather up-to-date information on user expectations.

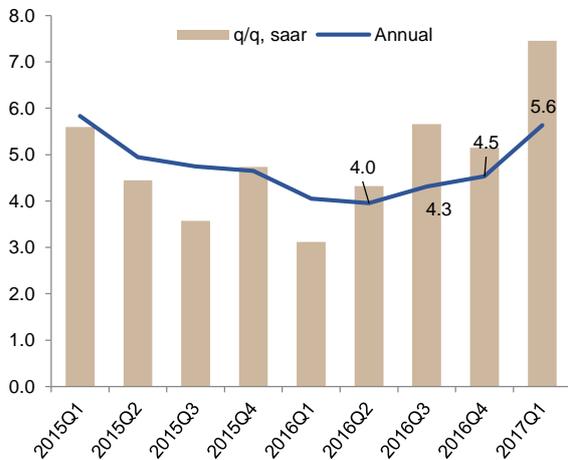
- **Increasing access of microdata to more users within the government sector and researchers.** Liberalizing more products could be done through a forward-looking microdata release policy that sets clear principles for dissemination and anonymity protection. Government agencies can then actively seek out stakeholders to provide more granular data for high-demand areas, publishing data inventories, and having standardized and streamlined procedures for requesting data. It could also be supported by increasing use of the secure room by where microdata can be released to researchers.



# RECENT TRENDS IN THE MALAYSIAN ECONOMY

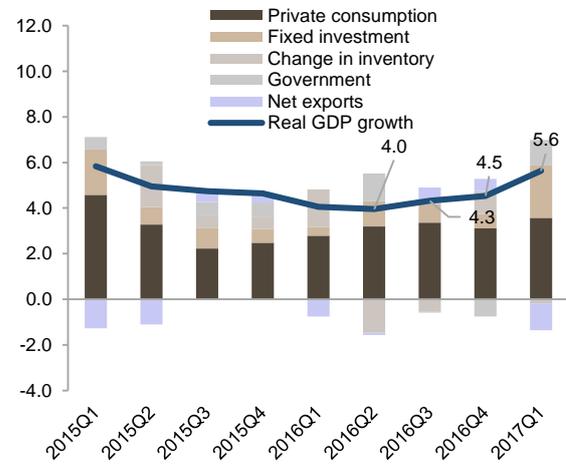
## GDP grew by 5.6 percent (y/y) in 1Q 2017...

GDP, q/q sa (annualized), annual, and y/y %



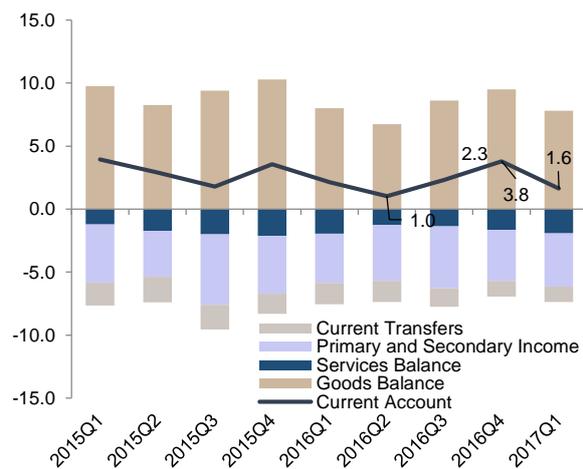
## ...continued to be driven by private consumption.

Contribution to GDP, y/y, %



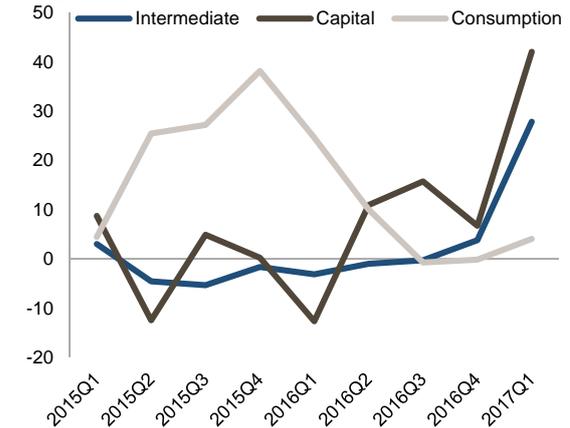
## The current account surplus narrowed to 1.6 percent of GDP...

Balances, % of GDP (last four quarters)



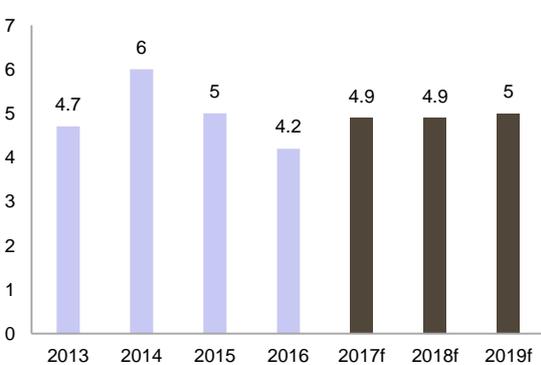
## ...in part due to larger capital and intermediate imports.

Change in import component, y/y, %



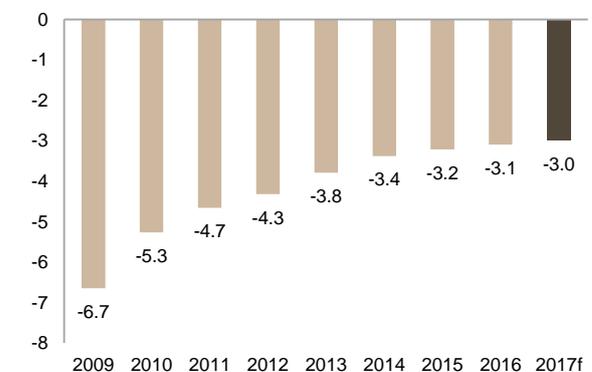
## GDP growth is expected to accelerate to 4.9 percent in 2017...

Annual GDP growth, %



## ...and fiscal consolidation is expected to continue through 2017.

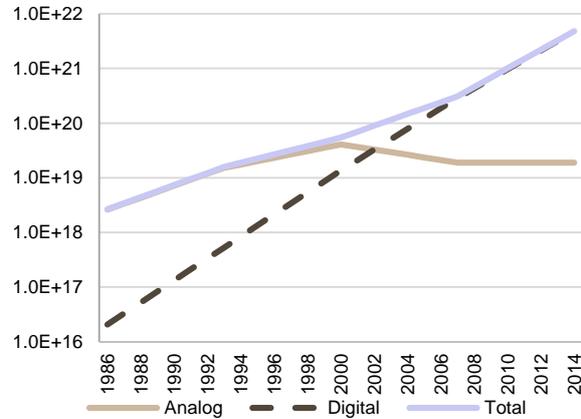
% of GDP



# DATA FOR DEVELOPMENT

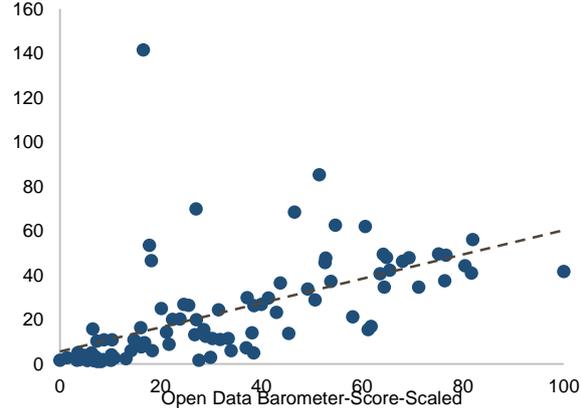
The amount of data generated in the world has increased exponentially in recent years...

Optimally compressed bytes



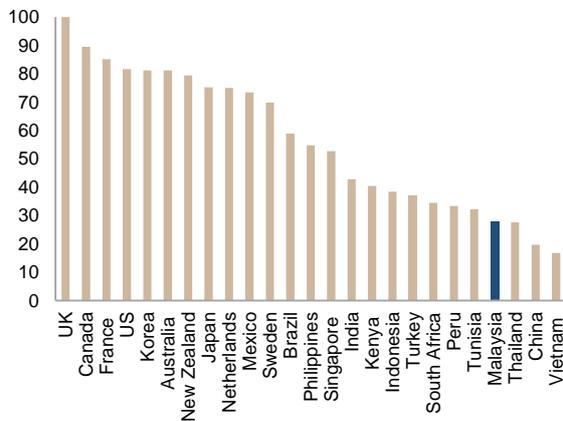
Higher degree of openness in data correlates positively with GDP per capita

GDP per capita (current international), USD thousands



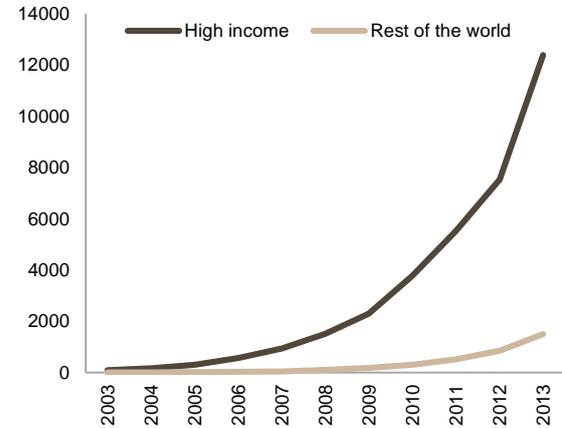
Malaysia's degree of data openness still trails many other countries...

Open Data Barometer Scores



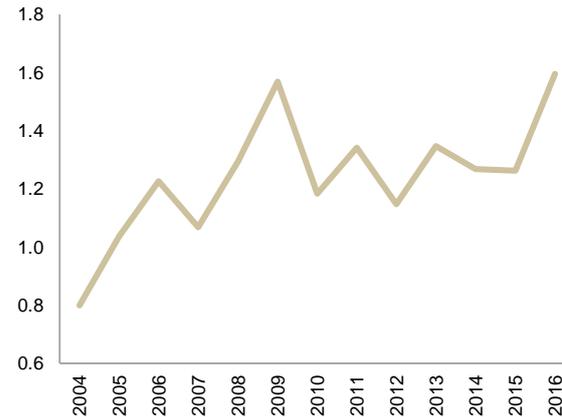
...driven by the significant growth in telecommunications power.

Optimally compressed kbps



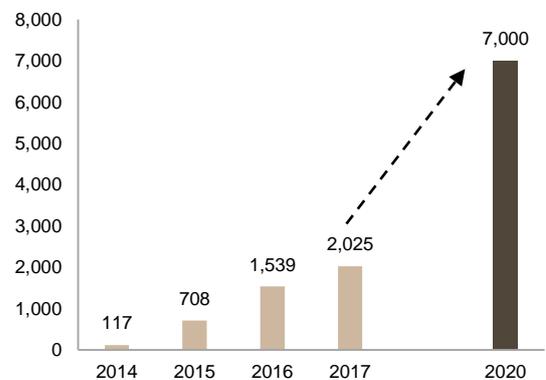
Usage of data has been effective as a catalyst for reforms

Average number of doing business reforms, annual



...but the government has put in place plans to achieve a higher degree of openness by 2020.

Number of data sets published



# RECENT ECONOMIC DEVELOPMENTS & OUTLOOK



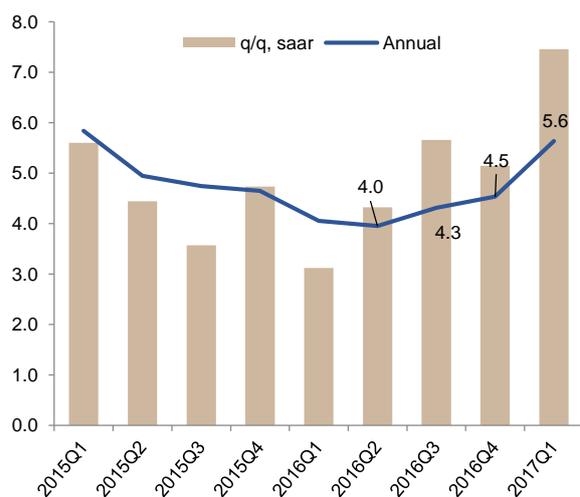
# RECENT ECONOMIC DEVELOPMENTS AND OUTLOOK

## BROAD-BASED EXPANSION OF THE MALAYSIAN ECONOMY IN 1Q 2017

1. **The Malaysian economy accelerated to 5.6 percent (y/y) in 1Q 2017 (4Q 2016: 4.5 percent), led by stronger domestic demand (Figure 1).** Private sector consumption continued to be the main driving factor behind the robust growth during the period. On the external front, despite higher export growth, underpinned by strong manufactured exports and improvement in commodity exports, strong imports reduced external contributions to GDP growth. There was also additional support coming from higher public consumption and investment during the period.
2. **Private consumption remains the primary anchor of economic growth (Figure 2).** Private consumption keeps expanding strongly (1Q 2017: 11.7 percent, 4Q 2016: 8.1 percent, q/q, saar), broadly driven by stable labor market conditions and continued wage growth. Also, ongoing government income-support measures, particularly the Bantuan Rakyat 1Malaysia (BR1M) cash transfers, saw an increase in the transfer amount. Additionally, seasonal factors, such as festival spending, provided a further boost to private consumption. Reflecting this, the Malaysian Institute of Economic Research Consumer Sentiment Index rose to 76.6 in 1Q 2017, up from 69.8 in from 4Q 2016.

**Figure 1: Malaysia's GDP grew robustly in 1Q 2017 by 5.6 percent**

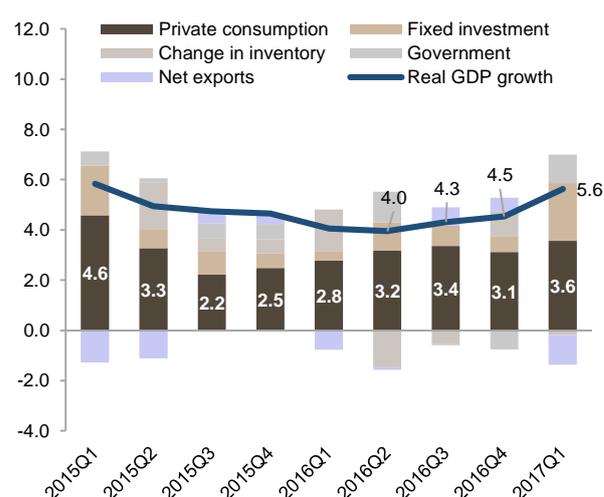
GDP - q/q saar, annual and y/y, %



Source: Census and Economic Information Center (CEIC), Department of Statistics Malaysia (DOSM), World Bank staff calculations

**Figure 2: Private consumption continues to be the main engine for GDP growth.**

Contribution to GDP, y/y, %



Source: CEIC, DOSM, World Bank staff calculations

3. **Private investment growth accelerated supported by a more optimistic external and domestic environment.** Private investment has accelerated (1Q 2017: 12.9 percent; 4Q 2016: 4.9 percent, y/y) supported by capital spending in machinery and equipment, following the implementation of several large-scale projects in the manufacturing sector and ongoing investments in the services sector. Investments in the manufacturing sector came largely from the *electrical and electronics* (E&E) subsector, while the transport and storage subsector led the investment in the services sector. The stabilization in global commodity prices also reinvigorated investments in the oil and gas sector. Furthermore, improved business sentiment, following a better international economic environment and strong domestic demand, was also a positive factor in supporting private investment.
4. **Public sector consumption and investment has accelerated in early 2017.** Public expenditure increased (1Q 2017: 7.5 percent; 4Q 2016: -4.2 percent, y/y) mainly driven by spending in salaries/emoluments, and supplies and services. Public investment also grew (1Q 2017: 3.2 percent; 4Q 2016: -0.4 percent, y/y) due to increased spending by public corporations on fixed assets. During 1Q 2017, Parliament passed a supplementary bill for government expenditures in 2016 amounting to RM4.1 billion, mainly to fund for additional expenditures in selected ministries including Education, Transport, and Health. Nonetheless, the approved bill does not affect the government's fiscal deficit target of 3.1 percent of GDP for 2016.<sup>1</sup>
5. **On the supply side, turnaround in the agriculture sector was a key contributor to economic growth.** As the negative effects from *El Niño* waned, the agriculture sector, including a surge in rubber production, outperformed the rest of the sectors (1Q 2017: 23.6 percent, q/q, saar). The services sector also accelerated (1Q 2017: 7.4 percent, q/q, saar), largely driven by the *information and communication*, and *finance and insurance* subsectors. In the manufacturing sector, the E&E subsector continued to lead the growth of the sector, in line with the continued increase in global demand for semiconductors. The construction sector was largely supported by civil engineering projects (petrochemical, transportation, utilities) and residential buildings segments, while the mining sector recorded a small contraction following lower oil production in Sarawak and West Malaysia, due to OPEC's agreement in January 2017 to cut production.
6. **For 2016, the Malaysian economy grew at 4.2 percent (y/y) (2015: 5.0 percent) against a more challenging economic environment.** Economic growth performance in Malaysia was affected by adjustments to lower commodity prices and lower economic growth in advanced economies, which affected external demand. Private sector consumption grew at 6.1 percent in 2016 (2015: 6.0 percent), remaining the main engine of growth. This was bolstered by stable labor market and steady wage growth, as well as various income-supporting measures including higher minimum wages and civil servants' salaries. Public

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<sup>1</sup> The supplementary bill approved the transfer of surplus allocation in development expenditure (DE) to operating expenditure (OE), and the use of funds which have been allocated for Contingency Spending. As such, no additional expenditures were incurred by the government.

consumption grew at a slower pace to 1 percent (2015: 4.4 percent) driven by ongoing fiscal consolidation efforts. Gross fixed capital formation (GFCF) expanded moderately by 2.7 percent in 2016 (2015: 3.7 percent) supported by investments in the *manufacturing* and *services* sectors. Investment in the *mining* sector continued to be constrained by lower oil prices.

- 7. On the supply side, all economic sectors expanded in 2016, with the exception of the agriculture sector.** The *services* sector recorded a higher growth of 5.6 percent in 2016 (2015: 5.1 percent) while the *manufacturing* sector grew by 4.4 percent in 2016 (2015: 4.9 percent), led by firm growth of the E&E segment and steady demand for food-related products and construction-related materials. Growth in the *mining* sector moderated to 2.2 percent (2015: 4.7 percent) given the low global commodity prices. The *construction* sector moderated slightly to 7.4 percent (2015: 8.2 percent), supported by ongoing construction of transportation and utilities projects as well as expansion of the residential sub-sector. In the *agriculture* sector, growth contracted by 5.1 percent (2015: 1.2 percent), as the production of crops, particularly palm oil was affected by El Niño phenomenon.

**Table 1: GDP Growth Decomposition (saar, q/q, %)**

	2015	1Q 2016	2Q 2016	3Q 2016	4Q 2016	2016	1Q 2017
GDP	5.0	3.1	4.3	5.7	5.1	4.2	7.5
Consumption							
Private Sector	6.0	9.6	4.2	2.7	8.1	6.0	11.7
Public Sector	4.4	6.0	12.0	-10.9	-19.5	0.9	65.2
Gross Fixed Capital Formation	3.6	-2.9	3.8	0.3	10.7	2.7	24.9
Exports of Goods & Services	0.3	-9.3	-0.9	7.9	11.8	1.1	21.8
Imports of Goods & Services	0.8	-4.0	-6.9	5.2	11.7	1.1	48.5
Sectoral							
Agriculture	1.3	-18.9	13.5	-3.7	3.3	-5.1	23.6
Mining	5.3	4.8	8.1	2.9	4.4	2.2	-7.8
Manufacturing	4.9	3.4	3.5	5.4	6.7	4.4	6.3
Construction	8.2	10.8	4.4	8.3	-2.1	7.4	14.5
Services	5.1	6.3	4.0	7.1	4.7	5.6	7.4

Source: Economic Planning Unit, DOSM

- 8. Inflation peaked in 1Q 2017, driven by higher transport and fuel prices (Figure 3).** During the quarter, inflation was on an uptrend before peaking at 5.1 percent (y/y) in March 2017, the highest level since November 2008. This was explained by the increase in the index of transport group, driven by the upward adjustment in domestic fuel prices.<sup>2</sup> Other reasons were the low base effect from last year, and higher food prices due to increase in prices of fish and other seafood due to unfavorable weather conditions at the

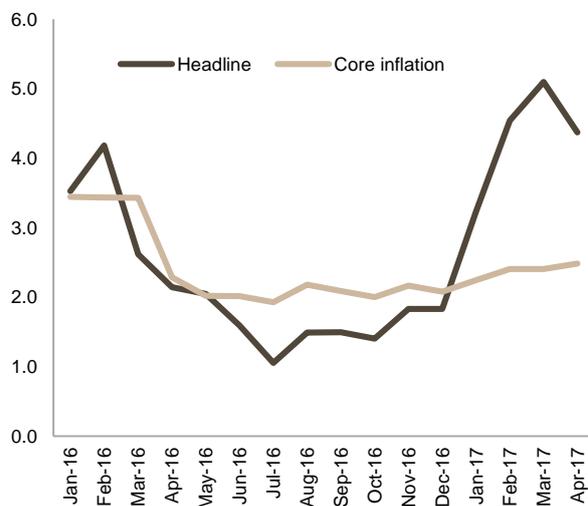
<sup>2</sup> The average price of 1 liter of RON95 petrol was RM2.29 in March 2017, compared to RM1.60 in March 2016.

beginning of the year as well as increase in the prices of cooking oil following the removal of cooking oil subsidy in November 2016. The higher inflation trend is expected to continue throughout 1H 2017 before gradually easing subsequently. In April 2017, inflation moderated to 4.4 percent (y/y).

9. **Although indications of second-round effects of inflation are minimal, concerns about increases in the cost of living remain.** This is the case in particular of the lower-income group, which allocates almost 40 percent of its monthly expenditure on food. This is more pronounced especially among those in highly urbanized states which saw higher increases in the *food and non-alcoholic beverages* component of their CPI during the quarter (Figure 4).

**Figure 3: Inflation peaked in 1Q 2017, on higher fuel prices**

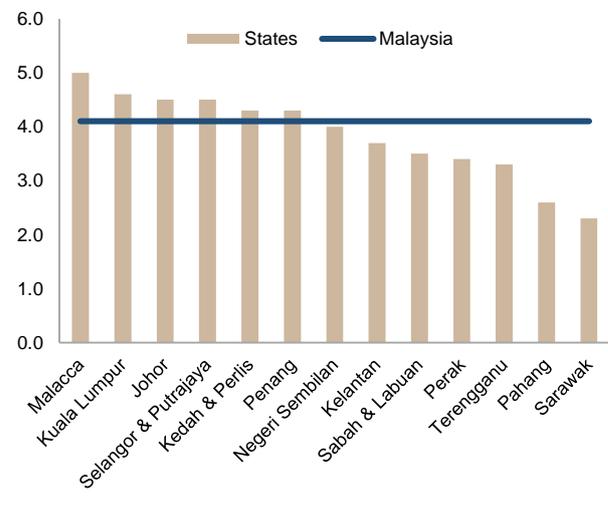
Inflation, %, annual change



Source: CEIC, DOSM, BNM, World Bank staff calculations  
 Note: Core inflation excludes transportation and food prices; the producer price index is for local production.

**Figure 4: Highly urbanized states saw higher increases in food and beverage prices.**

CPI: Food and non-alcoholic beverage, %, annual change



Source: CEIC, DOSM, World Bank staff calculations

10. **Labor market conditions remain strong.** As at March 2017, the unemployment rate declined to 3.4 percent from 3.5 percent in January and February 2017. Similarly, the labor force participation rate was sustained at 67.7 percent as at end March (Figure 5). Private sector wage growth during 1Q 2017 was sustained at 4.5 percent (y/y). Stronger wage growth in the services at 5.1 percent (4Q 2016: 3.7 percent) helped to mitigate the moderating wage growth in the manufacturing sector during the quarter.

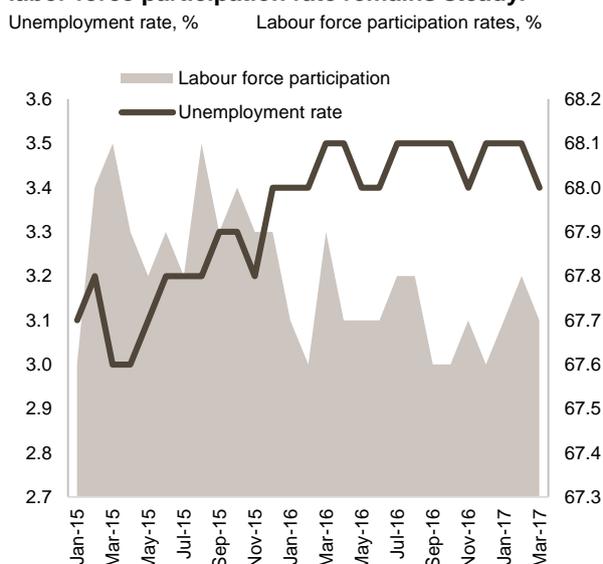
11. **The report on annual salary and wages<sup>3</sup> showed that overall wage growth remained steady and above inflation in 2016 (Figure 6).** Median nominal monthly wages increased by 6.2 percent in 2016 (2015: 6.3 percent) and remaining well above inflation, which was below 2 percent over the same period. The median wage growth in urban areas of 7.5 percent outpaced growth in rural areas (4.6 percent). The growth in men's average wages

<sup>3</sup> Department of Statistics Malaysia – Salary and Wages Survey Report 2016.

in 2016 was slightly higher than women's, growing at 6.4 and 6.2 percent, respectively. The increase in the amount of BR1M's cash handouts has further provided support to household income.

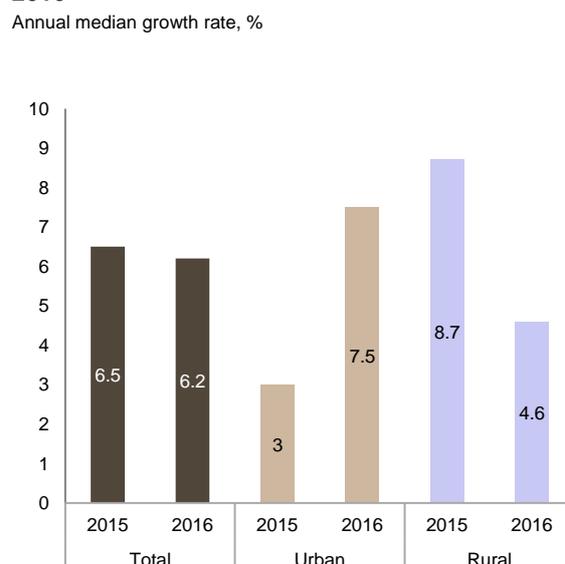
12. **Stable labor market conditions and steady wage growth was accompanied by an increase in labor productivity in 2016.** For 2016, unemployment rate remained low at 3.5 percent, albeit slightly higher than its long-term average of 3.0 percent. Labor force participation also was stable at about 67 percent. The steady wage growth observed in 2016 was in tandem with a slight improvement in labor productivity, which increased from 3.4 percent in 2015 to 3.5 percent in 2016,<sup>4</sup> with the *manufacturing* and *services* sectors registering the highest level of labor productivity at 1.4 percent and 2.8 percent, respectively. Nonetheless, it should be noted that the labor productivity still trails regional and other high-income economies.

**Figure 5: Unemployment has declined, and the labor-force participation rate remains steady.**



Source: CEIC, DOSM

**Figure 6: Overall wage growth remained steady in 2016**



Source: DOSM

<sup>4</sup> Malaysia Productivity Corporation estimate (<http://www.theedgemarkets.com/article/msia-labour-productivity-growth-unsatisfactory>).

## THE CURRENT ACCOUNT SURPLUS NARROWED ON HIGHER SERVICES DEFICIT AND LOWER GOODS SURPLUS

### 13. Gross exports performed strongly due to both manufacturing and commodities exports.

Exports significantly increased (1Q 2017: 21.8 percent; 4Q 2016: 11.8 percent, q/q, saar), with manufactured exports mainly driven by higher exports of semiconductor devices to the US, China and regional economies. The broad-based improvement in commodity prices also contributed to higher commodity exports, which also benefitted from higher export volumes of crude palm oil (CPO), liquefied natural gas (LNG) and crude oil.

### 14. Gross imports rose due to larger imports of capital and intermediate goods (Figure 8).

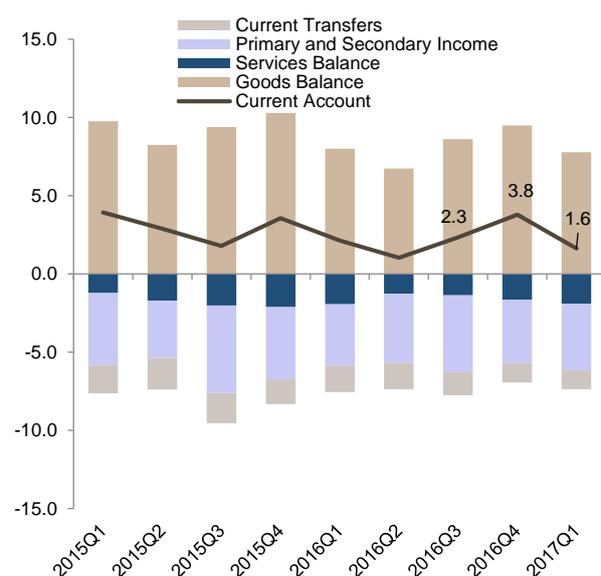
Capital imports increased (1Q 2017: 42.0 percent, y/y) largely due to purchases of high-value items, including oil and gas vessels and several aircraft. Reflecting the higher manufacturing exports, intermediate imports also rose by 27.8 percent (y/y). At an aggregated level, gross imports in 1Q 2017 rose 48.5 percent (q/q, saar) (4Q 2016: 11.7 percent).

### 15. A widening services deficit contributed to the declining of the current account.

The current account surplus declined to 1.6 percent of GDP in 1Q 2017 (4Q 2016: 3.8 percent) (Figure 7), primarily driven by a lower goods surplus, as the increase in imports outpaced the increase in exports. Also, the services deficit continued to grow during the quarter and increasing by 15.3 percent from 4Q 2016, led by higher payments for transportation and construction services despite an improvement of the travel surplus.

**Figure 7: The current account surplus narrowed to 1.6 percent of GDP in 1Q 2017...**

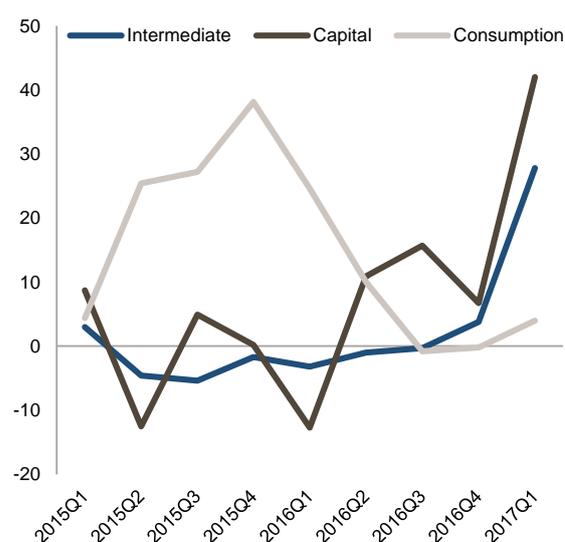
Balances, % of GDP (last four quarters)



Source: CEIC, DOSM, World Bank staff calculations

**Figure 8: ...in part due to lower goods surplus following higher capital and intermediate imports**

Change in import component, y/y, %



Source: BNM

**Table 2: Summary – Selected External Sector Indicators**

	4Q 2015	1Q 2016	2Q 2016	3Q 2016	4Q 2016	1Q 2017
Balance of goods & services (% of GDP)	8.2	6.1	5.5	7.2	7.8	5.9
Current account balance (% of GDP)	3.6	2.1	1.0	2.3	3.8	1.6
Total exports (% of GDP)	72.2	67.7	66.7	67.0	69.1	71.3
Total imports (% of GDP)	59.5	55.4	56.9	56.9	61.3	65.4
Net portfolio investment (RM billion)	18.0	14.1	0.1	-10.6	-19.1	-31.9
Gross official reserves (RM billion)	409.1	381.6	390.4	405.0	423.9	422.2
(US\$ billion)	95.3	97.0	97.2	97.7	94.5	95.4

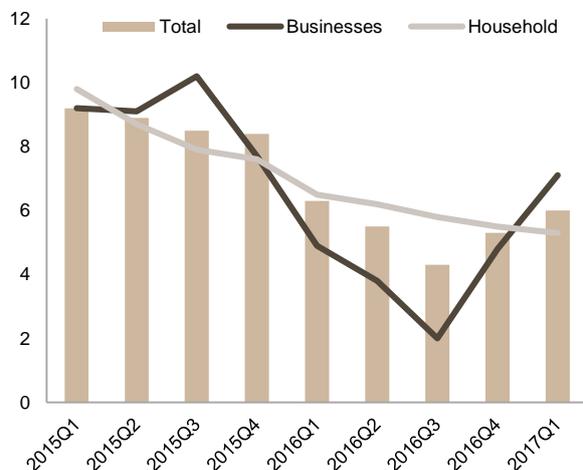
Source: Bank Negara Malaysia, DOSM

## THE DOMESTIC FINANCIAL SYSTEM REMAINS STABLE

16. **The central bank (Bank Negara Malaysia, BNM) kept the overnight policy rate at 3.00 percent in the most recent monetary policy committee meeting.** In its May monetary policy statement, BNM indicated that it expects the expansion in the global economy to continue with growth in emerging economies continuing, supported by strong external demand. For Malaysia, BNM expects growth to be mainly driven by domestic demand amid continued wage and employment growth, and the implementation of new and on-going investment projects. In addition, it expects the higher headline inflation in the first half of 2017 to moderate in the second half of the year.
17. **Growth of outstanding loans to the banking system was higher in 1Q 2017.** The growth rate of outstanding loans in the banking system accelerated (1Q 2017: 6.0 percent; 4Q 2016: 5.3 percent, y/y) in line with the stronger economic growth. The higher growth in outstanding loans was driven by loans given to businesses (1Q 2017: 7.3 percent; 4Q 2016: 4.9 percent, y/y) (Figure 9) mainly channeled to the *finance, insurance, and business services, transport, storage and communication, and construction* sectors. Outstanding loans to small and medium enterprises (SMEs) continued to outpace average loan growth, growing at 9.2 percent (y/y) in 1Q 2017. The contraction in loan applications by businesses slowed down (1Q 2017: -1.6 percent; 4Q 2016: -14.1 percent, (y/y), signaling improvement in overall business sentiment.

**Figure 9: Credit growth in the banking system was higher, driven by businesses**

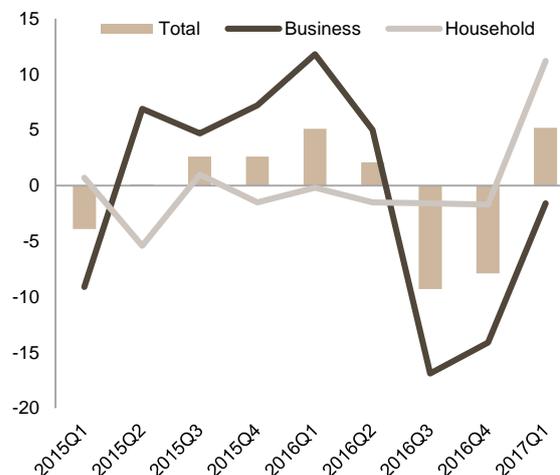
Outstanding loans, y/y, %



Source: BNM, World Bank staff calculations

**Figure 10: Demand for loans by households increased**

Loan applications, y/y, %



Source: BNM, World Bank staff calculations

18. **The moderation in household credit growth continued in 1Q 2017.** The growth rate of outstanding household debt moderated further (1Q 2017: 5.2 percent; 4Q 2016 5.4 percent, y/y), driven by a decline in passenger cars loans, and purchase of securities loans (Figure 9). Residential property financing continued to drive household credit growth (1Q 2017: 8.5 percent; 4Q 2016: 9.1 percent, y/y), reflecting sustained demand for affordable housing. Higher loan application (11.2 percent) and approval (13.3 percent) rates during the quarter also partially reflected the ongoing demand for affordable housing (Figure 10). The quality of the household debt portfolio remained stable, as affordability assessments indicate that about 42 percent of borrowers with newly-approved loans have debt service ratios of less than 40 percent. Both aggregate impaired and delinquent loans ratios remained unchanged at 1.6 percent and 1.3 percent, respectively.

19. **The banking system continues to remain resilient.** Financial indicators continue to show that the banking system remains well-capitalized, and the banking system's net impaired loans rate remained below 2 percent in 1Q 2017. While external debt recorded an increase amid the strengthening of the ringgit, the bulk of external borrowings continue to comprise of inter-bank and inter-company obligations, minimizing funding and rollover risk. Liquidity in the banking system remained sufficient, and the liquidity coverage ratio rose from just under 124 percent in 4Q 2016 to 131 percent in 1Q 2017, far above the statutory minimum of 80 percent. Further underscoring the resilience of the banking system, BNM indicated that banking institutions are no longer required to maintain a

reserve fund<sup>5</sup>, given that banking institutions have begun a four-year phase to maintain a capital conservation buffer, which have the same purpose as the reserve fund requirement.

## PORTFOLIO OUTFLOWS IN THE DOMESTIC BOND MARKET ACCELERATED

20. **Large portfolio outflows were recorded in 1Q 2017, driven by developments in the ringgit bond market.** During the quarter, non-resident holdings of government bonds fell from 30.6 percent of total outstanding government bonds<sup>6</sup> in 4Q 2016 to 24.7 percent in 1Q 2017, contributing to the portfolio outflows in 1Q 2017 to RM31.9 billion (4Q 2016: RM19.1 billion) (Figure 11). The decline was mainly driven by unwinding of non-deliverable forward (NDF) positions by non-resident financial institutions, and the two MGS maturing, of which RM11.5 billion was held by foreign investors. However, the presence of domestic institutional investors helped to mitigate the impact of the outflows, particularly on MGS yields. While the 3- and 5-year MGS yields rose by 6.4 and 12.4 basis points, the 10-year MGS yields declined by 7.9 basis points. Net inflows of foreign direct investment (FDI) increased to RM17.0 billion in 1Q 2017, largely channeled into the *mining sector* and *non-financial services* sub-sectors. There has been a noticeable increase in FDI from China from 2.4 billion in 3Q 2016 to RM3.1 billion and RM3.2 billion in 4Q 2016 and 1Q 2017, respectively, with Chinese investments in key transportation and urban development projects.
21. **The ringgit appreciated by 1.3 percent against the US dollar in 1Q 2017 (Figure 12).** The appreciation was in part due to the weakening of the US dollar, following uncertainty of US trade and fiscal policies going forward. Similarly, regional currencies also appreciated against the US dollar during the period. Against other major currencies, the ringgit remained unchanged against the Euro and weakened against the UK pound and Yen.

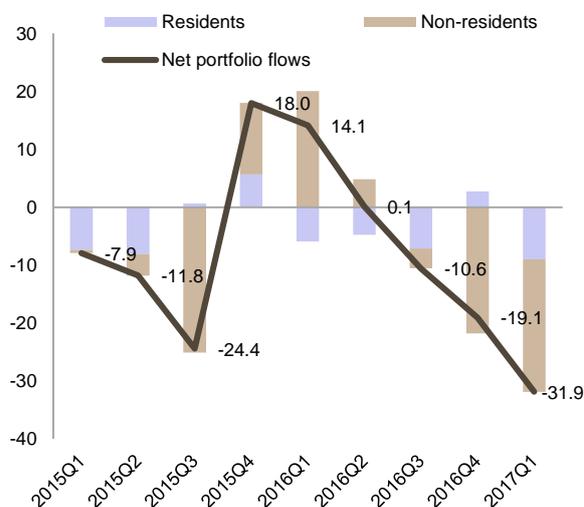
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<sup>5</sup> In the past, Malaysian banks were required to set aside a percentage of their profits as buffers (known as reserve fund) before any distribution of dividends can be made. This buffer serves as a prudential tool for banks that can be used during period of stress to ensure that banks can continue to provide financial services without any disruption.

<sup>6</sup> Includes Malaysian Government Securities (MGS), Government Investment Issues (GII), and Sukuk Perumahan Kerajaan (SPK).

**Figure 11: Higher net portfolio outflows largely driven by non-resident investors**

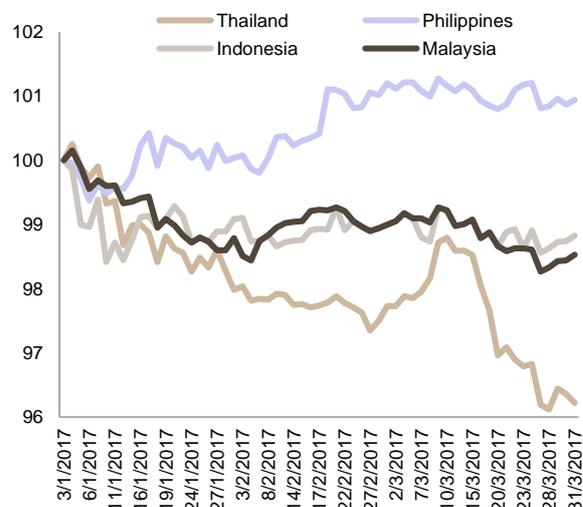
Portfolio flows, RM billion



Source: CEIC, DOSM, World Bank staff calculations

**Figure 12: The depreciating trend in ringgit has recently reversed**

Currency/ US\$, Rebase Jan 2017 = 100



Source: CEIC, BNM, World Bank staff calculations

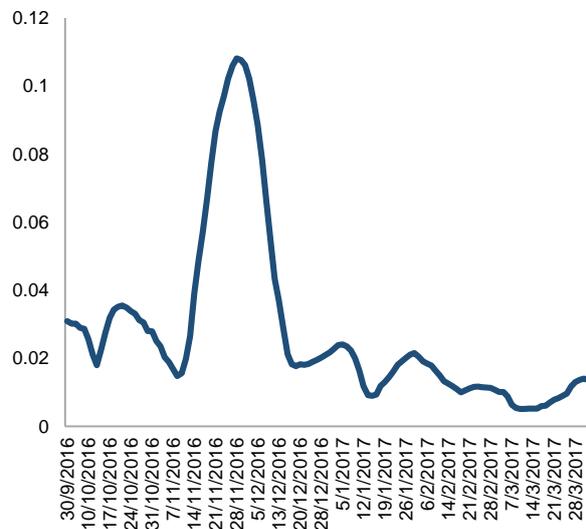
Note: An decrease indicates appreciation

22. **Since the introduction of the exchange rate measures by BNM in November 2016<sup>7</sup>, volatility in the foreign exchange (FX) market has subsided (Figure 13).** Following the announcement by BNM on FX measures in November 2016, volatility in the exchange rate spiked, given the rising uncertainty prevailing during that period. Subsequently, BNM has held several rounds of engagements with financial market participants, businesses, and the general public to clarify the measures and provide regular updates. BNM's Financial Markets Committee also regularly published statements on BNM's website, providing latest developments in the domestic FX market, as well as discussing further initiatives to develop the market. In its latest statement in May 2017, the Committee indicated that the onshore FX market recorded an increase in trading volume for ringgit from USD5.2 billion in February to USD6.3 billion in April. Additionally, there has been more balanced FX flows between exports and imports, with exports conversion exceeding imports by USD919 million (Figure 14).

<sup>7</sup> In November 2016, BNM introduced a series of measures to develop the onshore FX market, and introduced measures which require exporters to convert most of their proceeds to ringgit.

**Figure 13: Ringgit volatility has subsided since introduction of measures in November**

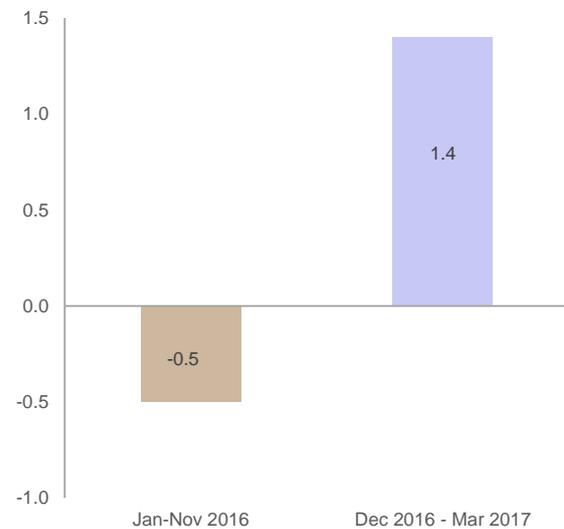
30-day rolling standard deviation, MYR/US\$



Source: BNM, World Bank staff calculations

**Figure 14: More export proceeds are being converted into ringgit**

US\$ billion



Source: BNM

## MALAYSIA'S GDP GROWTH IS EXPECTED TO ACCELERATE IN 2017

23. **The GDP growth rate is expected to accelerate in 2017 to 4.9 percent, slightly above the government's projection range of 4.3-4.8 percent (Tables 3 and 4).** This is an increase from the previous forecast of 4.4 percent.<sup>8</sup> The strong momentum in private consumption is expected to continue to anchor economic growth, with a stable labor market and wage growth, coupled with income-support measures, including the BR1M cash transfers. Private investment will also provide steady support to growth, driven by ongoing capital spending in the manufacturing sector and various infrastructure projects, while stabilizing commodity prices are expected to revive investments in the *oil and gas* sector. Furthermore, improvement in commodity prices, particularly in crude palm oil and rubber, coupled with the recovery in the *agriculture* sector, would also help to provide additional disposable income, particularly to smallholders. Concurrently, growing global trade growth, supported by recovery in global economic growth, is expected to contribute positively to exports. The upgrade in the World Bank's growth estimate for 2017 is in line with consensus estimates, which expects a faster expansion in the economy (Figure 15).

<sup>8</sup> April 2017, East Asia and Pacific Economic Update.

**Table 3: GDP growth is projected to accelerate to 4.9 percent in 2017...**

Growth Rates (y/y, %)	2016	2017f	2018f	2019f
GDP	4.2	4.9	4.9	5.0
Domestic demand (including stocks)	4.5	5.0	5.0	4.4
Final consumption	4.9	5.7	5.6	4.8
Private sector	6.0	6.5	6.3	5.4
Public sector	0.9	2.8	3.0	2.2
Gross Fixed Capital Formation	2.7	3.3	3.2	3.0
External demand	1.5	3.9	3.3	3.5
Exports of Goods & Services	1.1	3.8	0.8	0.5
Imports of Goods & Services	1.1	3.8	0.4	0.1

Source: World Bank staff calculations

**Table 4: ...and remain around the range for 2018 and 2019.**

Contribution to GDP Growth (percentage points)	2016	2017f	2018f	2019f
GDP	4.2	4.9	4.9	5.0
Domestic demand (including stocks)	4.1	4.6	4.6	4.7
Final consumption	3.2	3.8	3.8	3.8
Private sector	3.1	3.4	3.4	3.5
Public sector	0.1	0.4	0.4	0.3
Gross Fixed Capital Formation	0.7	0.8	0.8	0.9
Change in Stocks	0.2	0.0	0.0	0.0
External demand	0.1	0.3	0.3	0.3
Exports of Goods & Services	0.8	2.7	0.5	0.4
Imports of Goods & Services	-0.7	-2.4	-0.2	-0.1

24. **Over the near term, GDP growth is expected to be between 4.9 and 5.0 percent in 2017 and 2018, respectively.** Domestic demand, led by private consumption, is projected to remain the main driver of economic growth, supported by a strong stable labor market, steady wage growth, and ongoing income-support measures, including increased cash transfers. Major transportation infrastructure projects are expected to shore up both private and public investment, as the country approaches the final stages of its current national development plan. Further recovery in global commodity prices could also contribute to export growth and boost capital expenditures, particularly in the *oil and gas* sector. External headwinds are expected to continue to affect Malaysia's economic outlook over the medium-term, especially uncertainty regarding US trade and fiscal policies, China's ongoing economic rebalancing, and fluctuations in the global commodity prices.
25. **Global economic growth is projected to strengthen to 2.7 percent in 2017.**<sup>9</sup> Global activity is firming broadly. Manufacturing and trade are picking up, confidence is improving, and international financing conditions remain benign. Activity in advanced economies is expected to gain momentum in 2017, supported by an upturn in the United States. Obstacles to growth among commodity exporters are gradually diminishing, while activity in commodity importers remains generally robust. Despite substantial policy uncertainty, global economic growth is projected to accelerate to 2.7 percent in 2017, up from a post-crisis low of 2.4 percent in 2016. In the US, GDP growth is expected to recover to 2.1 percent in 2017, following a slowdown in 2016 that reflected investment and export weakness. GDP growth in the euro area is expected to remain at around 1.7 percent in 2017, helped by accommodative monetary policy and stronger exports. GDP growth in Japan is projected to accelerate to 1.1 percent in 2017 from 1 percent in 2016, reflecting strengthening domestic demand and exports. China's economic growth is projected to

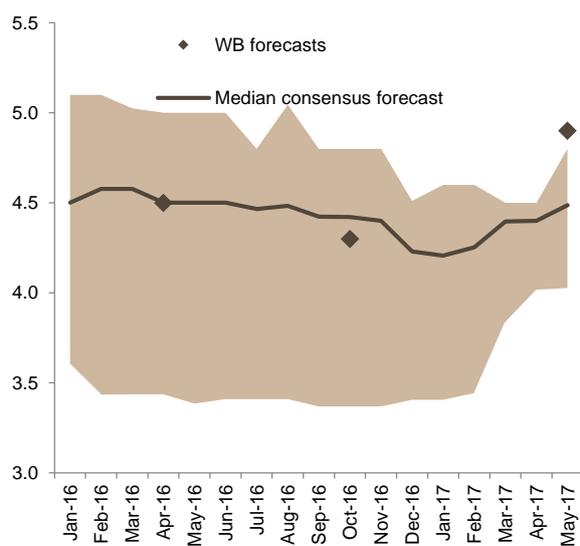
<sup>9</sup> Unless noted otherwise, all GDP forecasts are taken from the June 2017 Global Economic Prospects (World Bank, 2017).

slow to 6.5 percent in 2017, as the economy rebalances. This forecast envisages strengthening trade, gradual acceleration of exports, amid robust domestic demand.

26. **Global growth is to strengthen further to 2.9 percent in 2018-19 (Figure 16).** In advanced economies, economic growth is expected to moderate to 1.8 on average in 2018-19, with output gaps narrowing and inflation gradually converging toward central bank targets. U.S. monetary policy normalization is expected to proceed at a measured pace. Global outlook is predicated only on legislated fiscal and trade policies. Growth in commodity exporters is projected to accelerate firmly from 1.8 percent in 2017 to 2.7 percent in 2018, while commodity importers growth is projected to remain stable, at an average of 5.7 percent. The aggregate growth rate for emerging markets and developing economies is projected to accelerate to 4.5 percent in 2018 and 4.7 percent in 2019. Nonetheless, weak investment and slow productivity growth pose a challenge to developing economies' medium-term prospects.

**Figure 15: The median consensus expects a faster expansion of the economy in 2017**

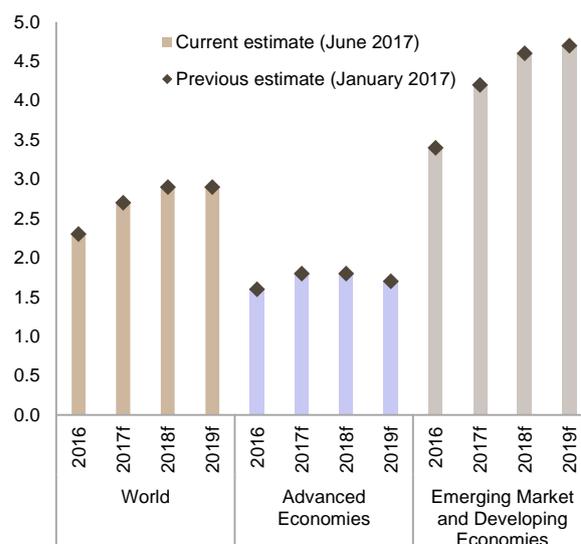
Annual GDP growth, %



Source: Consensus Economics, World Bank staff calculations  
 Note: Shaded area indicates gap between highest and lowest surveyed forecast

**Figure 16: Global growth is expected to strengthen in 2017 and accelerate further in 2018**

Annual growth, %



Source: World Bank staff calculations  
 Note: Bars indicate latest projections

## MACROECONOMIC FUNDAMENTALS ARE EXPECTED TO REMAIN STEADY IN 2017

27. **Inflation is expected to average higher in 2017, due to the recovery of global oil prices, which translates into higher domestic fuel prices.** BNM is projecting inflation to be between 3-4 percent in 2017 (2016: 2.1 percent), with inflation trending upward in the first half of 2017, before gradually subsiding in the second half of the year. Indirect impact from higher domestic fuel prices could also contribute to higher inflation. Any further weakening in the ringgit is expected to have limited impact, given that domestic production and consumption contain relatively-modest import content. Additionally, no second-round effects are currently anticipated, as wage pressures remained contained. Nonetheless, sustained upward pressure on inflation could prevail, should global oil prices trend higher than anticipated.
28. **The current account surplus is projected to narrow further to 1.6 percent of GDP in 2017 (2016: 2.4 percent).** While the recovery in global growth and stabilization in commodity prices bode well for external demand and subsequently the current account surplus, this is expected to be partially offset by higher capital imports, given ongoing investments in the economy and higher intermediate imports in tandem with improvement in exports. Furthermore, the services deficit is expected to remain at its current level, following continued reliance for foreign service providers, particularly in the *oil and gas, transportation, business services* and *energy* sectors. The confluence of these developments would have a notable impact on the current account surplus.
29. **Monetary policy is expected to remain accommodative and supportive of economic growth.** Acknowledging that growth is forecasted to be higher in 2017 and that inflation is expected to average higher in 2017 compared to 2016, the monetary policy committee (MPC) in its recent statement also noted that the ringgit has continued to stabilize, and banking system liquidity remains sufficient. Concurrently, the MPC also indicated that risks to global growth arising from protectionism, geopolitical developments, and commodity price volatility could heighten financial market volatility.
30. **Fiscal consolidation is to continue, and the government remains committed to achieving its deficit target of 3.0 percent of GDP in 2017.** The government is expected to continue to rein in on its expenditures, and continue to work on achieving efficiency in spending, including focusing on more targeted subsidies and on projects with higher impact, such as public infrastructure, for development expenditures. Nevertheless, expenditure for pension and salaries are expected to continue to grow and constitute the biggest portion of government spending. On the revenue side, the stabilization of global commodity prices would benefit the government positively, and the goods and services tax (GST) will provide diversification in revenue.

## BETTER ECONOMIC ENVIRONMENT PROVIDES OPPORTUNITY TO ACCELERATE FISCAL CONSOLIDATION AND CONTINUE WITH REFORMS

31. **The Malaysian economy has been able to weather a challenging economic environment in 2016 effectively.** The government was pro-active in responding to the decline in oil prices at the beginning of the year, by recalibrating its budget and ensuring that fiscal consolidation remains on track. In addition, the government's income-support measures, including targeted cash transfers such as BR1M, supported private consumption. The reduction of interest rates by the central bank also provided further relief to indebted households. On the external front, the well-diversified economy has helped to cushion the impact of lower commodity prices on trade, as manufacturing exports continued to provide support to the economy. For 2016, the economy grew at 4.2 percent, within the government's target; fiscal consolidation continued, unemployment remained low at 3.4 percent, and wage growth remained healthy.
  
32. **Growth will continue to be broad-based in 2017, and Malaysia is progressing from a position of strength.** Private consumption is expected to remain robust and be the main engine for growth, supported by a stable labor market and ongoing income-support measures. Private and public investments are also projected to contribute to GDP growth, given the expansion in the manufacturing and services sectors, as well as the implementation of various infrastructure projects. The stabilization of global commodity prices would contribute positively to exports and trade in general and help to reignite private investments particularly in the *oil and gas* sector.
  
33. **The higher growth trajectory projected for 2017 opens up room to undertake further reforms to achieve larger reductions in the fiscal deficit.** The stability in global commodity prices, and recovery in external trade, could prove opportune for the government to undertake further measures to accelerate fiscal consolidation. To date, the government's fiscal consolidation efforts have focused on reducing operating expenditures, especially untargeted subsidies and transfers, and introducing the GST. Going forward, given higher petroleum revenues, which provides an additional buffer to government finances, the government may consider additional reforms to improve public-sector efficiency and raise additional revenue. This could include reforming the civil service pension, gradually eliminating GST exemptions, and broadening the coverage of the personal income tax, which could further diversify the revenue base. Given the expected robust growth, any further accommodative policies such as income-support measures could be scaled down or adjusted to be leaner and more targeted. Concurrently, while monetary policy continues to remain accommodative and supportive of growth, continuous monitoring over incipient signs of financial imbalances should remain in place. These signs include any marked and sustained uptrend in credit growth and

indications of speculative property purchases such increases in the number of households purchasing more than two properties.

34. **Risks to growth in the short-term stem mainly from external developments.** Many of these risks are from the arising threats of protectionism, as well as uncertainty regarding the potential US fiscal stimulus and trade policies, and their prospective impact on global economic growth and trade that could hamper business sentiment in the economy. Moreover, uncertainties over US policies, as well as geopolitical developments, could have reverberations in the financial markets and result in higher financial volatility. Another possible risk to growth is the commodity price volatility. A sudden downward reversal in the global commodity prices could affect external demand while constraining the policy space, particularly on the fiscal side, due to the decline in petroleum revenues.
  
35. **Marked short-term risks will continue to put a premium on fiscal consolidation and weak long-term productivity growth calls for structural reforms.** The country's macroeconomic management has been constantly proactive, and effective in navigating near-term challenges in the economic environment. Nevertheless, of equal importance is the need to accelerate structural reforms in the economy particularly raising the level of productivity, and addressing some of its key challenges. This include looking into addressing distortions in markets of goods and services, strengthening its competition policy and adopting competitive neutrality in regulatory stance, particularly with respect to Government Linked Companies' operations. In addition, efforts to overcome the skill-gaps in the economy through more intense use of labor market information to inform skill development policies and programs and increasing female labor force participation should continue. The recently-launched Productivity Blueprint provides a good platform to anchor further work on these topics. Ongoing efforts to improve efficiency of social assistance programs should also continue, including a shift toward more-targeted social policies, which could also provide immediate support to vulnerable households.

# DATA FOR DEVELOPMENT



## DATA FOR DEVELOPMENT

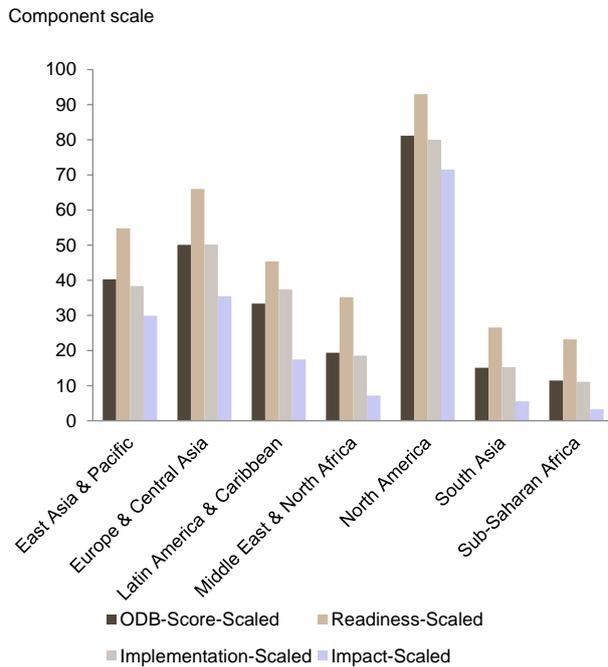
### 1. GOOD QUALITY DATA IS KEY FOR ECONOMIC DEVELOPMENT

36. **Data is increasingly relevant for economic development.** In the public sector, data is used by authorities to formulate, monitor and evaluate policies as well as to improve public service delivery. In the research communities and academia, the use of data has been important in undertaking empirical analysis and testing of hypotheses, conducting case studies, and the discovery of key findings which could feed into other parts of the economy. The private sector uses data for multiple purposes, from product development, to market analysis, to evidence-based decision-making or assessment. Over the years, the amount of data and its quality has increased exponentially, and today we live in a data-rich environment. Realizing this, there have been greater efforts to disseminate data in a timelier, more granular and more usable manner. Concurrently, the availability and accessibility of data has also improved over the years, leading the push to continue to have a more transparent data ecosystem.
37. **An increased volume of high-quality data is highly correlated with development.** One way to measure the availability of data for economic development is by countries' data openness ranking<sup>10</sup>. At the current juncture, data gaps remain especially between developed and developing economies. There are also obvious differences in data openness at the regional level, whereby the more-developed North America region has more data openness in comparison to other regions (Figure 17). Indeed, more openness and better accessibility in data is positively correlated with higher GDP per capita (Figure 18).

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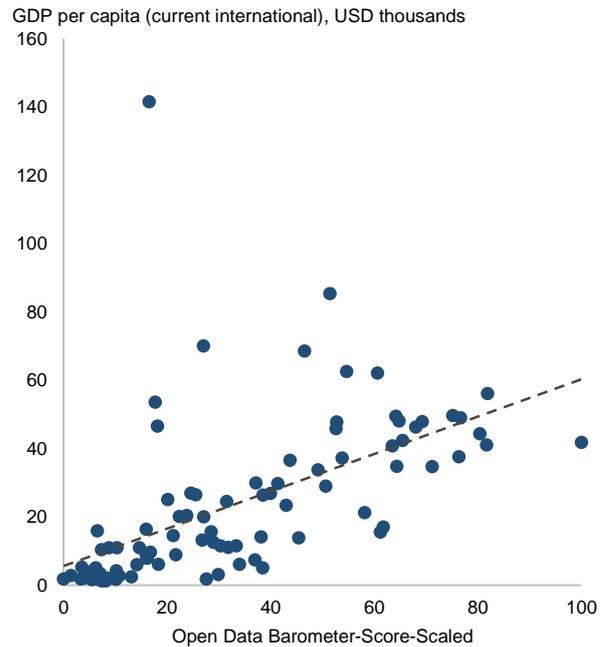
<sup>10</sup> See section "2B. Role of Data Producers and Key Collaborators in Malaysia – Data Dissemination" for detailed discussion on data openness.

**Figure 17: Data openness varies across different regions**



Source: Open Data Barometer

**Figure 18: More openness and data accessibility is positively correlated with higher GDP per capita**



Source: World Development Indicators, Open Data Barometer, World Bank staff calculations

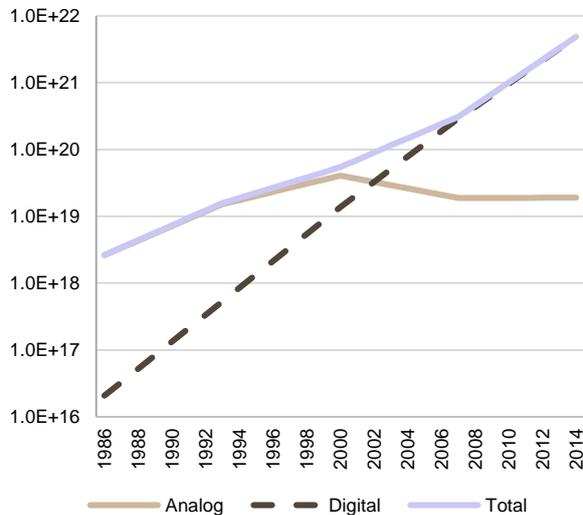
38. **With rapid improvement of technologies, a greater volume and a wider range of data is increasingly available.** The world is witnessing an unprecedented explosion of data. Digital data overtook analog around 1998, and in 2013 amounted to 46 billion trillion bytes (Figure 19). Telecommunications capacity has also grown exponentially over the last decade (Figure 20). For the past three decades, computing power has been doubling about every 18 months. By 2020, four billion people are expected to be online, with 31 billion connected devices and trillions of gigabytes of data generated<sup>11</sup>. It is estimated that 90 percent of the data in 2014 was created starting 2012<sup>12</sup>, and it will continue to grow rapidly in the future. Data improvement via new technology creates favorable and exciting opportunities for policymakers, researchers, companies, and citizen groups to make decisions, enhance accountability, and solve development challenges.

<sup>11</sup> Oxford Martin Commission of Future Generations, *Now for the Long Term*, Oxford Martin School at Oxford University, 2013 (Oxford: Oxford University Press, 2013).

<sup>12</sup> See e.g., <http://www-01.ibm.com/software/data/bigdata/what-is-big-data.html>.

**Figure 19: Digital data overtook analog around 1998, and in 2013 amounted to 46 billion trillion bytes**

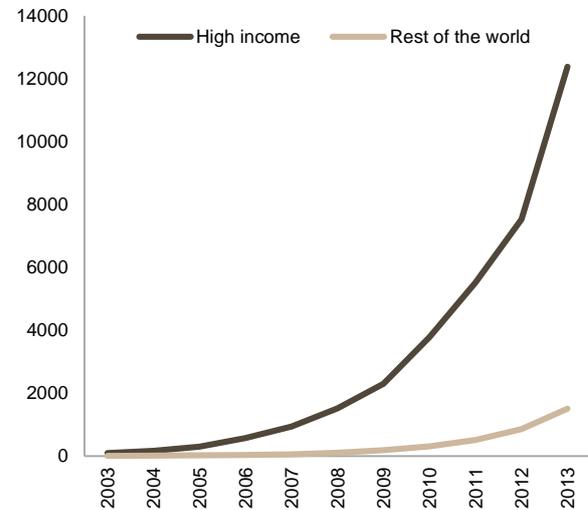
In optimally compressed bytes



Source: World Development Report 2016

**Figure 20: Telecommunications capacity has also grown exponentially over the last decade**

Optimally compressed kbps



Source: World Development Report 2016

39. **The demand for data is also changing with users demanding more detailed, and timelier data.** Firstly, there is a continuous demand for data to reflect the current state of the environment, be it economic, social or science. For example, when a country at its initial stage of development first establishes its national statistical office, one of the first statistics generated would usually be the aggregate consumer price index (CPI). As the economy and users such as policy makers become more sophisticated, there is a need for the statistical office to publish more detailed statistics, such as regional CPI and component level CPI, for example, food and transportation. Similarly, the demand for detailed and timelier statistics also moves in tandem with the rapid change in the global landscape. For example, with the rising population in urban areas, the demand for key timely data such as the current traffic and crime information is critical both for the public and for public service delivery. Concurrently, with climate change becoming a key focus for the society, timely and measurable data such as on greenhouse gas emissions is necessary for the private sector to meet certain environmental regulatory requirements and for authorities to ensure compliance.
40. **Enhanced data is both an input and a result of the digital economy.** Data collection, management, and dissemination are evolving rapidly, streaming into a digital economy in today's world, which is expected to add US\$1.4 trillion into the global economy by 2020.<sup>13</sup> In the case of Malaysia, the digital economy is estimated to account for 18 percent

<sup>13</sup> Digital Technologies Will Soon Add \$1 Trillion-Plus To Global Economy (<https://www.forbes.com/sites/foemckendrick/2015/03/17/digital-technologies-will-soon-add-1-trillion-plus-to-global-economy/#28d4e9cf21b8>)

of GDP. Many governments, research groups, companies, and citizen groups have made considerable progress to capture newly-generated data and use it for economic development. New ways of collecting data using innovative technologies are continually explored to improve the quality of data. For instance, platforms such as geographic information systems are continuously enhanced to integrate data, in order to collect, manage, and disseminate data more effectively. Indeed, the process of digital economy development is slowly progressing, through the evolution of collecting, managing, and disseminating data. The introduction of big data offers a new path of accessing unstructured data such as those from social media and e-commerce, allowing an unprecedented amount of knowledge that was not previously known to be discovered. Without adequate data, the progress of the digital economy would be constrained.

41. **Data systems, including collection, processing, analysis, and dissemination, are also evolving to accommodate the data needs of the economy.** The use of data for development involves (i) making data available, (ii) building public trust in the data, and (iii) expanding people's ability to use data so that their needs are fulfilled throughout the process of collecting, managing, and disseminating data. Recognizing the importance of data for decision-making and development, most countries continuously look for ways to reform their data policies, and develop new data sources and systems, in order to meet the needs and demands of data users in the 21st century.

## 2. MALAYSIA'S DEVELOPMENT AND ITS DATA ECOSYSTEM

42. **Accessible and reliable data is at the core of the Eleventh Malaysia Plan "Anchoring Growth on People", which aims to develop the country as a high-income nation by 2020.** This plan is ambitious, covering social, economic, and spatial development. In addition to the Eleventh Malaysia Plan, Malaysia is also a signatory to the UN-led Sustainable Development Goals (SDG). In order to fulfil these development plans, the national statistical system must assist in producing the data for monitoring and evaluation. As the Eleventh Malaysia Plan and the Sustainable Development Goals are both comprehensive in nature, the data and information will have to come from the entire system.
43. **The Malaysian government has started working on several initiatives to produce the data and statistics to meet the policy needs in the Eleventh Malaysia Plan.** One of the initiatives is to review Malaysia's statistical system and bring forth the full potential of the national statistical system in meeting the policy needs of Malaysia. This would serve to translate data into effective public service delivery. For instance, information on employment is currently collected and managed separately by DOSM, the Ministry of Human Resources, the Institute for Labor Market Information and Analysis, the Employees Provident Fund, and others. Technical and institutional barriers limit the sharing of this information across agencies. More robust and routine data sharing across

agencies, under the ambit of a revised Statistics Act and a new Malaysia Bureau of Labor Statistics, will help better leverage this information for policy making, monitoring, and evaluation. In another initiative, DOSM has reviewed the availability of green growth indicators and applied the System of Environmental-Economic Accounting (SEEA). This permits better monitoring of the interactions between the economy and the state of environment to help inform decision making.

44. **These policy and public service delivery data reforms are necessary steps but need to be matched by a broader ecosystem approach.** This section of the report aims to present some of the impact that data has on several aspects and components of Malaysia's development narrative, and identify ways to make the data ecosystem in Malaysia more effective. To do so, it presents some of the main uses that data has in key areas such as (i) public service delivery; (ii) research and development; and (iii) private sector growth. It presents the analysis of the current ecosystem for data management in Malaysia, its aspirations, and the opportunities and challenges to meet them.

## 2.A. MALAYSIA'S DEVELOPMENT AND ITS DATA ECOSYSTEM - PUBLIC SERVICE DELIVERY

45. **Effective data management is crucial for policy making.** A study by the World Bank shows that approximately 40 percent of developing countries are not able to measure their poverty trends over the last decade.<sup>14</sup> Lack of high-quality data could lead to misleading information for decision makers, possibly hindering the drive to improve economic growth and development of a nation as a whole. Although data collection, management, and dissemination activities have shown improvements globally, much more work needs to be done to ensure availability of data and its use for effective planning, implementing, monitoring and evaluating policies and programs in the public sector.
46. **International experience shows that governments that invest in data collection and availability tend to be more transparent, which contributes to more effective public service delivery.** Digital technologies are further facilitating data collection and dissemination. Governments' ability to share data internally through Integrated Financial Management Information Systems (IFMIS), Human Resources Management Information Systems (HRMIS), or other systems greatly facilitate this process. Indeed, countries with well-developed IFMIS are more likely to have open budgets, or those with HRMIS are better-placed to have more transparent hiring and remuneration policies in civil service. Enhanced data systems may also improve interagency cooperation and coordination, and countries with national monitoring and evaluation systems reinforce the coordination across units within government to provide and share administrative data.

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<sup>14</sup> World Bank staff estimate using WDI and PovcalNet as of March 11<sup>th</sup>, 2014.

47. **Data availability and access to information can improve service delivery outcomes when certain conditions are met.** In particular, open data matters when: (i) information or poor access to information are the main barriers to improving service outcomes; (ii) specific, measurable and attributable service delivery failures occur, and incentives for citizen voice and government action are aligned; and (iii) when a strong and vibrant community of data users within government, civil society, business and academia keeps demand pressure high. For example, government service providers (e.g., government veterinarians in Punjab) significantly improved service delivery when their work was rated, and the information on their ratings was disseminated among beneficiaries such as, farmers.<sup>15</sup> Also, smartphone monitoring reduced absenteeism among doctors in Pakistan, reflecting the importance of demand pressure from citizens in politically competitive constituencies, aligning incentives for citizens and government actors to improve services.<sup>16</sup>

### Box 1: Does Open Data Matter for Service Delivery Outcomes?

More openness and data availability can impact service delivery through various channels:

**Informing citizens.** There have been significant advances around the world in the use of data and digital technologies to improve public health outcomes. This includes point of sale (POS) data collection, disease surveillance, or telemedicine. In emergency cases, such as the Nepali earthquake in April 2015, information was mapped from data input from social media, satellite pictures and drones.<sup>17</sup> Access to information was crucial to improve the disaster response, especially in mapping the damages, identifying passable roads, collapsed houses, stranded, shelter-less and starving people, and the contact details of those willing to help. In other instances, mobile technologies such as geotagged photos have been used to document, control, and prevent corrupt practices in Pakistan after periods of flooding.

**Citizen feedback on service delivery.** Digital and mobile technologies facilitate citizens' reporting of service delivery issues, as well as to report back to citizens when issues are addressed. If the collected data is made public, surveys are far more effective than general complaint systems. For example, the evaluation of the large-scale effort in Pakistan to solicit feedback from citizens shows that citizen engagement helps shift negative perceptions of the government among citizens. After three years of operation, the government contacted more than seven million users of public services, and

<sup>15</sup> A Rezaee, A Hasanain, Y Khan. (2015). "Crowdsourcing government accountability: Experimental evidence from Pakistan." Manuscript, University of California San Diego.

<sup>16</sup> Callen, Michael Joseph and Gulzar, Saad and Hasanain, Syed Ali and Khan, Muhammad Yasir Yasir. 2013. "The Political Economy of Public Employee Absence: Experimental Evidence from Pakistan." Available at SSRN: <https://ssrn.com/abstract=2316245> or <http://dx.doi.org/10.2139/ssrn.2316245>

<sup>17</sup> See, for example, Parker, Laura (1 May 2015). "[How 'Crisis Mapping' Is Shaping Disaster Relief in Nepal](http://www.wired.co.uk/article/mapping-nepal-after-the-earthquake)". *The National Geographic*; or <http://www.wired.co.uk/article/mapping-nepal-after-the-earthquake>.

perceptions of corruption in service delivery declined by 9.3 percent among those that recalled being contacted.

**Improving management through data.** Absenteeism among service providers (teachers, doctors, nurses etc.) can be addressed by using digital technologies to record attendance and transmit data, although this must be accompanied by good management practices.<sup>18</sup> However, simply showing up for work does not guarantee the quality of the delivered services. In more complex services, such as education, showing up is still a prerequisite for teaching, but external citizen engagement is necessary to further address quality issues. Appropriate data must be collected to monitor goals and operational performance for organizations and workers.<sup>19</sup> In some cases, the effect of using smartphones to geotag government vaccinators has had a significant effect in improving the delivery of vaccines.

**Accountability.** Service delivery can be affected by weak accountability, especially where citizens face significant informational barriers in assessing performance. Open data has perhaps been less transformative than expected in raising accountability, because the impact of technical innovation and openness are conditional on the quality of institutions. Internal information flow within the governments can serve to align incentives for reform at the top of the hierarchy with the information of how to change processes available to the rank-and-file service providers. Once those internal flows are functional, then citizens can help further in holding service providers to account. For instance, in the US, UK, and Canada, open data initiatives have had some take-up, but mostly limited to sectors of consumer demand (e.g., real estate, transport, health care). In the developing world—including Kenya, Moldova, and the Philippines—the results have been mixed.

Source: Authors

48. **Good quality data has also been essential in implementing key reforms in various countries; for instance, in the business environment.** Since its inception, a central objective of the Doing Business report has been to provide policymakers objective and actionable measures of efficiency and quality of business regulations in their economies through benchmarking. The report offers economic data on business regulations from 2003 onwards. This data covers 11 areas of the lifecycle of a small- or medium-size company, and helps countries identify priorities for reform. Namely, starting a business and labor market regulation indicators analyze the regulations pertinent to entrepreneurs looking to start-up and formally operationalize a company. Since 2003, the number of indicators and data points have expanded significantly, reaching 24,120 indicators (120

<sup>18</sup> See for example, Callen et al (2013) op. cit.

<sup>19</sup> See, for example, Minahil Asim, Thomas Dee (2016). "Mobile Phones, Civic Engagement, and School Performance in Pakistan." NBER Working Paper No. 22764. <http://www.nber.org/papers/w22764>

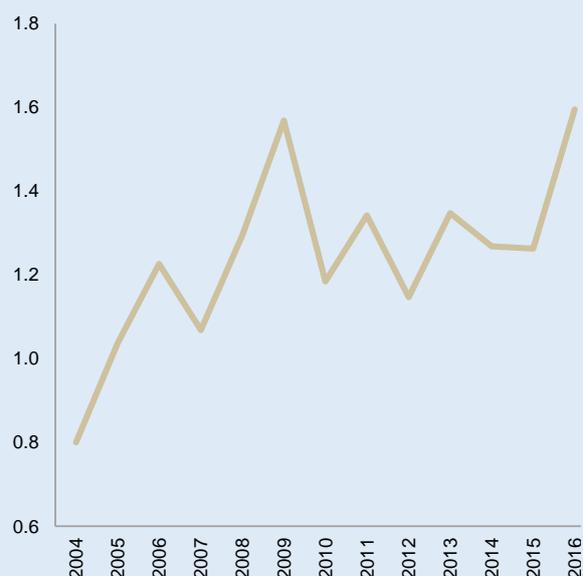
indicators per economy) and more than 115,000 data points in the latest edition in 2017. The Doing Business indicators provide data that is actionable, and allows policymakers to pinpoint the areas in the business environment which need updating or a complete revamp. The benefits of publishing objective measures, and in this way, urging the public sector to reform, can be enormous—far from just improving on the Doing Business ranking, but actually making a big difference for the business community and the economy as a whole.

## Box 2: Doing Business Data as a Catalyst for Reforms

Reforms inspired by the indicators in the Doing Business Report have been implemented in every region. Since 2004 onwards, the number of reforms peaked in 2009 when the global financial crisis had intensified, and reforms were badly needed (Figure 21). The number of reforms also increased after 2015 when the Doing Business report introduced a number of additions to the dataset pertaining to the regulatory quality of regulations.

**Figure 21: Number of reforms from Doing Business have increased since 2004**

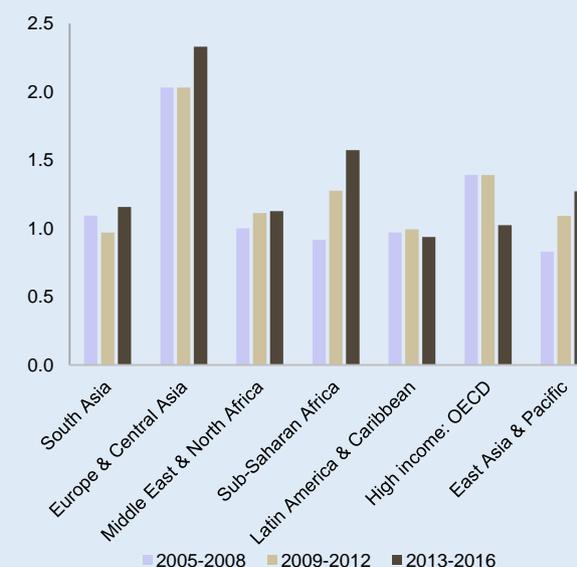
Average number of reforms



Source: World Bank staff calculations

**Figure 22: Europe and Central Asia has been the most actively-reforming region**

Average number of reforms



Source: World Bank staff calculations

The Doing Business Report has served to catalyze reforms across all regions (Figure 22). This has also been the case of Malaysia, which, for example in 2016, improved the getting credit indicator by beginning to provide consumer credit scores—data that is very helpful as it pools information across many creditors and public information sources. Credit scores may improve market efficiency and provide borrowers with more opportunities to obtain credit. The availability of credit scores allows lenders that would otherwise not be capable of analyzing the raw credit data to extend credit to under-served markets at lower cost.

Source: Authors

## 2.B. MALAYSIA'S DEVELOPMENT AND ITS DATA ECOSYSTEM – THE CASE FOR HOMEGROWN ACADEMIC RESEARCH

### 49. **Research in the social sciences keeps demanding additional and more granular data.**

Social sciences have evolved over the past several decades toward greater emphasis on empirical work, as granular data is being used to pose new questions. While economic theory provides a conceptual framework, better data facilitate more rigorous testing of theories and assessment of their relevance<sup>20</sup>. As a result, the share of empirical papers in top journals has climbed to more than 70 percent in 2011. These empirical papers use data assembled by public agencies, obtained directly by the authors, or generated through controlled experiments, enabling new research designs that can offer insights in the consequences of different economic policies and events.

### 50. **Reliable and timely microdata is an essential ingredient for research and policy analysis.**

Often, analysis for policy and research purposes requires more detailed data than the summary tables that are published in reports or on the statistical offices' web site provide. Microdata or granular data permits in-depth analysis, such as assessing the impacts of a program on different types of households (for example, low-income versus high-income, urban versus rural, those without children versus those with children). In most high-income countries, and in many middle-income countries, national statistical offices share anonymized microdata with analysts, both inside and outside of government, who are able to conduct in-depth studies that are outside the mandate of the statistical office.<sup>21</sup> This contributes to knowledge and more effective policies, and increases the return on the costly investment of collecting detailed survey data.

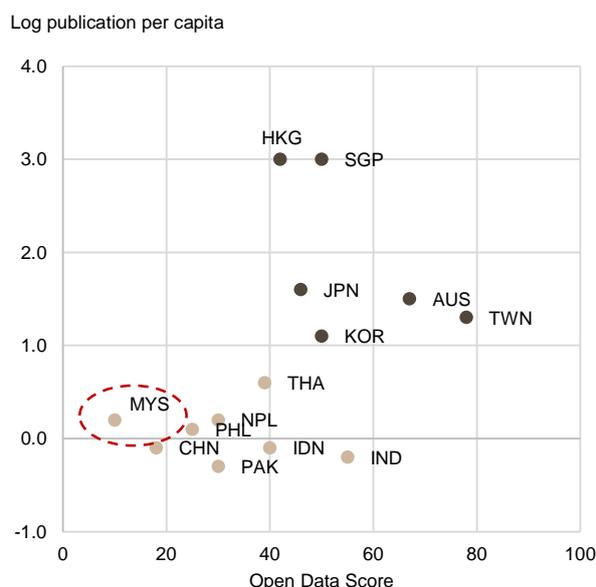
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<sup>20</sup> Einav and Levin 2014, Jin 2009.

<sup>21</sup> See Appendix I for examples of microdata access policies in several high-income countries.

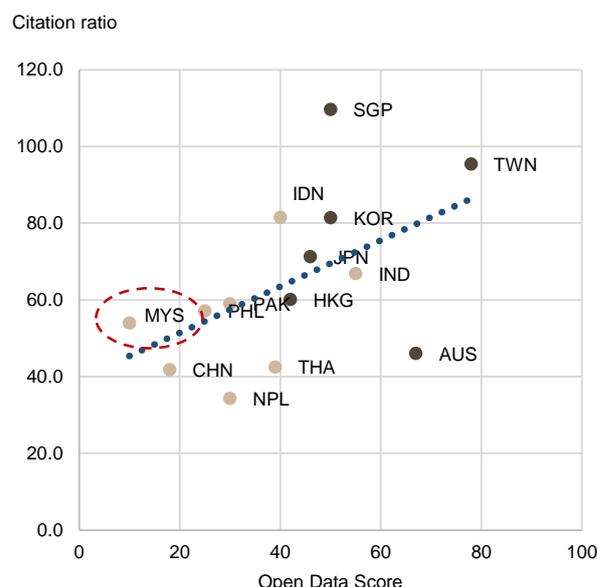
51. **Malaysia's research productivity and quality is significantly lower than many regional and advanced economies.** The relevance of available data for research is evidenced by the positive correlation (0.46) between a country's open data ranking and the number of publications published in the country. Indeed, high-income countries with higher degree of data openness have more publications per capita (1.9 on average, compared to the overall average of 0.8) (Figure 23). Furthermore, the association between the citation ratio and open data is positive, which is consistent with the idea that data openness is needed to produce quality research (Figure 24). Malaysia's indicators for the quantity and quality of research output are comparable to those of middle-income neighbors such as China, the Philippines, and Thailand, even though Malaysia's Open Data Score is lower. However, Malaysia's indicators lag behind those of high-income countries, and some middle-income countries, that have higher Open Data Scores.

**Figure 23: High-income countries with higher open data scores produces more research per capita...**



Source: Open Knowledge Institute, IDEAS, World Bank staff calculations

**Figure 24: ...as well as producing higher-quality research.**



Source: Open Knowledge Institute, IDEAS, World Bank staff calculations

52. **Access to granular data, such as household or firm-level data, emerges as a key constraint to research in Malaysia.** A survey conducted by the World Bank in Malaysia<sup>22</sup> shows that more than 75 percent of the respondents agree that data availability contributes to Malaysia's research capacity. Indeed, the majority of respondents found publicly-available data relatively easy to access online, and half of them also consider the quality and format to be average. However, the nearly all of the respondents (95 percent) reported that the granularity of available data is not adequate for rigorous economic research.

<sup>22</sup> Chuah, L; Loayza, N; "Open Data: Differences and Implications across Countries", World Bank Research Policy Note No.7.

Furthermore, many of the respondents who said that granularity is an issue work in professions that use data intensively, such as academics, researchers, consultants and analysts.

## 2.C. MALAYSIA’S DEVELOPMENT AND ITS DATA ECOSYSTEM – DATA FOR THE PRIVATE SECTOR

53. **The private sector uses both structured and unstructured data from various sources, including administrative records, mobile telephony, and social media.** Structured data such as macroeconomic statistics and accounting information have always been crucial for the private sector environment to make key business decisions such investing in new projects or improving business operations.<sup>23</sup> With the explosion of social media and telecommunications, many businesses or companies, such as Facebook or Twitter, are increasing the use of various unstructured data sources to understand consumers’ behavior and expectations. A major challenge for the private sector is how to rapidly analyze the growing volumes of data and discover new findings from the existing data. One way to do so is through data mining, a widely-used practice in areas such as financial data analysis, retail, telecommunications, biological data analysis, intrusion detection etc. to extract hidden information from data (Table 5).

**Table 5: Examples of data mining applications**

Focus Areas	Data Mining Applications
Business	<p>Data mining allows e-commerce businesses to understand the patterns hidden inside past transactions, assisting the businesses to plan and launch new marketing campaigns in a prompt and cost-effective way. Amazon is a good example, and is well-known for its strategy of “Things that other consumers bought” which recommends complementary items to users through data analysis, by tracing similarities and patterns.</p> <p>Retailers collect customer information, related transaction information, and production information, to improve the accuracy of product demand forecasting, assortment optimization, product recommendation, and ranking across retailers and manufacturers.</p>
Industry	<p>Insurance organizations and banks use data mining to assess borrowers’ credit worthiness in advance during the credit evaluation process to reduce default risks.</p>
Health Care	<p>Treatment record data such as information of payers, medicine providers, pharmaceuticals information, prescription information, doctor’s notes, clinic notes, etc. are used to do clinical text mining, predictive modeling, survival analysis, patient similarity analysis, and clustering, to improve care treatment, reduce costs, and deliver better medicine.</p>

Source: Authors

<sup>23</sup> For example, Walmart works to offer visibility into its supply chain through real-time, anonymized worker feedback from 279 factories in Bangladesh. Armajaro, a commodity investment firm, tries to trace all its cocoa from Ghana through handheld devices, and then shares information to its purchasers, regulatory authorities, and to the producers, for increased sustainability and governance traceability – World Bank Perspectives on Development, “The Next Frontier for Open Data: An Open Private Sector” (<https://blogs.worldbank.org/voices/next-frontier-open-data-open-private-sector>).

54. **Governments have recognized the value of big data for the private sector.** To help improve businesses' productivity, the Malaysian government is helping companies use data analytics to stay competitive on the global stage. Malaysia is one of the few countries with a structured big data analytics (BDA) roadmap to unleash the value of big data, spearheaded by MDEC. MDEC has been engaging with the private sector to promote data sharing through several platforms. These include the National Big App Challenge, which is a competition that requires participants to develop apps that showcase the importance of BDA in solving Malaysia's pressing issues for the good of society through data, while highlighting the talents of homegrown software specialists. MDEC also organizes Big Data Week with the intention of fostering networking among vendors and end-users, enriching the ecosystem for the big data community. To further encourage the use of BDA in the private sector, MDEC has also established ASEAN Data Analytics eXchange (ADAX) which functions as a platform for companies to get trained, build analytics products, and test new ways to improve their business with data.
55. **Malaysia is a pioneer in South East Asia in adopting a Personal Data Protection Act (PDPA).** As concerns around privacy, national security, and local competition arise, many countries are putting in place policy and regulatory restrictions around cross-border flows, especially of sensitive personal data. Malaysia is no exception, and in 2010 adopted the PDPA,<sup>24</sup> which came into effect in 2013. The Act requires that companies can only transfer personal data out of Malaysia to countries that have been pre-approved by the Ministry in charge of data protection.<sup>25</sup> After challenges in implementing PDP's regulations, the Department of Personal Data Protection (PDP) is now taking proactive steps to facilitate international data sharing. Since January 2017, and following the footsteps of the approach taken by the European Union (EU), the PDP has convened a public consultation to solicit feedback about a proposed whitelist of places for transfer of personal data outside Malaysia, which includes the eurozone countries, the UK, US, Australia, Canada, Japan, Korea, Hong Kong, Singapore and the Philippines.
56. **At the current stage, the private sector in Malaysia is seen to be less open and prefer to work individually.** One of MDEC's main observation is that private-sector firms in Malaysia tend to work and build analytics in-house, rather than leveraging from one another. The private sector in Malaysia has not warmed up to the idea of sharing its data for two key reasons: one, it does not see the immediate business benefits that data sharing could bring. Second, it is afraid of violating existing regulations around the Personal Data Protection Act (PDPA).

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<sup>24</sup> The PDPA specifies that certain data users, such as licensed insurers, professional firms (e.g. legal, auditing, accounting, engineering and architecture), housing developers, and medical clinics, must register with the Department of Personal Data Protection (PDP).

<sup>25</sup> Department of Personal Data Protection, Personal Data Protection Act 2010, <http://www.pdp.gov.my/index.php/en/akta-709/personal-data-protection-act-2010>

### Box 3: Developing a Market for Private Sector Data Sharing - The Case of Data Philanthropists

A number of companies and industries in the world, including those in Malaysia, are embracing open data principles as part of their larger business strategies, rather than as one-off opportunities. While only a relatively-small number of companies are sharing their data so far, private sector data sharing can be beneficial to governments, individual organizations, entire industries and the general public. A recent report by the Open Data Institute describes three industry-leading enterprises that have embraced an open approach – open source, open standards, open data and open innovation – to help retain their competitive edge.

An even more altruistic approach is “data philanthropy”, a new movement in corporate social responsibility, in which private-sector organizations allow access to their data holdings for the public good. This emerging concept was first proposed at the World Economic Forum in Davos in 2011, and popularized through a United Nations data project known as Global Pulse. While acknowledging potential complications, including privacy risks, proponents of data philanthropy argue that the rapidly-growing quantities of “data exhaust” (passively-collected data deriving from daily usage of digital devices) held by the private sector can be shared and leveraged to protect communities against the impacts of crises and keep global development on track.

Although still far from prevalent, some examples of corporate data sharing exist. In Côte d’Ivoire and Senegal, Orange Telecom hosted a challenge that allowed researchers to use anonymized, aggregated data to help solve various development problems, including those related to transportation, health and agriculture.

Despite the benefits, many businesses may be reluctant to share data that they view to be proprietary, out of concern that government agencies would release it publicly and erase a potential market advantage. Much research remains to be done on the value proposition for corporations doing the sharing, and on ways to maximize the potential, and importantly, minimize potential harms of shared data.

Source: The Center for Open Data Enterprise (2016) Briefing Paper on Open Data for Public-Private Collaboration

57. **Most Malaysian companies do not allocate enough funding for employee training and development, including in data management and analytics.**<sup>26</sup> Across the globe, countries are experiencing a talent crunch in data management and analytic skills, and Malaysia is no exception. According to a study by Microsoft<sup>27</sup>, the lack of digital skills is one of the

<sup>26</sup> According to the study by MDEC on talent supply and demand for MSC<sup>26</sup> and non-MSM companies, for example, more than 40% of the 1000 companies surveyed did not allocate funds for employee training and development.

<sup>27</sup> The Microsoft Data Culture study was conducted in March 2016 with 940 business leaders from 13 Asian markets including Australia, China, Hong Kong, Indonesia, India, Japan, South Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand and Vietnam.

main barriers holding back Asian organizations from embarking on data-driven transformation. Another study by PIKOM, the National ICT Association of Malaysia, highlights the mismatch between skills and qualifications of job seekers and the industry. The skills shortage includes not only technical skills, but also soft skills such as problem-solving, confidence, leadership, communication and English proficiency, especially among fresh graduates.<sup>28</sup>

58. **The government of Malaysia has initiated a host of initiatives to close the talent skills gap.** As part of the National BDA Framework, Malaysia has put in place the necessary steps to produce sufficient talent to meet the demand for data analytics. Talent development initiatives have been put in place by working closely with both the public and private sectors. MDEC, working closely with institutions of higher learning (IHLs), has been able to introduce various data analytics related courses in local universities, with 12, offering programs at both the undergraduate and postgraduate levels. In addition, to address the growing demand for immediate data analytics expertise, it has introduced various related courses from well-regarded sources such as Harvard Business School and Data Incubator for professional development, as well as massive open online courses (MOOC) content from Coursera and Data Camp. To accelerate professional development programs further and to maintain the quality of the trained data analytic professionals, Malaysia has developed its own BDA training framework to guide local training providers to produce relevant talent. Another agency, the Human Resources Development Fund (HRDF) operates a Pool Fund for re-skilling and up-skilling the workforce. Through the Pool Fund, HRDF has allocated funds to support digital adoption and skills initiatives in data science, data professional training, and women's empowerment through ICT, some of which is carried out in partnership with MDEC. (See Box 4 on Singapore's experience in developing and closing the skills gap).

#### **Box 4: Singapore's SkillsFuture**

Singapore has always had global reputation for being a talent hub of Asia; it ranked second in the INSEAD's Global Talent Competitiveness Index and 15<sup>th</sup> in IMD's Talent Competitiveness Ranking. Since 2016, Singapore has been implementing the SkillsFuture program to boost digital skills.

The program is a mix of conditional cash transfers and a market place of courses that maximizes flexibility, as well as encourages individual ownership of skills development. Each Singaporean above 25 years old is given a SkillsFuture credit of SGD500 and can choose from more than 18,000 courses to retrain and upskill. The courses range from mobile app development to a fine arts degree, and providers include educational institutes, public agencies such as the Ministry of Health and People's Association, and MOOCs players such as Udemy and Coursera. These providers have been curated and

<sup>28</sup> PIKOM (2016), ICT Job Market Outlook in Malaysia, [http://www.pikom.org.my/Job\\_Market/PIKOM\\_ICT\\_JOB\\_MARKET\\_OUTLOOK-2016.pdf](http://www.pikom.org.my/Job_Market/PIKOM_ICT_JOB_MARKET_OUTLOOK-2016.pdf).

vetted by SkillsFuture Singapore, a statutory body leading the movement, to ensure they "offer high-quality and industry-relevant training."<sup>29</sup>

The competency-based skills framework, which underpins the SkillsFuture program, serves as a reference point for employers, employees, job seekers and training providers. Training providers can use the framework to develop and align their training courses, while businesses can use it to monitor their employees' capacity development.

As part of the overall Singapore's Workforce Qualification scheme, the Workforce Development Agency and Infocomm Media Development Authority (IMDA), in consultation with the industry counterparts, have developed the National Infocomm Competency Framework (NICF). To date, NICF has identified 631 competency standards of 334 job roles in the ICT and multimedia industries, including in emerging areas such as data analytics, Green ICT and Cloud Computing, and its website refers to SkillsFuture as a source of retraining and upskilling.<sup>30</sup>

The cross-agency coordination of SkillsFuture is worth noting. The development of the NICF was led by IMDA, under the Ministry of Communications and Information, while SkillsFuture is under the Ministry of Education. At least on the publicly available materials, these initiatives clearly cross-reference each other, which helps to ensure that they complement and add value to each other.

Source: Authors

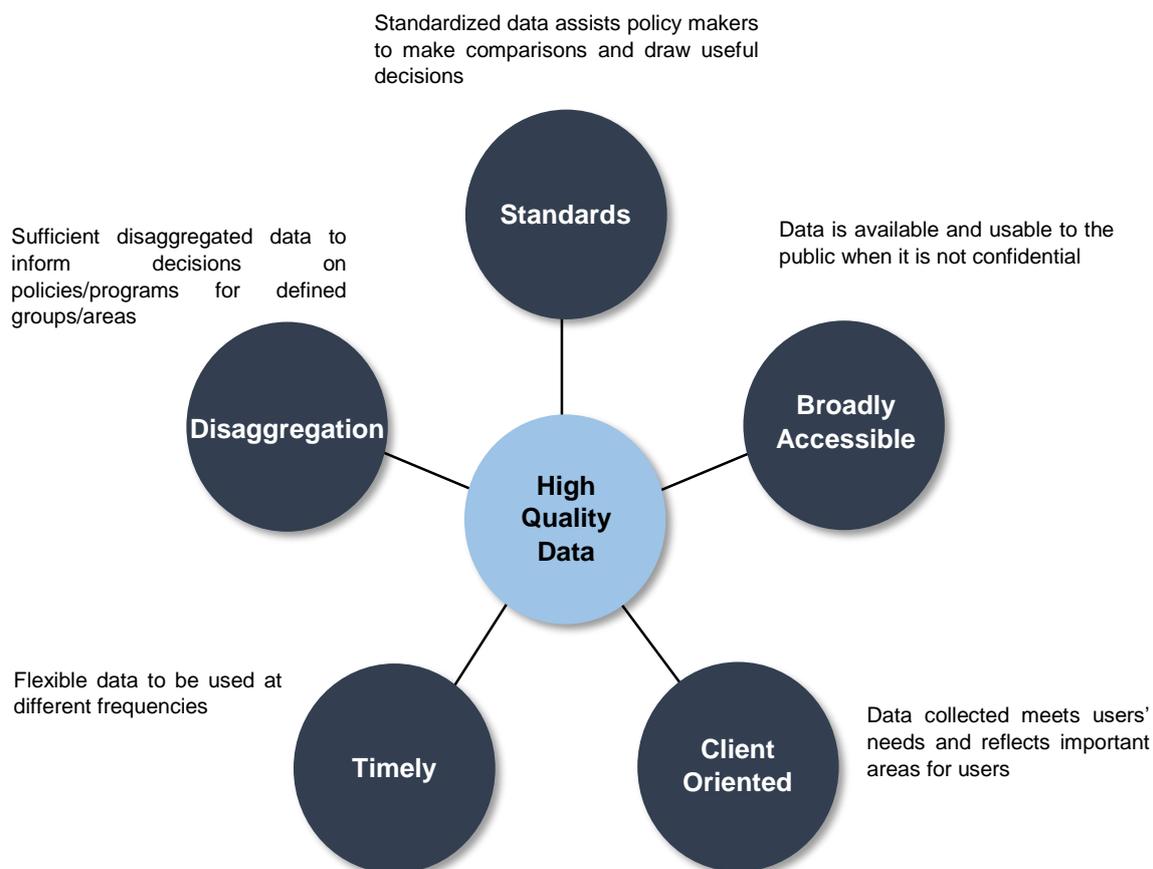
### 3. DATA INSTITUTIONS – THE ROLE OF DATA PRODUCERS AND KEY COLLABORATORS IN RAISING THE QUANTITY AND QUALITY OF DATA

59. **The quality of available data is as important as the quantity made available.** To ensure efficiency in data production and usage, data must be of high quality, disaggregated at an appropriate level, and be accessible on time to those who want or need it (Figure 25). Hence, high-quality data is crucial to provide accurate information, and to assist in its effective use. A large volume of data is produced but goes unused, or is not usable or available for potential users, limiting the effective use of data by different parties within or outside of specific countries.

<sup>29</sup> Seow, Joanna, "The ST Guide to Using Your SkillsFuture Credit" May 19, 2017, The Straits Times.

<sup>30</sup> <https://www.imda.gov.sg/industry-development/programmes-and-grants/individuals/national-infocomm-competency-framework-nicf>.

**Figure 25: Criteria of high quality data**



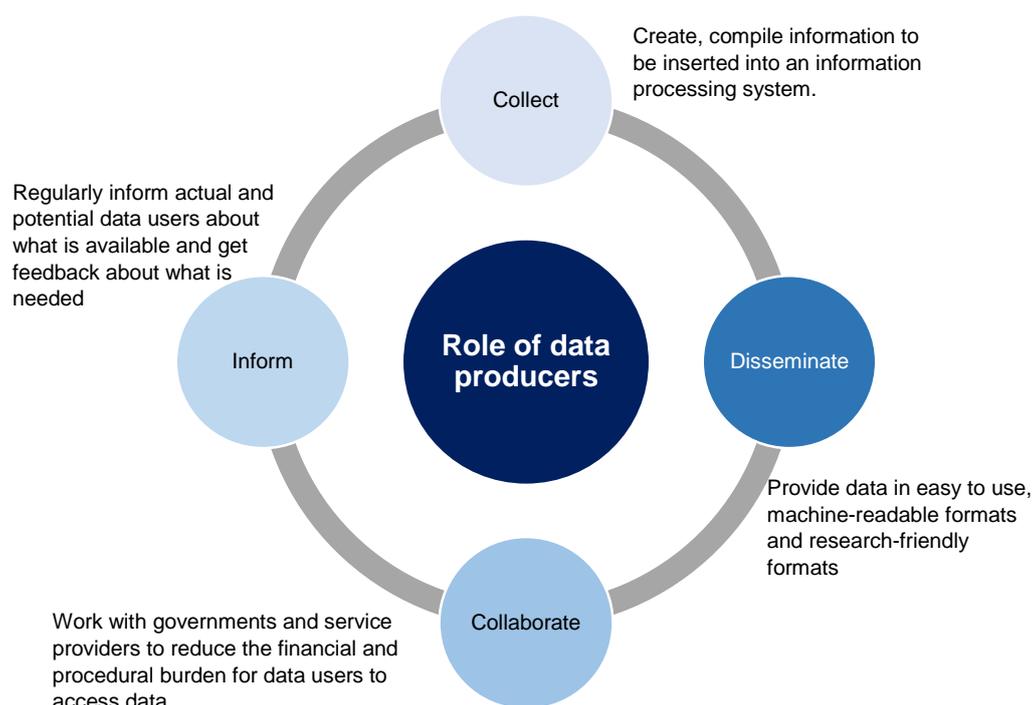
Source: Authors

60. **A well-functioning data ecosystem that produces quality data can be traced back to the role of the country's data producers and its key collaborators.**<sup>31</sup> The role of data producers and key collaborators is crucial in enabling data access and usage, to close data gaps between developed and developing countries, between information-rich and information-poor people, and between private and public sectors. Essentially, assessing how well the data ecosystem functions can be done by understanding how well the data producers are able to capture its four main roles; collecting data, disseminating data, fostering collaboration among the various data producers, and engaging with the users and general public (Figure 26).

<sup>31</sup> In addition to data producers, in some countries including Malaysia, there could also be agencies responsible in ensuring wider accessibility to data.

61. The following section discusses the evolution of data producers and its key collaborators in Malaysia, and its effectiveness in undertaking its four main roles. These four roles are as follows;
- i. Data collection
  - ii. Data dissemination
  - iii. Collaboration across institutions and agencies
  - iv. Engagement with users

**Figure 26: Role of data producers**

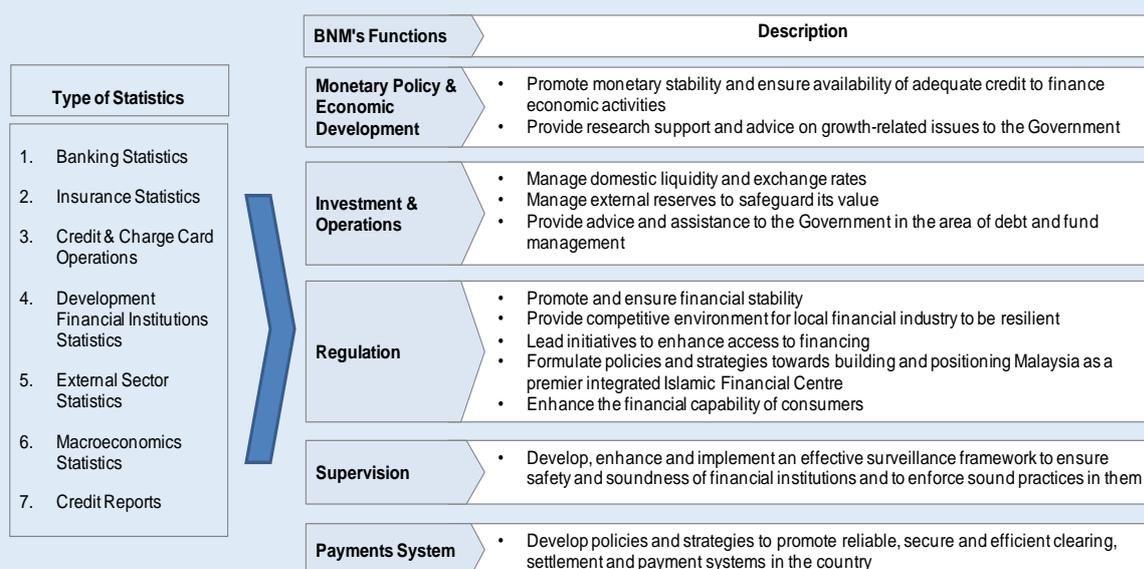


Source: Authors

### Box 5: Bank Negara Malaysia's Experience in Compiling and Managing Statistics to Support its Core Mandates

Central banks' functions are vastly driven by data, and similarly for Bank Negara Malaysia (BNM), a diverse spectrum of datasets are compiled to support its core mandate of maintaining monetary and financial stability, and other related functions. BNM is tasked with various functions in addition to maintaining monetary and financial stability, including ensuring a sustainable growth of the financial sector, and overseeing the implementation of efficient payment systems. Recognizing the importance of quality statistics in decision-making processes (Figure 27), BNM's data quality assurance governance is framed within internationally-accepted standards.

**Figure 27: Statistics to support the functions at Bank Negara Malaysia**



Source: Bank Negara Malaysia

The statistics compiled to meet the functional needs of BNM are compiled from three main institutional sectors, namely banking institutions, insurance companies and intermediaries, and other reporting institutions (such as development financial institutions, payment systems operators, and corporations).

Recognizing that aggregated data, while informative, could be insufficient to inform optimal policy across the various functions of BNM, granular datasets are also utilised to conduct assessments and inform decisions. For instance, in upholding monetary stability, entity-level financial information and market transactional records are used to monitor liquidity conditions, and the transmission of the policy interest rate to the broader economy. In implementing prudential policies to ensure financial stability, granular information from the Central Credit Reference Information System (CCRIS) database was critical to determine the appropriate levels of policy, in order to effectively curb unsustainable behaviour without hindering access to financing.

BNM has put in place a data governance framework to ensure quality of the statistics and to balance the needs of introducing new statistics, weighing the additional effort and financial burden on both compiler and reporting agents. The data quality requirements adopted by BNM takes into consideration seven key quality components; namely, timeliness, relevance, reliability, coherence, accessibility, confidentiality and auditability (Table 6).

**Table 6: Key Policies and Standards of BNM's Data Governance Structure**

Area	Objective
Data Needs Management	a. Eliminate reporting of duplicate and "nice-to-have" data b. Instill discipline to minimize <i>ad hoc</i> requests and impact of changes to the Bank and Reporting Entities
Data Architecture Management	a. Establish the blueprint of the data structure and its relationship b. Facilitate the design and control of data flow in application systems
Metadata Management	Provide a complete and accurate picture of structure and content of data to eliminate ambiguity and ensure consistency
Reference and Master Data Management	Standardize the foundational/common data, e.g. Country codes, Company Registration numbers, etc. across systems in the Bank
Data Quality Management	Produce credible data for stakeholders to meet their business needs
Data Privacy and Security Management	a. Ensure data accessed and disseminated is in accordance with business functions and authorization b. Ensure easy and fast access to credible data by stakeholders in a secured environment
Data Retention and Archival Management	Ensure that the cost of maintaining data does not exceed its value to the organization.

Source: Bank Negara Malaysia

Data quality is assured through three layers of checking, where data quality assurance begins at source with standardized system functionalities at the data providers, conforming to data reporting guidelines issued by BNM, and enforced by the Statistical Reporting Enforcement Framework. Micro- and macro-level data analyses are performed on a periodic basis on data submitted by data providers to eliminate data anomalies. Finally, the data is subject to further review and deliberation by an independent quality assurance panel, comprising cross-sectional subject matter experts to ensure data consistency vis-à-vis other indicators, economic and financial developments. The finalized statistics are published in various BNM periodic reports and reports by international agencies such as IMF and World Bank.

Source: Bank Negara Malaysia

### 3.A. ROLE OF DATA PRODUCERS AND KEY COLLABORATORS IN MALAYSIA - DATA COLLECTION

62. **In Malaysia, the Department of Statistics Malaysia (DOSM) is the primary entity responsible for the collection and dissemination of socioeconomic data and statistics.** By virtue of Section 2 of the Statistics Act, 1965 (Revised 1989), DOSM is authorized to collect and interpret statistics for the purpose of furnishing information required in the formation or carrying out of government policy in any field required for government. Furthermore, DOSM has the power to communicate statistics collected, or interpretation of statistics, that may be useful to the government or the general public.

63. **The scope and sophistication of DOSM's operations has expanded in line with Malaysia's development.** DOSM's collection, management, and dissemination of data have evolved to meet the growing information needs for the formulation and monitoring of government policies. As the New Economic Policy (NEP) brought a new focus to improving the labor force and reducing poverty, DOSM launched its first national Household Income Survey (HIS) and Household Expenditure Survey (HES) in 1973, which continue to be important instruments for assessing the well-being of Malaysians. As information needs and technology have advanced, DOSM has adapted, for example, adding online data collection to the 2010 Population and Housing Census, implementing online e-surveys for economic establishments, introducing Computer-Assisted Telephone Interviews (CATI) in the Labor Force Survey and Computer-Assisted Personal Interviewing (CAPI) in the prices survey for the CPI.
64. **The government, led by DOSM and MAMPU, has also looked into ways of adopting BDA in the public sector.** In 2016, DOSM launched its Statistics Big Data Analytics (StatsBDA) project, which provides opportunities to develop a longer term strategy for using big data in official statistics as well as to understand the challenges of using it. Through StatsBDA, it also has initiated a platform for online price collection to give better insight in DOSM consumer price analysis, as it modernizes price collection methodology, where the price is extracted from various relevant websites. This project is expected to be completed at the end of 18 months and use a high volume of data from a large variety of sources. DOSM's StatsBDA is expected to increase the use of new data sources as well as simplify the process of decision making based on facts. Concurrently, MAMPU has created a governance structure for BDA initiatives comprising a Steering Committee, Technical Committee and project team for the implementation of open data and BDA in the public sector. Subsequently, a public sector data-driven program has been established to create the national ecosystem for proliferating the use of BDA as a catalyst for further economic growth. The key deliverables for the program includes creating a framework for supporting public sector BDA adoption and providing consultancy services for public sector agencies in initiating BDA programs.<sup>32</sup>

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<sup>32</sup> See Appendix 2 for MAMPU's big data initiatives

## **Box 6: DOSM's Statistics Big Data Analytics (StatsBDA)**

Statistics Big Data Analytics (StatsBDA) project was kicked off in 2 December 2016. The StatsBDA encompasses three main modules namely Trade by Enterprise Characteristics (TEC), Price Intelligence (PI) and Public Maturity Assessment on Official Statistics (PMAOS) and supported by three other modules namely Real Time Business Status (RTBS), BizCode@Stats Mobile Apps and Real Time News on Official Statistics (RTOS). This project is expected to be completed at the end of 18 months and utilize voluminous, high velocity, numerous variety and valuable data sources. The impact of DOSM's StatsBDA will increase the use of new data sources as well as simplify the process of decision making based on facts and produce new insights products and services.

Since big data holds great potential for revolutionizing statistics, the big data platform has been used to integrate Malaysia Trade Database with Malaysia Statistical Business Register (MSBR) to come out with new statistics without having additional surveys which is being implemented in TEC module. MSBR is a fundamental property in maintaining the comprehensive list of businesses and companies operating in Malaysia. The exploration of BDA for this TEC initiative can inform the decisions about the future of international trade performance by using advance analytics. Extracting information from MSBR and existing trade data sets can determine the patterns and predict future trade outcomes and trends.

DOSM also has initiated a platform for online price collection through PI module in STATSBD A to give better insight in DOSM consumer price analysis. PI offers modernization in price collection methodology, where the price is extracted from various relevant websites. It mainly consists of the adoption of web scraping techniques by using web crawler. The data collected can be used as research reference in establishing new price basket analysis where later it can be used as a value added to the current Consumer Price Index (CPI) published by DOSM.

These three main modules are then supported by three other modules. RTBS is an integration of Companies Commission of Malaysia (CCM) data to DOSM environment to enable DOSM to get direct access of latest business entities information at any time. The information is vital for DOSM in order to keep the MSBR updated. MSBR is a tool to prepare and coordinate the surveys or censuses. It is an essential component in the core statistical infrastructure that supports collection of economic data and production of economic statistics.

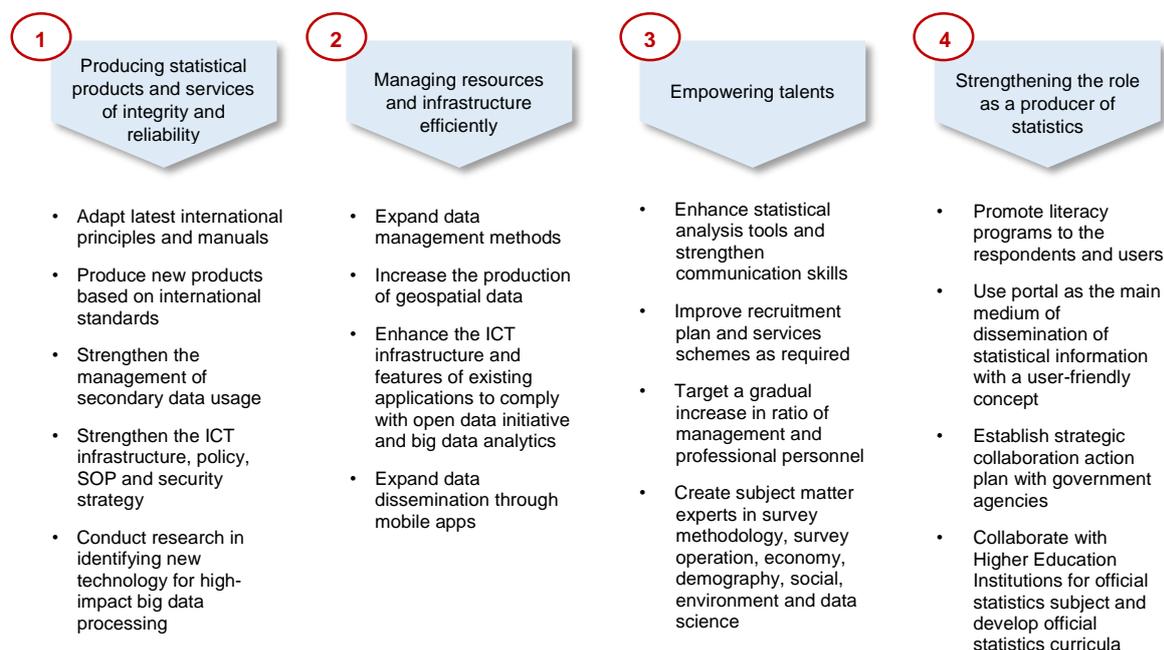
As mobile application has been recognized as an impressive channel for delivering information in easy way, BizCode@Stats is being developed specifically for statistical codes and classifications. It allows users to access the statistical codes application via handheld devices and can be accessed even without internet connection. The standard statistical codes and classifications make statistical comparison possible and bring uniformity to the data collection and statistics production. In short, BizCode@Stats supports TEC and PI modules in order to have a better quality of statistical classification.

Given the rapid speed of how things developments, DOSM is expected to know what is happening in the world in real time, especially news on official statistics published by other National Statistical Offices (NSOs). Thus, daily comprehensive up-to-date news on official statistics is aggregated from worldwide sources is gathered in RTOS module, in which the module uses the same platform as PMAOS. The news is ranked based on certain characteristics such as topic, freshness, location, relevance etc. for analysis or reference purposes. On top of that, this module offers in depth analysis of opinion from news media cluster.

Source: DOSM

65. **The DOSM Transformation Plan 2015–2020 details its ambitions and guidelines for upgrading its systems and performance.** In line with Malaysia’s development objective of becoming a high-income economy, DOSM aims to continue its modernization efforts to meet the increasing demands for accurate, timely, and comprehensive statistics to inform public policy. DOSM’s Transformation Plan is built around four strategic thrusts (Figure 27). The DOSM Transformation Plan 2015–2020 is complemented by an ongoing strategic review of the entire national data statistical system, which will propose steps to transform the wider network of producers and users of socioeconomic data throughout Malaysia.

**Figure 27: The Four Strategic Thrusts of the DOSM Transformation Plan 2015–2020**

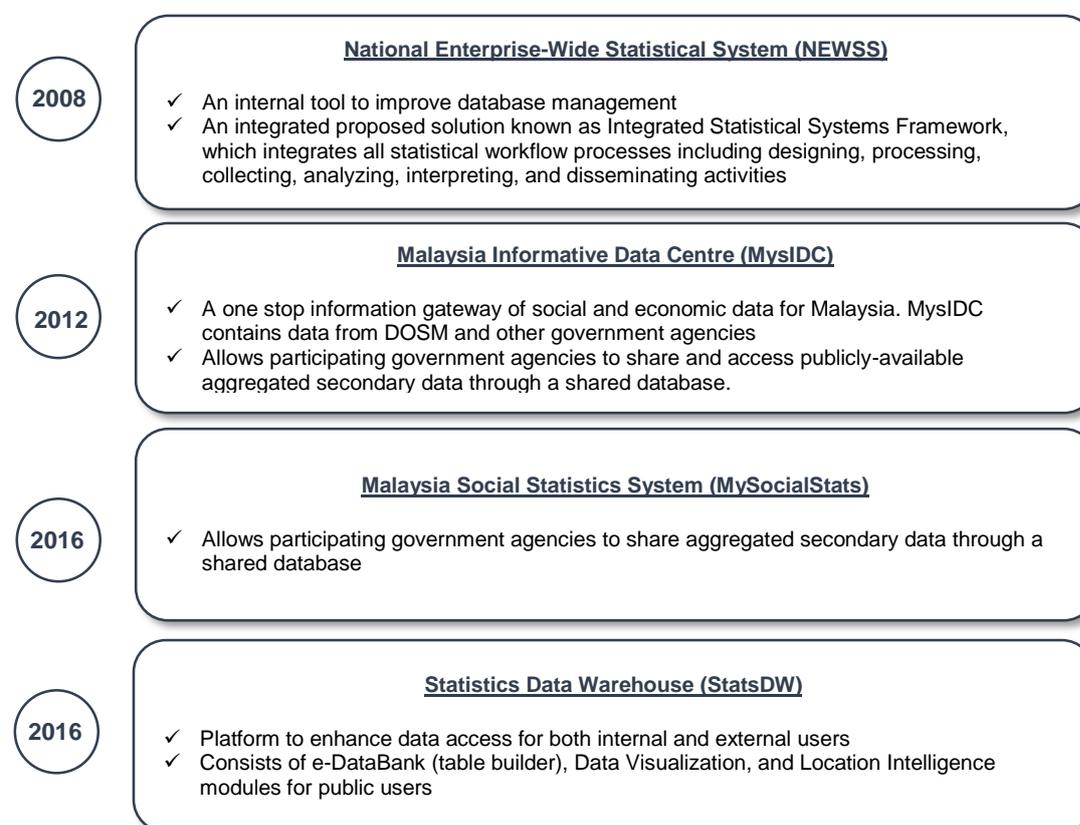


Source: Department of Statistics Malaysia (DOSM)

66. **DOSM has adopted the Generic Business Process Model (GSBPM) to standardize its processes in line with international standards.** DOSM is among the 50 leading national statistical offices that have adopted GSBPM recommended by the United Nations Economic Commission for Europe (UNECE). The GSBPM provides a standard framework and harmonized terminology to help statistical organizations modernize their statistical production processes, as well as share methods and components. The GSBPM can also be used for integrating data and metadata standards, as a template for process documentation, for harmonizing statistical computing infrastructures, and to provide a framework for process quality assessment and improvement. DOSM began adopting GSBPM in 2013, though its efforts to establish an integrated process framework predate its formal adoption of GSBPM. The adoption of GSBPM has improved harmonization and communication across DOSM's various statistical departments.
67. **DOSM has made efforts to improve its operations and coordination.** In recent years, DOSM has introduced several new database management systems to foster greater cross-departmental communication and collaboration within DOSM and across government agencies, as well as public dissemination of statistical data. Four of these initiatives include NEWSS, StatsDW, MysDIC, and MySocialStats (Figure 28). Like other advanced national statistical offices, DOSM has begun addressing emerging areas such as the digital economy, sharing economy, environment, as well as indicators for the Sustainable

Development Goals (SDG). Furthermore, from time to time, DOSM produces new data such as the index of services, green economy indicators and System of Environmental-Economic Accounting (SEEA).

**Figure 28: DOSM Database Management Initiatives 2008-2016**



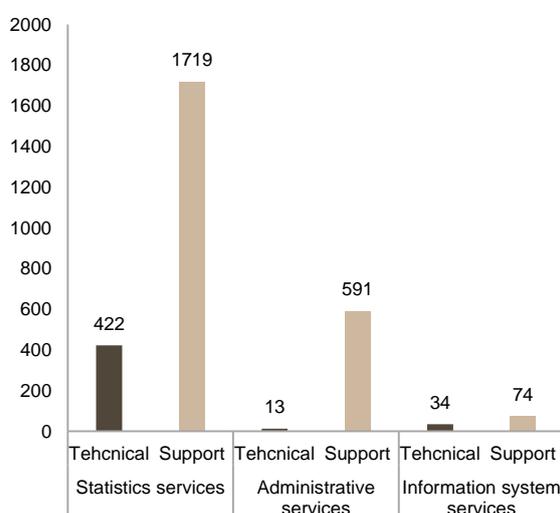
Source: Department of Statistics Malaysia (DOSM)

68. **DOSM has a cadre system across ministries, where statisticians from DOSM are deployed to different ministries and agencies.** The DOSM staff posted to the various ministries and agencies are responsible for providing technical assistance for collecting analyzing, interpreting and disseminating data. They also give other services related to statistics such as consultancy. The number of statisticians deployed depends on the statistical needs of a given ministry. The number of statisticians from DOSM in different agencies varies from one to 24 people, indicating a considerable variance in statistical capacity among government agencies in Malaysia.
69. **The composition of DOSM's workforce has not evolved in similar pace with technological advances and increasing demands for information.** The staff structure is a legacy of the time when much of DOSM's work depended on manual clerical skills. DOSM's organizational structure has been very stable over time, and the majority of DOSM's staff is in lower-grade support staff positions. Lower-grade support staff

positions account for more than 80 percent of DOSM’s staff positions (Figure 29). In contrast, management and technical staff represents only 13 percent of total DOSM staff, significantly lower than the ratio observed in high-income countries (Figure 30). By international standards, DOSM may be considered a medium-sized national statistical organization, with a total of about 3,500 staff positions. Approximately one-third of DOSM staff are based at headquarters, while 60 percent are based in DOSM state offices and 6 percent are based in other government agencies.

**Figure 29: A large proportion of DOSM staff is composed of support-staff positions...**

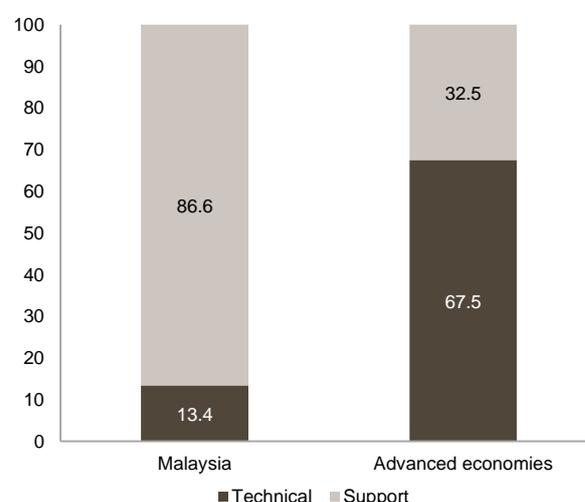
Number of employees, 2015



Source: DOSM

**Figure 30: ... and the proportion of managerial staff is significantly lower than high-income countries**

Number of employees, percent of total, 2015



Source: DOSM

Note: High-income economies is the average of Singapore, Spain and Netherlands

### 3.B. ROLE OF DATA PRODUCERS AND KEY COLLABORATORS IN MALAYSIA – DATA DISSEMINATION

70. **The open data movement is rapidly growing across the globe.** Open data is a policy that aims to make government-held data publicly available, with very few restrictions on access, and in formats that both people and software can easily read and use for any purpose. Open data is not only a tool for transparency and accountability, but also a powerful catalyst for innovation, entrepreneurship, and improved public service delivery.

Early experiences confirm that opening data can drive smarter development, better decision making, and contribute to improving the lives of millions of people.<sup>33</sup>

### Box 7: Indonesia's Open Data Initiative – Paving Way for Change

Indonesia's movement to open up its government started in 2008, when, in an effort to promote good governance and transparency, the country passed the Public Information Disclosure Act. The Act created a paradigm shift. Data which was previously closed by default, and were only made public when requested, became open by default. In 2011, Indonesia became one of the eight countries who initiated the [Open Government Partnership](#), to promote governments to take concrete actions towards enhancing transparency, accountability and citizen empowerment.

The country's online One Data Portal ([www.data.go.id](http://www.data.go.id)) was established to serve as a "one-stop shop" to access and obtain government data. Efforts were also made to encourage central government agencies, as well as local, to open up their data. In 2014, the data portal opened to the public. Currently, the portal has made available over 1,200 datasets provided by 32 central and local government institutions. Following the national government's lead, some local governments have even launched their own open data portals in Jakarta, Bandung and Banda Aceh. Not only has this improved transparency, but also facilitated citizen feedback, which in turn improves the delivery of services. For instance, residents can send reports using a mobile device by way of the Qlue mobile app, which the city administration system then forwards to local authorities for follow up.

Greater transparency is also changing the political landscape. Open data helped empower citizens to monitor the results of Indonesia's 2014 legislative and presidential elections, as well as the district elections in 2015. As a result of the widespread use of the electoral data, the General Elections Commission passed in 2015 a regulation that mandates election results to be made available in an open data format.

The current government administration is now preparing a presidential decree on open data, allowing the public greater access to data and to standardize the data generation process in government institutions.

Source: World Bank (2016) Open Data Brings Change to Indonesia

71. **There are two international assessments of data openness around the world.** The first is the Open Data Barometer (ODB), and the second is the Global Open Data Index by the Open Knowledge International (OKI). These two assessments define open data as public information that can be "freely used and shared by anyone for any purpose". Concurrently, data quality is equally important, as together, the availability, accessibility, and quality of data determine the usefulness and usability of data. Users find significant

<sup>33</sup> World Bank "Open Data for Sustainable Development" August 2015, Transport and ICT Policy Note, ICT01.

value added in having accurate, complete, easy to interpret, and timely data to solve problems or make decisions.

### **Box 8: Measures of Openness – Open Data Barometer and Open Knowledge International**

Produced by the World Wide Web Foundation as a collaborative work of the Open Data for Development (OD4D) network, and with the support of the Omidyar Network,<sup>34</sup> the Open Data Barometer (ODB) analyses global trends, and provides comparative data on countries and regions, using an in-depth methodology that combines contextual data, technical assessments and secondary indicators.<sup>35</sup>

The Open Data Barometer score is based upon three kinds of data assessments;

- i. A peer-reviewed expert survey with a range of questions about open data contexts, policy, implementation and impacts, and a detailed dataset survey, which touched upon issues of data availability, format, licensing, timeliness and discoverability.
- ii. A government self-assessment in the form of a simplified survey.
- iii. Secondary data taken from the World Economic Forum, World Bank, United Nations e-Government Survey and Freedom House, selected to complement the expert survey data.

The Global Open Data Index is evaluated using a set of questions that examine the openness of the datasets, based on the Open Definition and the Open Data Charter.<sup>36</sup> In 2016, the index was measured through a new survey, where each survey question measures a crucial aspect of either the legal, technical, or practical ‘openness’ of data.

Source: Authors

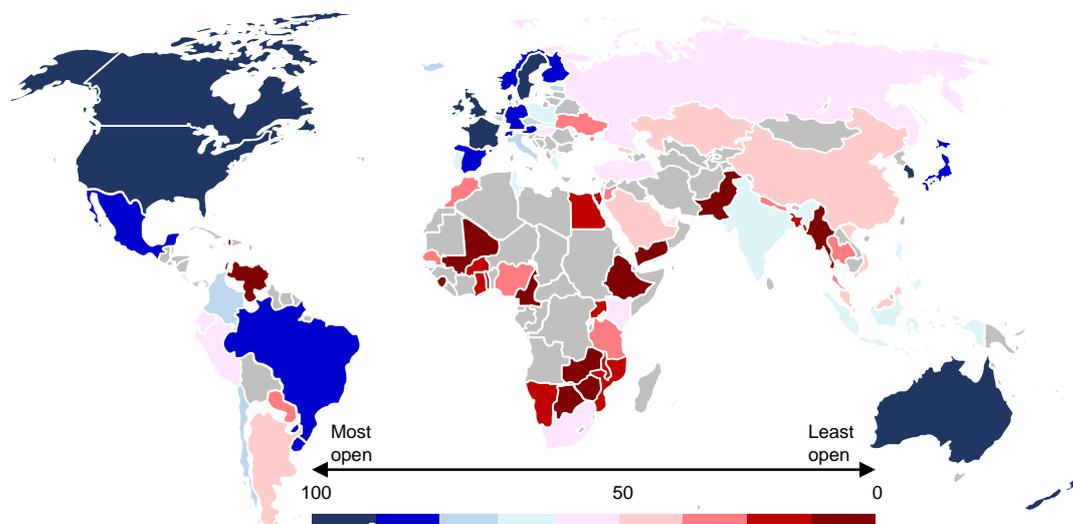
<sup>34</sup> The World Wide Web Foundation is an organization established in 2009 by Web’s inventor Sir Tim Berners-Lee to advance the open Web as a public good and a basic right; the Open Data for Development (OD4D) is a network of partners that have a wealth of experience in developing countries, and the Omidyar Network is an investment firm that invests in both for-profit businesses and non-profit organizations.

<sup>35</sup> For detailed methodology, see <http://opendatabarometer.org/doc/3rdEdition/ODB-3rdEdition-Methodology.pdf>.

<sup>36</sup> For detailed explanation, see <https://index.okfn.org/methodology/>.

**Figure 31: Advanced economies rank higher in their open data scores, followed by emerging and developing economies**

ODB aggregated scores, 2015



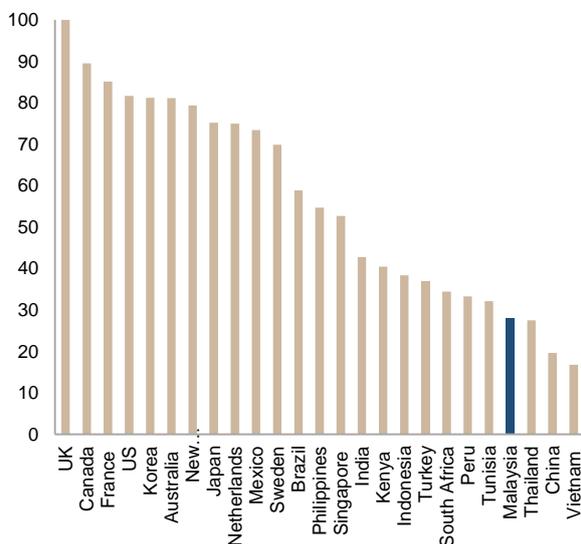
Source: Open Data Barometer

72. **Malaysia's degree of data openness is still lagging behind many countries.** As of 2015, Malaysia's ODB ranking was at 51 from 92 countries, while in 2016, Malaysia's ODB ranking was at 53 out of 114 countries, lower than most advanced economies and many Southeast Asian economies (Figures 31, 32, and 33). Recognizing the room for improvement, the government indicated that accelerating implementation of the Public Sector Open Data Initiative is one of the government's key strategic thrusts, and this was outlined in the Malaysian Public Sector ICT Strategic Plan 2016-2020. As of 1 June 2017, 2025 data sets have been made available in the public-sector open data portal, ([www.data.gov.my](http://www.data.gov.my)).<sup>37</sup> The government's target is to increase it to 7000 datasets by 2020. Improving this platform is key to unlocking its value through community usage and creation of applications.

<sup>37</sup> <http://www.data.gov.my/event/60>

**Figure 32: Malaysia's ODB score lags behind many advanced and regional countries**

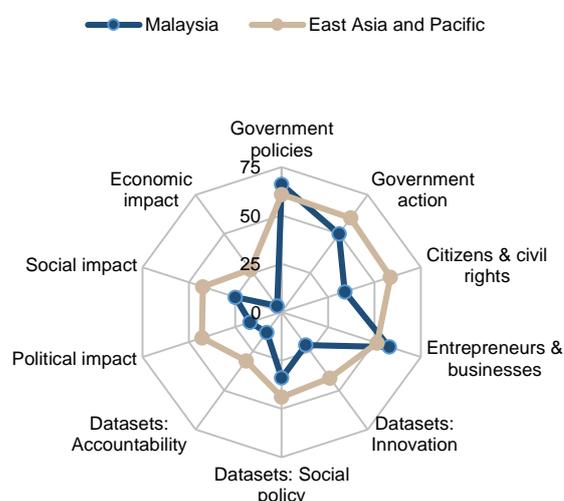
ODB aggregated scores, 2016



Source: Open Data Barometer

**Figure 33: Malaysia sub-categories scores are also lower than the region's average**

ODB score of sub-categories, 2016



Source: Open Data Barometer

Note: The ODB scores are calculated based on three broad categories; readiness, implementation and impact. Each of the sub-categories contributes to these three broad categories.

73. **In Malaysia, government agencies have access to anonymized microdata held by DOSM for policy formulation and monitoring purposes.** Anonymized microdata has been shared with stakeholders as well as organizations such as the World Bank, which jointly conducts studies with the government in various areas such as productivity and investment. DOSM evaluates all requests for microdata on the basis of the proposed research questions and analytical methods. These are assessed together with the characteristics of the requested microdata, such as the appropriateness of the sample design for the research questions, the reliability of the data at the level of disaggregation proposed for the study, and disclosure risk (especially for establishment-level surveys). Based on this evaluation the agency requesting the microdata may receive a subset of data (e.g., selected observations, variables, or survey rounds) that DOSM considers appropriate for the particular study and data.
  
74. **DOSM provides subsets of micro datasets to selected universities.** DOSM's data sharing activities with universities are governed by its microdata released policies, and are formalized as bilateral memoranda of understanding (MOU). DOSM's standard

microdata release policies apply. At present, DOSM has MOUs with 12 universities<sup>38</sup> in Malaysia, with more in progress.

75. **Additionally, at the end of 2016, DOSM established a data enclave to facilitate secure data access for researchers.** In the secure room, known in DOSM as the “external lab,” approved users are allowed to access of the requested microdata. To prevent unauthorized disclosure of the anonymized data, the secure data room is equipped with computers not linked to the Internet or an external network, and from which no information can be downloaded via USB ports or other drives. The summary outputs generated are examined by way of a disclosure review before release to the user. Such arrangements are routinely employed by statistical offices in a wide range of middle- and high-income countries.
76. **DOSM has taken steps to make it easier for the public to work with micro datasets.** DOSM’s Statistics Data Warehouse (StatsDW) which was launched in 2016, provide tools for public users to generate their own statistical tables, graphs, and maps. StatsDW is an Enterprise Data Warehouse (EDW) of DOSM. StatsDW stores historical data from as early as 1974 from various censuses and surveys conducted by the DOSM, as well as compiled data for economic indicators. StatsDW enables fast and easy access to stored data, and facilitates wider access for users according to user requirements and level of access permitted. The StatsDW allows users to compile aggregate tables and graphs according to their needs. These data are ready to be exported in different file formats such as Excel and comma-separated values (CSV) text.
77. **Many of the statistical outputs and data for Malaysia are now available online.** In its initial stages, most of DOSM and other government data outputs were thick books filled with hundreds of dense tables. With the rapid expansion of Internet and mobile phone usage, the government’s public outreach has emphasized online communications. Statistical publications are available to download free of charge as PDF files, while a large and growing proportion of their statistical results and underlying data are available as spreadsheets or in other formats that facilitate further analysis that can be downloaded from DOSM’s website. In line with the open data initiative, all of DOSM’s publications were uploaded in a portal for free access since 2012. DOSM’s eStatistik platform provides fast and easy access to all of DOSM’s publications. As of May 2017, almost 1,000 publications are available for free download. This user-oriented facility ensures that all DOSM publications and can be accessed easily and quickly.
78. **Providing access to more granular data sets would help to close existing data gaps currently faced by many data users inside and outside of government.** Closing the data gaps enables effective evidence-based decision-making at the individual, institutional,

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<sup>38</sup> The 12 universities that currently have MOUs with DOSM are: Malaysia University Science & Technology, Multimedia University, National University of Malaysia, Northern University of Malaysia, Sultan Idris Education University, University of Malaya, Universiti Malaysia Sabah, Universiti Putra Malaysia, University of Science Malaysia, University of Technology MARA, Universiti Tun Hussein Onn Malaysia and Management Sciences University.

national, and international levels. Hence, enhancing development in the country by ensuring wide access to data, while honoring confidentiality and privacy requirements, should be a high priority for the producers and custodians of data. When data is not confidential, the access should be made available and usable to the public. However, rules and standards should be aimed at protecting privacy and reducing information inequality.

### **Box 9: Access to Microdata in High-Income Economies**

Detailed survey data is often needed to understand the impacts of policies and programs. For example, the introduction of a consumption tax such as the GST will affect the real incomes of consumers as well as their purchasing behavior, and the effect is likely to vary by income level and possibly area of residence. Similarly, the removal of fuel subsidies will have different impacts on population sub-groups, depending on how much households spend on fuel and products for which fuel is an important intermediate input. The analysis of productivity trends and interventions to increase productivity requires detailed firm-level data. To assess these impacts, decision makers usually rely on microdata from sample surveys that often cover hundreds of variables on tens of thousands of households or business establishments.

While National Statistical Offices (NSO) are usually the *first* users of detailed survey data sets, in many advanced countries, the *main* users of NSO survey data are other government departments, universities, and researchers. Survey data is costly to collect, and NSOs generally do not have the resources to undertake in-depth analyses beyond the main survey reports and official statistics. NSOs in high-income countries, and even many middle-income countries, have leveraged the public investment in collecting microdata, by streamlining procedures for others to access the microdata, effectively multiplying the analyses, information, and knowledge generated by the survey. This is also the case of administrative microdata, such as tax data. All NSOs take measures to protect confidential data. They remove personal identification information to anonymize microdata, with some variation in the thoroughness and sophistication of methods. Many NSOs create standard public-use data files that can be widely shared without compromising confidentiality. Data access logistics are evolving rapidly, as NSOs move away from the sharing of data discs and increasingly use secure on-site data rooms or secure Internet connections to provide access to data. Almost all NSOs require data users to sign a declaration—either in hard copy or online—agreeing to obey the confidentiality provisions of the national statistical act.

The extent of microdata access varies considerably, not only from country to country, but also within countries according to the category of user (e.g. NSO, government, research institution, public) and the type of data (e.g. consumer prices, household incomes, population census). Procedures for obtaining access also vary. Some NSOs require detailed research proposals, while others allow free access to the public simply by logging in to a web site. (See Appendix I for microdata accessibility in a small sample of advanced countries.)

Source: Authors

79. **The government aspires to enhance its degree of data openness.** There is a clear aspiration by the government to be among the top 30 countries in the Open Data Barometer, advancing from its ranking of 53 in 2016. This is in line with the 11MP's aspiration of becoming a digitally strong and mature society. The visible public Ministerial support for open data is evidenced by an open data program, which is coordinated by Malaysian Administrative Modernization and Planning Unit (MAMPU), a government agency under the Prime Minister's Department that is responsible for modernizing and reforming the public sector. MAMPU has adopted the role of "Network Leader" for the open data sector in Malaysia, including by becoming the liaison point between the Prime Minister's Office and the rest of government; and between government and data use communities. In addition to this program, the government has also established other related initiatives, such as a big data program led by the Malaysia Digital Economy Corporation (MDEC).
80. **Malaysia has the necessary building blocks to improve its data accessibility and openness.** In particular, these building blocks include having an emerging senior leadership support for open data, and having the necessary fundamentals such as skills and ICT capabilities, adequate funding, and technology infrastructure. Moreover, there is a growing actual demand for open data, and an increasing level of civic engagement for open data. The Open Data Readiness Assessment (ODRA) results highlight areas where Malaysia should focus in order to move forward. These include refining the current legal and regulatory framework, and providing better clarity for both government and the public on data accessibility and usability.

### Box 10: The World Bank's Open Data Readiness Assessment (ODRA)

The World Bank Open Data Readiness Assessment (ODRA) is an action-orientated assessment of the readiness of a national, regional or municipal government or even an individual agency to evaluate, design and implement an open data program. An open data program goes beyond the design and launch of an open data portal, aiming to drive the development of a dynamic open data ecosystem, rich in both the supply and reuse of open data that fuels innovations by many types of public and private sector stakeholders.

Thus, the ODRA evaluates readiness based on eight dimensions considered essential for an open data program; namely, i) senior leadership; ii) policy and legal framework; iii) institutional structures, responsibilities and capabilities within government; iv) government data management policies and procedures; v) demand for open data; vi) civic engagement and capabilities for open data; vii) funding an open data program; and viii) national technology and infrastructure. Within each dimension, the assessment considers a set of primary questions, noting evidence that favors or disfavors readiness, and proposes a set of actions that can form the basis of an open data action plan. The recommendations and actions proposed are based on global best practices, while also incorporating the needs and experiences of the government to date.

Source: World Bank Open Data Readiness Assessment Users' Guide

81. **MAMPU is largely responsible for Malaysia's open data strategy.** While Malaysia does not yet have specific policies on open data, MAMPU has spearheaded the implementation of open data since 2014.<sup>39</sup> The General Circular No.1/2015 on Implementation of Public Sector Open Data, developed based on global best practices of open data, was issued to provide guidance in the implementation of open data for public sector agencies to promote data sharing, improve government service delivery system to be more user-friendly, fast and transparent. In line with the government's aim to be in the top 30 of the ODB rankings, MAMPU has formulated its open data strategy anchored to the three main scopes of the ODB rankings; readiness, implementation and impact. MAMPU's open data program consists of the 14 strategies that have been identified, comprising 22 action plans and programs for both the short-term (quick wins) and long-term.<sup>40</sup>
82. **Malaysian civil servants have the necessary skills and ICT capabilities for operationalizing open data.** MAMPU has been able to attract and retain a group of technically-strong ICT professionals. It is supported by 50 expert ICT support staff and 100 technicians and administrative staff. They have already successfully coordinated a

<sup>39</sup> Based on the mandate from The Government IT & Internet Committee (GITIC) Bil.1/2014, The Panel on Humanising the Public Service (Merakyatkan Perkhidmatan Awam (MPA)) Bill. 1/2016. The General Circular No.1/2015 on Implementation of Public Sector Open Data was issued to provide guidance in the implementation of open data for public sector agencies to promote data sharing, improve government service delivery system to be more user-friendly, fast and transparent. Nonetheless, it is worth to note that 1) the circular is not yet systematically implemented across the government and 2) the circular only applies to those government agencies that have agreed to release data (kind of an opt-in format) limiting its effectiveness in supporting the open data efforts in the country.

<sup>40</sup> The circular follows 10 principles: primary source, timely, accessible, machine readable, non-discriminatory, use of open standards, data permanent, licensing and usage costs.

number of cross-government ICT projects, including the Malaysian Government Open Data portal, as well as the Malaysia Corporate Identity (MyCoID) Gateway, which enables simultaneous registration for businesses across a range of government agencies. In addition to MAMPU, other agencies including DOSM, Ministry of Health, and Ministry of Finance also have well-developed data competencies. Furthermore, all government officials receive ICT training through several main channels. The Malaysian National Institute of Public Administration (INTAN) provides general government training to all incoming civil servants across a range of different topics, including ICT use and basic analytics. Also, individual agencies provide more targeted ICT training for officials on an ongoing basis, especially related to newly-implemented or revised ICT tools and platforms.

83. **Malaysia's open data program has adequate funding.** Malaysia already runs an open data program with dedicated resources. There is also government funding for big data programs and e-government projects with the aim of creating societal impact with data. These e-government projects include the MYEG portal, which provides services from various government agencies to the public, JobsMalaysia, a platform by the Ministry of Human Resources to connect employers with job seekers, and E-Syariah, an online portal to assist the public on questions regarding Syariah law. On the demand- or user-side, innovation funding is also available. Both MAMPU and MDEC have organized hackathons<sup>41</sup> where prize money was available, as well as resources to assist winners in working more closely with the relevant data holders and/or scaling their projects.

### **Box 11: Malaysia's Government Open Data Portal**

The *Malaysian Government Open Data Portal*, ([www.data.gov.my](http://www.data.gov.my)) was developed in-house by MAMPU and serves as an online one-stop-center to access and download open government data. The portal was launched in August 2014 and went live on 23 May 2016. The data set is divided into 18 clusters, such as budget, education and agriculture, and users are able to download the available data into a spreadsheet format.

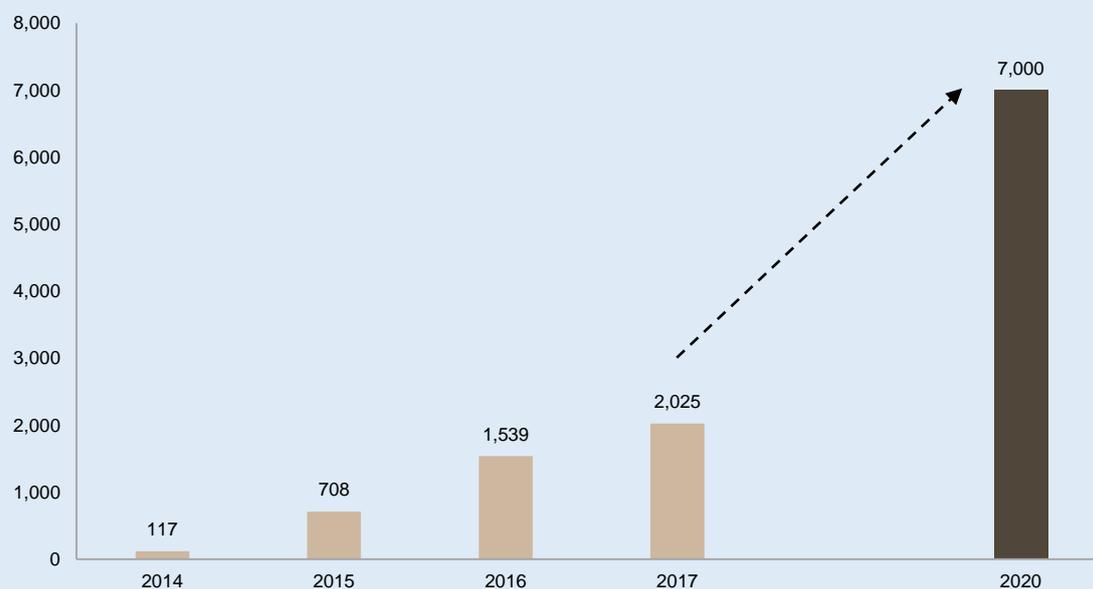
The portal is accessible by the public. The data sets published in the portal as raw data format with quality assurance, fulfilling the eight characteristics of the open data quality assessment.<sup>42</sup> The data sets are provided in 100 percent machine readable format such as Excel, CSV, and JSON. Over the years, the number of sets of data that were published from 2014 has gradually increased (Figure 34), although there is still room for improvement, given the government's target of 7000 data sets by 2020.

<sup>41</sup> A Hackathon is an event, usually lasting between 1 day to a week, in which computer programmers and others involved in software development, including graphic designers, interface designers, project managers, collaborate intensively on software projects.

<sup>42</sup> Machine readable, Available in bulk Free to access, openly licensed, sustainable, discoverable, linked and updated.

**Figure 34: Number of data sets published has gradually increased**

Number of data sets available



Source: MAMPU

Various activities have been planned and carried out by MAMPU to encourage more open data to be published effectively into data.gov.my. These activities include:

- i. In May 2016, features to improve and enhance the portal in accordance with global best practices were successfully launched. The new portal is now equipped with a range of the latest features, including facilities for creating new data sets application.
- ii. An awareness program to encourage ministries and agencies to publish their data, as the government's target is to achieve 7,000 data sets by the year 2020.
- iii. Appointing 60 open data champions across ministries and agencies. The data champion is responsible as a consultant to advise on the implementation of the open data initiative in their respective agencies. The data champions' roles are:
  - a. Act as agency advisor and champion for public sector open data implementation
  - b. Study and identify suitable datasets for agency open data
  - c. Obtain relevant approvals from heads of departments to allow public access to the datasets
  - d. Ensure agencies' open data datasets are uploaded to public sector open data portal
- iv. Engagement programs with government agencies, the business community, data providers and data champions to increase the quantity and improve quality of datasets. As of now 31 series of engagement had successfully been put in place.

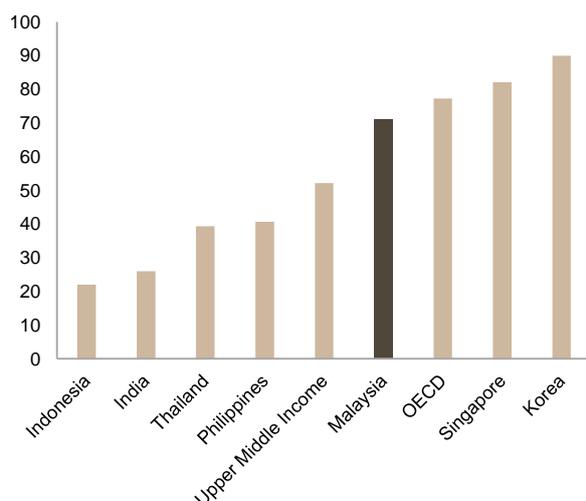
- v. Organizing Hackathon programs in 2015 and 2016, where the contestants pitting skill and creativity using the open data portal as well as other relevant data to develop an innovative product of applications.
- vi. Publicizing eLearning modules on data.gov.my, and inviting and continuously educate users to access the course.
- vii. Conducting collaborative programs in 2016 with open data experts from the Open Data Institute, United Kingdom, and the World Bank Group, in order to successfully explore knowledge- and experience-sharing in implementing open data initiatives with more efficient and viable practices.

Source: MAMPU

84. **Malaysia's open data program also benefits from having an adequate technology infrastructure.** In terms of hardware and connectivity, mobile penetration as at end 2015 is at 144 percent, and 71 percent of Malaysian households have access to the Internet.<sup>43</sup> This surpasses most regional comparators, and even the average of upper-middle income countries. Furthermore, the number of secure internet servers, an indication of how many companies conduct encrypt (secure) transactions over the Internet, is also higher than comparators (see Figures 35 and 36) In addition, the ICT sector is well-developed, constituting about 18 percent of GDP<sup>44</sup> and growing. A national agenda, the Human Capital Strategic Initiatives, also exists to improve technical skills amongst the general population to meet the demand of companies.

**Figure 35: Malaysia's Internet usage surpasses most regional comparators...**

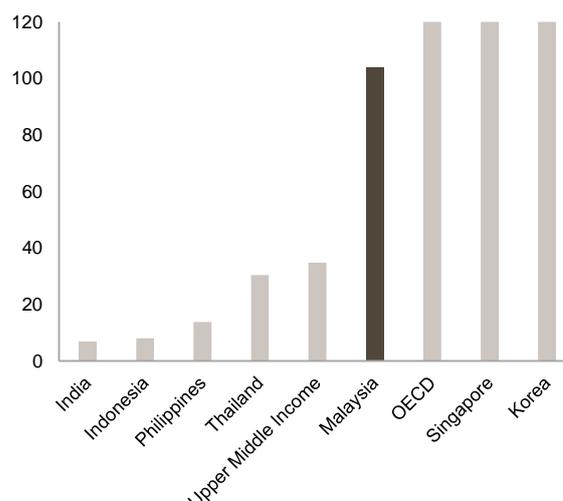
Internet users (per 100 people), 2015



Source: World Development Indicators

**Figure 36: ...as well as the number of secure Internet servers.**

Secure internet servers (per 1 million people), 2015



Source: World Development Indicators

<sup>43</sup> World Development Indicators 2017.

<sup>44</sup> DOSM 2015.

## **Box 12: World Bank Open Transport Partnership to Improve Transportation through Open Data**

Traditional methods of collecting traffic data rely either on labor-intensive fieldwork or capital-intensive data sensor networks. The former is slow and results in low-quality data, and the latter requires substantial capital and maintenance outlays, while only covering a small portion of metropolitan data. In the era of big data, should we not be able to do better?

Responding to this need, Easy Taxi, Grab, and Le.Taxi, three ridesharing companies—which, combined, cover more than 30 countries and millions of customers—are working with the World Bank and partners to make traffic data derived from their drivers' GPS streams available to the public through an open data license. Through the new Open Transport Partnership, these companies, along with founding members Mapzen, the World Resources Institute, Miovision, and NDrive, will empower resource-constrained transport agencies to make better, evidence-based decisions that previously had been out of reach. Issues that this data will help address include, among others, traffic signal timing plans, public transit provision, roadway infrastructure needs, emergency traffic management, and travel demand management.

The Open Transport Partnership builds upon the success of Open Traffic, the pilot program launched in the Philippines in April 2016. In the Philippines, the World Bank collaborated with Grab, with support from the Korea Green Growth Trust Fund, to develop an open-source platform for using anonymized GPS data generated by more than 500,000 Grab drivers to analyze traffic congestion peak patterns and travel times. Using this platform and road incident data, city governments in the Philippines could, for the first time, answer the fundamental questions necessary to address safety and congestion—Where and when is congestion most acute? Where and when are our citizens most vulnerable to road incidents? And most fundamentally, when we invested in interventions to mitigate accidents or congestion, did these investments work? What was their impact? Could we have done better?

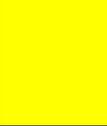
A similar initiative was launched in Malaysia (OpenTraffic Initiative) by MDEC, Grab and the World Bank Group on April 10 2017. The initiative will provide traffic data from Grab's GPS data streams to Malaysia's traffic management agencies and city planners. It will enable them to better manage traffic flow, addressing traffic congestion and improving road safety and to make investment decisions on local transport infrastructure with access to an open dataset.

Through these global public data goods, governments, together with the private sector, will be able to effectively shape their transportation futures, ensuring equitable and safe access for all.

Source: World Bank (2016) Open Traffic Data to Revolutionise Transport

85. **The existing legal and regulatory framework could benefit from refinement.** Currently, the legal environment for data collection, management, and sharing is a source of some uncertainty and caution. Data holders are not always confident about the application of general rules and regulations related to privacy and confidentiality, and individual agencies may also face specific internal data management regulations. This creates a fragmented environment for data management that lacks clarity for both government and the public on how data can be requested, shared and used. It also means that majority of data exchanges, whether inter-agency or with non-government stakeholders, are decided on a case by case basis, with senior managerial approval necessary for most decisions.

**Table 7: Summary of ODRA results for Malaysia**

Dimension	Importance	Rating	Assessment/ Commentary
National tech and skills infrastructure	High		High Internet usage, mostly mobile broadband. Start-up and coding communities active.
Institutional structures, responsibilities, capabilities	Medium high		Clear lead institution, clear mechanisms for ICT projects.
Funding open data program	Medium high		Ongoing open data and big data programs and innovation funding. Acceleration likely lies in connecting existing elements, not increased funding.
Senior leadership	Very high		A national open data program exists, and general support for the concept is high. However, increasing open data buying amongst data-owning agencies is still a critical issue to be addressed in Malaysia. Stronger sense of purpose for open data as an instrument for impact may yield additional champions.
Societal demand for open data	Very high		CSOs, academia and the business community articulate clear demand, though not all groups well-developed. Case-by-case decision-making for data requests hinders responsiveness and predictability of data provision.
Civil engagement and capabilities for open data	High		Notable ICT sector and apps economy; however, data journalism not visible. Higher education involved in increasing data skills. Co-organized events. More sustained interaction possible after those events.
Legal and policy framework	Very high		While data availability is high, access to data is challenging and remains an area of concern among data users in Malaysia. The legal framework is fragmented, and poses an obstacle to more open data as well as to sustained publication. Minor fees charged for data requests are inefficient and act as a further barrier.
Government data management policies	High		Malaysia is a data-rich environment, but not much high quality data released, little automated interagency data exchange, and many fees but of low significance to data holders.

Source: World Bank Open Data Readiness Assessment: Malaysia 2017

Note: **Green** rating indicates clear sign of readiness; **Yellow** rating indicates evidence of readiness is less clear

### 3.C. ROLE OF DATA PRODUCERS AND KEY COLLABORATORS - DATA COLLABORATION

86. **The current national statistical system can best be described as a “federated system” with multiple production units.** It is a system with many parts but no formal central control mechanism, although DOSM is the largest statistical agency in the country. While the Statistics Act gives DOSM wide authority to collect and interpret statistics, the Act does not empower DOSM with any legislated mandate to manage or direct the national statistical system. Hence, individual ministries can and do conduct their own statistical activities for their own use, as directed by their own governance structures. While it is not legally required for the ministries to work closely with DOSM, it has been involved as a member of steering and technical committees for the implementation of projects or studies in the agencies. Amongst DOSM’s roles is to give advice on statistical methodology, providing social and economic statistics, and endorsing other agencies’ studies.
87. **In Malaysia, the national statistical activities are coordinated through the Main User Committee (MUC).** The MUC meets twice per year to “identify and establish the priorities and statistical needs” and “to coordinate the technical, collection, and statistical dissemination” activities. Beyond Malaysia, DOSM is also the coordinating international body for statistics. In addition to its national role as the producer of official statistics, DOSM also represents Malaysia regionally, ensuring adequate collaboration and data sharing within ASEAN (Box 13) as well as at the global stage (Box 14).

#### Box 13: Regional Data Sharing in ASEAN

At the regional level, data about ASEAN is crucial to ensure the sustainable development of the region, in order to achieve the One Vision, One Identity, One Community motto. A hub of ASEAN statistics was envisaged to provide statistics for the ASEAN Member States, and the ASEAN Community Statistical System (ACSS) Committee was officially established at the 43rd Meeting of the ASEAN Economic Ministers (AEM) in August 2011, in Manado, Indonesia.

The ACSS is the highest regional policy-making and coordinating body on ASEAN statistics. It aims to provide relevant, timely and comparable ASEAN statistics in support of evidence-based policy- and decision-making, and enhances the statistical capacity of the Member States and the ASEAN Secretariat. The National Statistical Systems of all ASEAN Member States, through the National Statistical Office (NSO), are the country focal point, while the ASEAN Secretariat, through ASEANstats, functions as the regional focal point, as well as the technical arm and secretariat of the ACSS Committee.

The ACSS Strategic Plan 2016-2020 provides the framework for an effective facilitation, coordination, production, harmonization, dissemination and communication of ASEAN

statistics. It charts the mechanisms in ensuring sustainable development in the dissemination of statistical information, delivery of statistical information needs, and statistical capacity building in the AMSs.

The ACSS had endorsed the policy and guidelines of data sharing, data transmission protocol and developed the interactive website with more than six hundred indicators. With regards to regional data sharing, technical working groups on selected economic and social statistics, as well as data communications (the Working Group on Data Sharing, Analysis, Dissemination and Communication of Statistics), have been established.

ASEAN Statistics are made available in regular publications and online databases on trade in goods and services, FDI, tourism, populations, GDP and other indicators. Moreover, detailed data is made available through online request at [www.aseanstats.org](http://www.aseanstats.org).

Source: Department of Statistics Malaysia

#### **Box 14: 62<sup>nd</sup> World Statistics Congress of the International Statistical Institute**

In November 2016, DOSM, representing the Malaysian government, bonded an agreement with the International Statistical Institute (ISI) to organize the 62<sup>nd</sup> World Statistics Congress of the International Statistical Institute (ISI WSC) in Kuala Lumpur in August 2019.

The Congress will gather 3,000 statistical practitioners in Kuala Lumpur and will be jointly organized by DOSM, BNM and the Institute of Statistics Malaysia (ISM) with the support of Malaysia Convention & Exhibition Bureau.

Participants are expected to come from various fields including academia, businesses and statisticians, and this will ensure cross-fertilization of ideas across disciplines. Eminent personalities, experts, researchers and students from more than 130 countries are expected, providing opportunities to expand and deepen professional networks.

The ISI WSC will be a significant avenue for strengthening global statistical networks within countries and across regions. It will bring together members of the statistical community to share and disseminate the best practices and research in the field of statistics.

Source: DOSM

88. **Databases that are maintained by various ministries are sometimes not fully integrated at the national level.** Some ministries and agencies collect their own data and have their own databases. For example, the Ministry of Health, the Ministry of Education, the Ministry of Finance, and the Implementation Coordination Unit all maintain their own respective databases and have full responsibility for control of their own databases. Some aggregated data is shared publicly across government agencies, including through the data.gov.my site managed by MAMPU.

### **Box 15: How Data Fragmentation Challenges Policy-Making in Malaysia**

Data fragmentation and lack of data integration in Malaysia has been a long-standing issue, and has presented additional challenges for policy making.

#### **Addressing the issue of immigrant labor in Malaysia**

A fragmented migration system with duplicative roles undermines efforts to get the right number and profile of immigrant labor, and to control irregular immigration. Current problems related to the demand and supply of immigrant labor in Malaysia can be attributed to the absence of coordination in determining the profiles of workers that the economy demands. The focus has been on the quantity of foreign labor needed in each sector, rather than on the suitability of the worker to fill market demands. As a result, agencies have been forced to act in silos, which in turn contributes to the oversupply and undersupply of immigrant labor in different sectors of the economy. The Ministry of Home Affairs and Ministry of Human Resources maintain separate databases on immigrants that do not necessarily coincide. This hampers further coordination, and has the potential to undermine policy formulation and implementation.

#### **Improving urban transport planning**

Numerous reports, models, and guiding documents underpinning urban transport planning and delivery in the Greater Kuala Lumpur area are almost always based on unique, non-comparable data series, data definitions, units of measure, and temporal horizons. This has resulted in different conclusions of what current travel demand levels are, and what their future behavior is likely to be in response to a defined set of interventions (or lack thereof). Subsequently, this makes it difficult to unequivocally answer important questions, such as the number of people entering the central business district (CBD) at morning peak every day, how this number is likely to grow over time, and what the current and expected future highway capacity in/out of the CBD is.

#### **Managing social protection programs**

A large number of agencies, at both the national and state levels, are involved in both policy development and program implementation of social protection in Malaysia, creating and contributing to fragmentation, lack of coordination and duplication of programs. As a result, there has been a proliferation of small and similar type of programs across multiple agencies. There is also fragmented data management across agencies and

programs. Though there have been welcome efforts to consolidate data, the systems have yet to become inter-operable in a way that would enhance real-time beneficiary assessment, program management, and cross-program synergies.

### **Planning for smart cities**

More and better use of data can improve policymaking at the local level. The National Key Results Area in crime reduction has demonstrated the potential of data analysis to provide improved service delivery, but much more can be accomplished through increased use of data in policy-making. Data is also needed to assess the greenhouse gas emissions of Malaysia's cities, so that baselines can be established and progress monitored and reported periodically.

Source: Authors

89. **Data fragmentation also exists at state and local government level.** Even though local authorities and state governments collect some data, they are often not up-to-date. They lack well-developed database systems to store and manage data, and a large portion of the data is recorded manually in log books and is not digitized. In addition, the dispersion of data collection responsibilities between different levels of the government creates asymmetries concerning which agencies are producing and using different data sources. The asymmetric information sometimes leads to repetitive work on collecting the same data by multiple agencies, leading to a waste of resources.

### Box 16: Sub-national Data Collection and Management in Malaysia

DOSM has established a branch office in every state and federal territory in Malaysia. Branch offices assist DOSM to produce national statistics, and thus they undertake all the surveys and field work as required by the headquarters. These branch offices are not designed or intended to support the states to produce state-level statistics. Their main task is to collect data for national surveys or censuses. While some of the data is shared with the state agencies, it is not done uniformly, and the usefulness is often limited by the adequacy of the sampling scheme. For example, most national surveys are only representative at the state and rural/urban levels, so they are not reliable sources of information for statistics at the district level or below.

Many state governments and local authorities do not have an explicit data collection and information management apparatus. As a result, they have to rely on DOSM branch offices for support or rely on published data from DOSM. It is important for state and local authorities to have greater access to data for the matters under them to meet their own decision-making requirements. More developed states, for example Penang, have think-tanks such as the Penang Institute, which collects and conducts research at the request of the State Economic Planning Division. However, not all states in Malaysia have such state-focused research institutes.

DOSM has taken the initial steps to improve the data access at the state level and has developed the mobile application “MyLocalStats” that provides detailed statistics at district level. The statistics will assist the state governments, district offices and local authorities in development planning and implementation in terms of economic, social and the environment.

Source: Authors

90. **Initiatives are currently underway to integrate two critical databases; one for trade data and businesses, and the other for the population.** DOSM has recently integrated trade data with the Malaysia Statistical Business Register (MSBR). The integration of trade and business statistics helps DOSM to connect trade information with Malaysia’s economic, social, environmental and financial dimensions. DOSM has embarked on using big data techniques, leveraging its well-developed MSBR to integrate it with detailed trade data. On the population side, DOSM has established Malaysia Integrated Population Census Framework (MyIPCF). The objective is to save labor costs for collecting census data, by relying more on administrative data and online data collection for Census 2020. One goal for this database is to have all living quarters in Malaysia geocoded. The population database integrates several databases: the population and housing census; databases from other government agencies such as the Department of Immigration, the National Registration Department, the Ministry of Health, and the Ministry of Education; the Malaysia Statistical Address Register; and geographic information systems (see Box 17 for examples of DOSM’s engagements and collaborations with other agencies).

### Box 17: DOSM's Engagements and Collaborations with Other Agencies

DOSM has long standing collaboration with a number of agencies. Collaboration among DOSM with various agencies has generally been formalized through a multi-stakeholder or inter-agency platform or committee. The function of the committee is to coordinate the strategic development and production statistics and to preserve continuity over time. These inter-agency platforms bring together users and producers to identify users' needs and ensure the production of the necessary statistics from a variety of data sources in a coordinated manner. Among the agencies that DOSM has collaborated with are:

- i. National Registration Department (NRD)  
NRD have been supplying registered records on births, deaths and marriages & divorces of Non-Muslims to DOSM since 1963 in order for DOSM to produce and disseminate statistics on Births, Deaths, Cause of Deaths as well as Marriages & Divorces of Non-Muslims. Statistics on births and deaths is also used as input for the Current Population Estimates.
- ii. Royal Malaysians Customs Department (RMCD)  
DOSM is the sole agency responsible for producing and disseminating Malaysia External Trade Statistics (METS) since 1949, with the main data source for METS is the Customs Declarations provided by the RMCD. RMCD provides electronic declarations to DOSM through their Sistem Maklumat Kastam (SMK) on a daily basis by transmitting to DOSM's server which is located at RMCD Headquarters, Putrajaya. More recently, DOSM was involved in the study on GST implementation in Malaysia by providing related data to the RMCD.
- iii. United Nations Statistics Division (UNSD)  
DOSM is working closely with UNSD in strengthening the compilation of environment statistics. DOSM has been appointed as a focal point to execute the pilot project on Green Economy Indicators for the period of 2014-2015.

Source: DOSM

91. **In order to fill data gaps as well as to improve the coverage, timeliness, and availability of indicators identified in the 17 SDGs, various agencies need to coordinate closely with each other.** DOSM has been assigned as the focal point in Malaysia to facilitate the coordination of SDG indicators development. Numerous engagements were conducted since 2015 with various agencies such as the Ministry of Health, Ministry of Education, Ministry of Finance, Ministry of Natural Resources and Environment, Ministry of Energy, Green Technology and Water, Ministry of Science, Technology and Innovation, and Ministry of Urban Wellbeing, Housing and Local Government in order to identify data availability. The SDGs are categorized into three areas; namely, social, environment, and

economy. Of the 244 listed indicators in the SDGs, Malaysia currently has 99 indicators (41 percent) that are available, 42 percent of indicators that still need further development, and 17 percent of indicators that are not available and/or not applicable in the Malaysian context. Moving forward, DOSM will actively discuss with related agencies the development of new SDGs indicators that are currently not available.

### **Box 18: Increasing Data Requirements to Implement and Monitor the Sustainable Development Goals**

The Sustainable Development Goals (SDGs) form an international initiative adopted by the National Assembly of the United Nations on September 25, 2015 that aims to end poverty, protect the planet, and ensure peace and prosperity by 2030. These 17 Goals build on the Millennium Development Goals that ended in 2015, while including new areas such as climate change, economic inequality, innovation, sustainable consumption, and peace and justice.

Achieving the 17 SDGs requires integration of environmental, social, and economic aspects to achieve inclusive development that leaves no one behind. This calls for more high-quality data for governments, civil society, and companies to plan, monitor, and be held accountable for their actions. Also, because of their “leave no one behind” objective, the SDG call for much greater collection and analysis of sub-national data than previous initiatives. The SDGs demand more data to measure progress in economic development. These new goals are further extended from narrower MDGs, expanding to include new areas such as environmental issues key for sustainable development. The SDGs envision data generation to enhance evidence-based policy design and monitoring, while in parallel increasing efforts to strengthen country-level statistical systems. Capacity improvement at government, institution, and individual levels is needed to produce and use the data well.

However numerous data gaps remain, some of them at a fundamental level. For example, data on gender inequality, as well as women’s activities and priorities at the country level, is often non-existent or very incomplete. Also, many of the issues relevant for women are not captured by existing data. For example, only a little more than half of all countries report data on intimate partner violence. Even among countries capturing the information, the quality of some data reported lacks consistency and makes comparison difficult.<sup>45</sup> In order to fill data gaps in the 17 SDGs and to improve the coverage, timeliness and availability of indicators in identified SDGs, data providers, academics and stakeholders need to identify available and missing data and indicators in each of the SDG areas. This requires a good understanding of the methods used to process them and how data are shared. Only with close collaboration from various agencies and areas, can the process of policy making and monitoring be improved, and thus beneficial for the development of the country.

Source: Authors

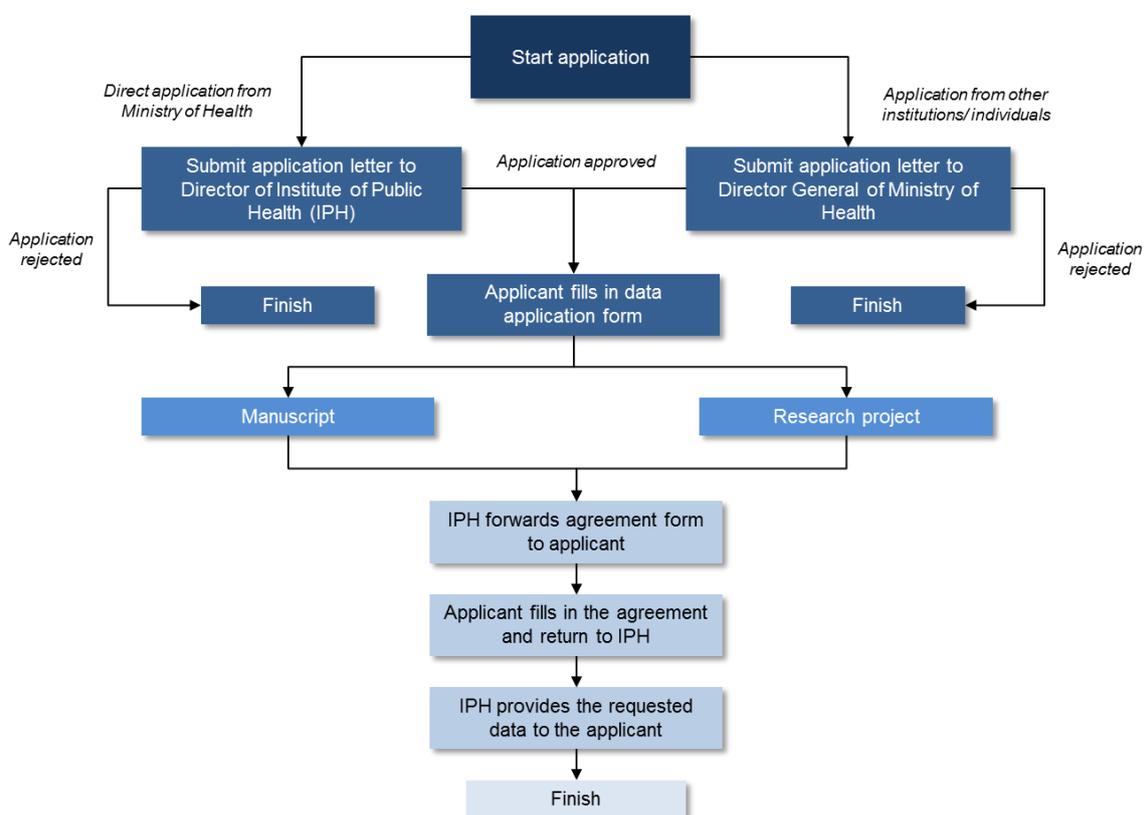
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<sup>45</sup> A UN Women’s compilation of country surveys on violence against women is available from [http://www.endvawnow.org/uploads/browser/files/vawprevalence\\_matrix\\_june2013.pdf](http://www.endvawnow.org/uploads/browser/files/vawprevalence_matrix_june2013.pdf)

### 3.D. ROLE OF DATA PRODUCERS AND KEY COLLABORATORS IN MALAYSIA - FEEDBACK FROM DATA USERS

92. **Civil society, the business community and academia in Malaysia are avid customers of various types of data.** Pro-active publishing by government agencies is taking place, such as in the websites for the Department for Civil Aviation (DCA) and the Ministry of Tourism, and agencies have mechanisms for data requests. For example, data from the Institute of Public Health can be requested through an application form available on the ministry's website (Figure 37). Geospatial data can be requested through a similar process from the official Malaysia geospatial website ([www.mygeoportal.gov.my](http://www.mygeoportal.gov.my)).

Figure 37: An example of data application process – Ministry of Health



Source: Ministry of Health Malaysia

93. **There is a growing civic engagement on the data ecosystem in Malaysia.** MAMPU has conducted hackathons over the last two years as a platform to bring together government data holders, the private sector, as well as civil society, to come up with various solutions using government data. Some of the interesting solutions that have come out from these hackathons include presenting data on dengue in a way that the public could benefit from

it, and an app to help households calculate efficient energy usage. In addition, MAMPU has also taken steps to improve engagement with government, the community and private sector through publishing stories on releases and uses of open data, running workshops with the release of new suites of data sets/or sector related workshops, including seeking feedback on what data they need and in what format. Participants in these events have continually indicated an appetite for more opportunities to work and interact with government data.

94. **Similarly, DOSM is also actively engaging with the public through various channels.** It is increasingly making use of infographics to communicate official statistics to laymen audiences, and also expanding its use of social media, such as Facebook and Twitter, to engage directly with data users DOSM is planning interaction sessions with stakeholders around data, and how to be more responsive to demand. DOSM has conducted a Customer Satisfaction Survey annually to understand users' needs and the information given is used to enhance the quality of DOSM's products and services. In addition, BizCode@Stats, a mobile application which contains the Malaysia Standard Industrial Classification (MSIC) would be able to assist government agencies, private sector and researchers in understanding the classification of businesses.
  
95. **There have also been initial steps taken by government agencies to manage occasional feedback from the public on data accuracy, perception and misinterpretation.** In recent times, many of the feedback pertains on the conflicting low and stable inflation data and the rising costs of living expressed by the public. Recognizing this, BNM has produced several articles in its publications<sup>46</sup>, to address public skepticism on the CPI as their personal experiences suggest larger increase in the cost of living. Going forward, more active public engagements could help to further clarify the public's misperception and queries on data made available to them.

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<sup>46</sup> See Bank Negara Malaysia. (2016). 'Box Article: Inflation and Cost of Living', Annual Report 2015, 64 – 69 and Bank Negara Malaysia (2017). 'Box Article: Inflation – Perception vs Reality'. Quarterly Bulletin 2017

Figure 38: Current data ecosystem in Malaysia

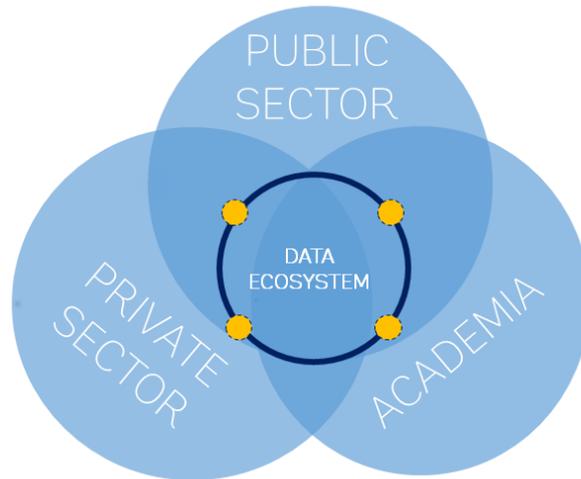
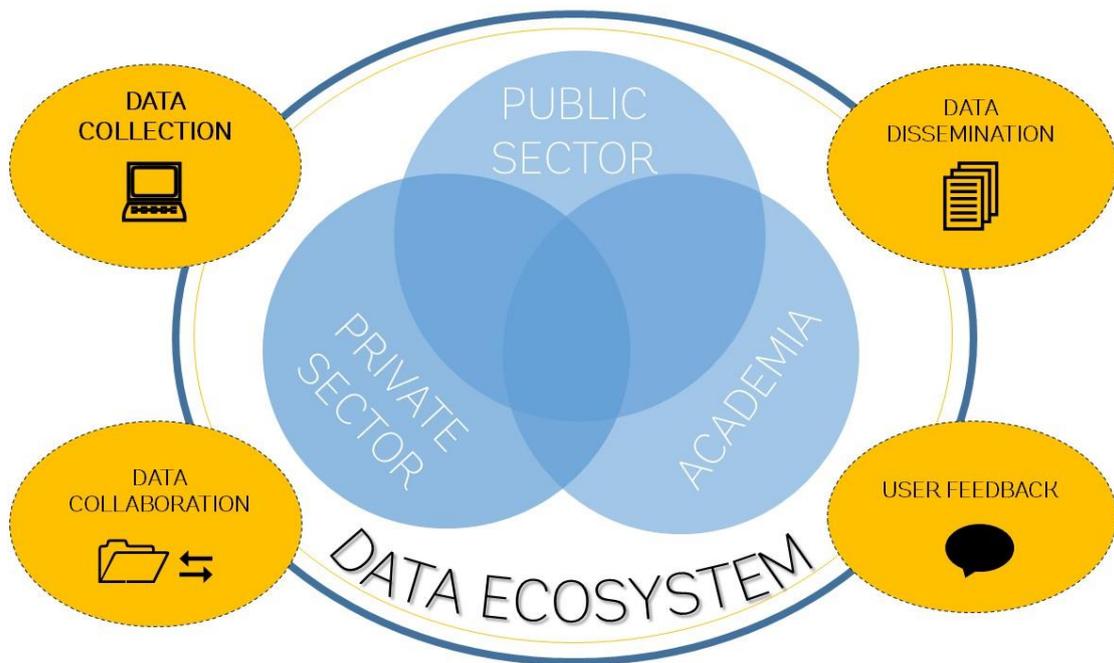


Figure 39: Optimal data ecosystem for Malaysia



**THE WAY FORWARD**



## 4. THE WAY FORWARD – POLICY AND CONCLUSIONS

96. **Data is relevant for economic development and there is strong correlation between availability of high-quality data and development.** Cognizant of this, accessible and reliable data is at the core of the Eleventh Malaysia Plan “Anchoring Growth on People” which aims to develop the country as a high-income nation by 2020. The Malaysian government has started working on several initiatives pertaining this, but these initiatives should to be matched by a broader ecosystem approach.
97. **International experience shows that countries that invest and disseminate data have more productive research, policy analysis and service delivery.** In academic research, reliable and timely microdata is an essential ingredient for research and policy analysis as it permits in-depth analysis, such as assessing the impacts of a program on different types of households. With regard to Malaysia’s own academic research, productivity and quality is significantly lower than many regional and advanced economies, and in part due to limited access to granular data.
98. **The private sector is a key data user, using both structured and unstructured data from various sources, including administrative records, mobile telephony, and social media.** The Malaysian governments has put in place various initiatives to develop data analytics including for big data, aiming to create a conducive environment for private sector companies to collaborate in the use of data. Despite the various efforts, the private sector fragmented construction and use of data analytics remain, hampering business opportunities. Also, skills for the analysis and use of data remain and additional efforts can be done by many Malaysian companies to allocate additional funding for employee training and development, including in data management and analytics.
99. **Overall, the data ecosystem in Malaysia needs to evolve to further facilitate data sharing among public, private sector and research community.** Considerable efforts have been made, led by DOSM, to improve statistics production, meet the demand of users and ensuring that data produced are in line with international standards. Many steps have also been taken by agencies like MAMPU to improve accessibility and degree of openness in the data ecosystem. Nevertheless, several areas of improvement remain for achieving a data ecosystem that further facilitates the exchange of granular data among public, private and research community. Many developed economies have shown that creating such a conducive environment for data sharing leverage on the growing opportunities that policy analysis, service delivery or the digital economy offer.

*A. The workforce and work process of data collection should move in line with the country's economic progress and growing demand for data*

100. **In tandem with Malaysia's steady growth and level of development the work process of the national statistical system will likely need to evolve.** Over time, statistical offices in more developed countries have gradually moved from units which focus on the production of individual data sets (e.g. labor statistics, inflation), towards one that specializes in processes (e.g. data collection and maintenance) that support the production of different data sets. This set-up, complemented with an increased use of administrative data to reduce the need of dedicated surveys, have effectively reduced the overall cost of data collection in statistical offices of more advanced countries.

101. **The statistical workforce will likely need to better reflect current and future demands, and technology needs.** In the near term, Malaysia should strive to have a more balanced share between technical and support staff, in line with national statistical offices in other upper-middle- and high-income countries. For example, in Statistics Singapore, the Spanish Statistical Office, and Statistics Netherlands, at least 60 to 75 percent of staff are of management or professional grades. As professional staff are more highly paid, the transition to a more professional statistics office in those countries was accompanied by a leaner workforce, less dependent on supportive staff and more dependent on technology to support technical staff. To support this transition, training by the Malaysia Statistical Training Institute can continue helping staff in lower grades to acquire the new skills for specialized tasks related to specific statistical products.

102. **Ongoing work to fill identified data gaps should continue.** This refers, for instance, to areas such as price indicators for residential property. Also, labour market statistics, such as monthly/quarterly wage indicators for all industries, could be strengthened to provide more granularity and timeliness. On this, laudable efforts have been made, led by DOSM to establish a bureau of labor statistics for Malaysia. Similarly, there is a growing demand for data from policy-makers at the state and local municipal level, which could improve public service delivery and detailed firm -level data, which could enhance productivity analysis in the country.

*B. Efforts to improve data dissemination should focus on improving access to more micro data and refining the current legal framework*

103. **There have been considerable efforts to mobilize more publication of government data, led by both DOSM and MAMPU.** The number of data sets in user-friendly format published over the years have gradually increased. Furthermore, Malaysia has the necessary building blocks which the country should take advantage of to enhance data dissemination and achieve a higher degree openness.

104. **The current constraints and limitations in accessing micro and granular data should be removed over time.** Survey data among Malaysian data users have indicated that while publicly available data is relatively easy to access, almost 90 percent of the respondents also said that the level of granularity is inadequate for rigorous analysis, which is key in producing quality and meaningful research. Expanding the current MOUs with 12 universities on microdata access to more accredited universities, think-tanks as well as international academic institutions could be a first step in this direction.

105. **The legal environment for data management in Malaysia calls for further refinement to facilitate open data.** Data holders are not always confident about the application of general rules and regulations related to privacy and confidentiality, and individual agencies may also face specific internal data management regulations. This creates a fragmented environment for data management that lacks clarity for both government and the public on how data can be requested, shared and used. It also means that the majority of data exchanges, whether inter-agency or with non-government stakeholders, are decided on a case-by-case basis, with senior managerial approval necessary for most decisions.

*C. The scope for strengthening the collaborations among government agencies and other producers should focus on addressing data fragmentation issues*

106. **Establishing a coordinating mechanism to address data fragmentation issues across government ministries and agencies should be a top agenda for the Malaysian data ecosystem.** While some aggregated data are shared publicly across government agencies through the data.gov.my site managed by MAMPU, many data sets still reside in individual ministries and agencies' databases, which do not always share them, given unclear dissemination policies. This has led to various inefficiencies for authorities to tackle key policy issues such as immigrant labor or improving urban transport planning. Moreover, reducing data fragmentation at the state and local government level could also reduce redundancy of work and waste of resources.

107. **The network of experts and researchers with government data holders and producers could also be strengthened.** The scope of existing partnerships and collaborations with universities, research institutes and other external experts could expand beyond providing access to data, to include also collaboration on the analysis as well as dialogue to improve the data sets available, and ensuring the data meets a certain standard and is responsive to emerging issues.

*D. Engagement with users should be fluid to meet the growing appetite for more opportunities to interact and work with government data*

108. **There is need to strengthen the interaction between data provider and user to better understand current and future data demands.** One way this can be achieved is by government agencies actively seeking out stakeholders with demand, seeking to provide more granular data for high-demand areas, publishing data inventories, and having standardized and streamlined procedures for requesting data. Currently, external stakeholders have offered assistance to agencies to better understand demand, and help increase availability and quality of data provision. In addition, improved access to statistical products can be done by: (i) increasing sharing of microdata with more users within the government sector, and within the scientific and research domain by “remote access”; (ii) increase the potential of the secure room by releasing more microdata to enhance research capacities and findings; and (iii) liberalizing more products through a forward-looking microdata release policy that sets clear principles for dissemination and anonymity protection. As an initial step, MAMPU is looking into the possibility of establishing a program that could create an information-sharing coordination mechanism and data exchange infrastructure.
109. **Reinforcing on-going efforts to strengthen data providers’ website.** DOSM’s recent undertaking to improve data access for the public has been noteworthy. New tools such as StatsDW and e-Statistik platforms are clear examples that allow data users to visualize and download the available statistics for free, moving beyond previously-published aggregate indicators and tables. Users expect ongoing improvements to the website and expanding it to an array of other electronic devices such as smartphones, tablets, etc. Consultations with users, website evaluation surveys, visitor pattern analysis, and web-based metrics provide complementary sources of information to understand web presence, and gather up-to-date information on user expectations.
110. **Efforts to educate the users and the general public on understanding data could be amplified.** While efforts have been made to engage with the general public to inform about the availability of data through events like hackathons, a more continual, interactive and collaborative engagement between government data holders and users should be made regularly, particularly on explaining its methodology and calculations. Such engagements can help users better understand the data, and improve the quality of how the data is being analyzed; and concurrently, minimize the incidences of data being misinterpreted or viewed as being inaccurate. This also provides an opportunity for data users to provide feedback and input to data holders on how data can be made even more useful and targeted.

# APPENDIX AND REFERENCES



## APPENDIX I – MICRODATA ACCESSIBILITY IN HIGH INCOME ECONOMIES

The table below reports on microdata accessibility in a small sample of advanced countries. The sample will be expanded for the final report of this review. The table focuses on principal socioeconomic surveys such as household income surveys or labor force surveys.

Country or Grouping	Survey	Microdata access policy (summary)
<b>Canada</b>	<p>Statistics Canada has several modes of microdata distribution.</p> <p><a href="#">More than 100 surveys</a> in the Public-Use Microdata Files (PUMF) collection</p> <p><a href="#">More than 13 business microdata sets</a> available via Canadian Centre for Data Development and Economic Research (<a href="#">CDER</a>) at Statistics Canada</p>	<p>Available to any researcher. Application procedure is different for government and non-government researchers. All must present findings at a seminar at Statistics Canada.</p> <p>The PUMF Collection contains complete (100% observations) anonymized data available on a fee-based subscription service.</p>
<b>European Union (Eurostat)</b> (28 member states plus several others such as Norway, Iceland, Switzerland, and some EU candidate countries)	<p><a href="#">Labor Force Survey</a></p> <p><a href="#">EU Statistics on Income and Living Conditions (EU-SILC)</a> This is the official source for monitoring well-being of the population and monitoring Europe 2020 social welfare goals.</p> <p><b>Other surveys</b></p>	<p>Free access for scientific/research purposes to universities, government research departments, banks, statistical institutes, and others in countries on all continents. A standard registration form is required, but not a customized MOU. The anonymization process removes most geographic identifiers such as state or province, but 100% of observations are allowed.</p>
<b>Netherlands</b> (Statistics Netherlands)	<p>A long list of surveys (see <a href="#">Microdata Catalogue</a>)</p>	<p>Complete access to universities, research institutes, policy analysis organizations, statistical offices, and others for statistical or scientific research. Users may upload and merge their own data sets with Stats NL's data. There may be fees required.</p>
<b>United States</b>	<p><a href="#">Current Population Survey</a> (monthly survey of unemployment and labor force participation)</p> <p><a href="#">American Community Survey (Public Use Microdata Sample, PUMS)</a></p>	<p>Free access to the general public. Basic monthly files do not include hours, wages, or full income and demographic data. These are included in the more-detailed annual March supplement. See the <a href="#">CPS data download page</a>.</p> <p>A 67-percent sample of observations is available for free to the general public.</p>

## APPENDIX II – MAMPU’s GOVERNMENT DATA-DRIVEN TRANSFORMATION

In line with global trend of data driven transformation, Malaysia is rigorously pursuing the power of data for public service delivery enhancement, and strengthening Government transparency and accountability. MAMPU has embarked on several big data analytics (BDA) programs since 2015. We started our BDA initiatives with pilot and proof of concept projects. Based on the experiences and lesson learnt in those pilot and proof of concept projects, we embarked of few more BDA initiatives.

### Big data initiatives

As part of the Government data driven program under the 11th Malaysia Plan, several projects has already been completed:

#### 1. BDA-Open Innovation Network (BDA-DGOIN) Project

- ✓ Proof-of-concepts project in collaboration with MDeC and MIMOS.
- ✓ This project was implemented from 29 January 2015 until 28 January 2016.
- ✓ Four (4) agencies involved with various business case as follows:

##### Ministry of Finance (MOF)

- To analyze and build fiscal economic models
- Sentiment analysis on cost of living obtained through social media

##### Jabatan Kemajuan Islam Malaysia (JAKIM)

- To Seek Islamic Extremism Amongst Malaysians

##### Department of Irrigation and Drainage (DID) –

- Developing a knowledge base flood based on the combination of sensor data and social media data

##### National Hydraulic Research Institute of Malaysia (NAHRIM) –

- Getting the projected of 90-year rainfall in line with the spillover effects on the river bank in Malaysia map

#### 2. Public Sector BDA Pilot Project

- ✓ Pilot project lead by MAMPU.
- ✓ This project was implemented from 10 March 2015 until 9 March 2016.
- ✓ Four (4) agencies involved with business case as follows:

### **Malaysian Administrative Modernisation and Management Planning Unit (MAMPU)**

- Sentiment Analysis on Patriotism

### **Ministry of Domestic Trade, Co-Operatives and Consumerism (MDTCC) –**

- Price Watch

### **Ministry of Health (MOH)**

- Infectious disease ie Hand, Foot And Mouth Diseases (HFMD)

### **Royal Malaysian Police (RMP)**

- Crime Prevention focussing on motorcycle theft

### **3. Proof of Concept (POC) Government Data Optimization Transformation Services**

- ✓ MAMPU leads in collaboration with five agencies: MDTCC, Ministry of Agriculture (MOA), Fisheries Development Authority of Malaysia (LKIM), Federal Agricultural Marketing Authority (FAMA).
- ✓ MOF, Department of Statistics Malaysia (DOSM) for price of goods analytics

Moving forward, MAMPU continue the BDA initiatives with accelerated approach and through coaching as follows:

### **4. BDA initiatives implemented through collaboration with third party service provider – an accelerated approach**

- ✓ Faster turnaround for data analytic results
- ✓ Collaboration with third party services with MCMC in Q2, 2017
- ✓ One (1) potential data analytic case - cost of living issues in urban poor (Kuala Lumpur)

### **5. BDA initiatives through coaching with various government agencies – a capability development approach**

- ✓ Participation of 12 government agencies involving 12 data analytic business cases
- ✓ Approach involved facilitated lab by MAMPU and coaching of public sector agencies representatives in training, identifying BDA business cases and development of data analytics.

## Spurring Big Data Analytics (BDA) in Malaysia

Malaysia has developed a Public Sector Big Data Analytics (BDA) framework with the vision of Malaysia as a Leading Regional BDA solution hub and deliver new value to all sectors. MAMPU has created a governance structure for data driven (BDA and Open Data) initiatives comprising of Steering Committee, Technical Committee and project team for the implementation of Open Data and Big Data Analytics in the public sector.

Public Sector Data Driven Program has created the national ecosystem for proliferating of the use of BDA as a catalyst for further economic growth. The key deliverables of the programs are as follows:

- Framework for supporting public sector BDA adoption in every cluster since the development of the National BDA Framework.
- Governance structure comprising of Steering Committee, Technical Committee and Project Team for Implementation of Open Data and Big Data Analytics (BDA) in the public sector to monitor the development and implementation of Public Sector Data Driven initiatives.
- Methodology for the development of Public Sector BDA leveraging on the Public Sector Open Data (*Data Terbuka Sektor Awam - DTSA*) platform and Public Sector BDA (*Analitis Data Raya Sektor Awam - DRSA*) platform established by MAMPU that can be used by the Public Sector agencies as sandbox for developing data products and innovations.
- Public Administrative Transformation Circular and Guidelines No.1 Year 2017 – Implementation of Public Sector BDA to encourage Public Sector agencies to implement Big Data Analytics towards enhancing public service delivery effectiveness and productivity. Moreover, all agencies are encouraged to leverage on the existing platform of DRSA provided by MAMPU.
- Innovation – MAMPU has organised Hackathon programme since 2015 to provide space and knowledge sharing for developing innovative products among civil servants, industry, academia, high school students and citizens to improve the quality of digital services.
- Capability Development – BDA project provide the opportunity for various public sector agencies on training, coaching and development of data analytics by using Open Source data analytic tools such as R.
- Consultancy Services - MAMPU also provide consultancy services for Public Sector agencies in initiating BDA programmes.
- Open Data initiated by MAMPU has created the data lakes which finally contribute to the establishment of Public Sector Data Ocean. Currently our open data portal achieves to have 2,026 datasets available to be access and used by the general public to data held by national governments.

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