Open Government Data: Principles, Benefits and Evaluations

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DISCUSSION PAPER 12/20 | 22 SEPTEMBER 2020

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This discussion paper was prepared by Ashraf Shaharudin from the Khazanah Research Institute (KRI) with research assistance from Shariman Arif Mohamad Yusof. The authors are grateful for the valuable comments from Rachel Gong, Nur Thuraya Sazali, Muhammad Nazhan Kamaruzuki, Tan Zhai Gen, Gregory Ho Wai Son, Amos Tong Huai En, Emir Izat Abdul Rashid and Shenyi Chua.

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Open Government Data:
Principles, Benefits and Evaluations

Ashraf Shaharudin

This is the first paper of the open government data series.

Summary

- **This paper discusses the principles, benefits and evaluations of open government data.** While the concept of *open data* is not only applicable to government data, this paper focuses on government data since the government collects and holds a large volume of data using public funds; therefore, it is imperative to maximise the potential value of this data. Besides, open government data is one of the Malaysian government's focus areas as stipulated in several policy documents.

- **By consensus, open data are digital data that are free from legal and technical constraints to be used by anyone at any time from anywhere.** Based on a survey of multiple authoritative references, there are seven important features of open government data, which are complete, granular, timely, legally and technically accessible, machine-processable, non-discriminatory and non-proprietary.

- **Malaysia did not perform well in all of the established global open data evaluations.** Malaysia's open data level is behind Indonesia, the Philippines and Singapore as well as many other developing countries. Malaysia's scores have also not improved significantly over the years, reflecting little progress in making government data more open.

- **Opening up government data would benefit all segments of society.** The private sector could use the data to make informed business decisions and offer better products and services to consumers. Accessible government information would allow better policy advocacy and improve governance. Researchers could utilise data to generate knowledge for the advancement of society.

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1. Introduction

The advancement of digital technology brings forth a great volume and a wide range of data. Digital data superseded analogue data in 1998 and in 2014 amounted to 4.8 zettabytes (48 billion trillion bytes), equivalent to the data consumed by 16 trillion 2-hour HD movies (Figure 1)[1]. Meanwhile, telecommunications capacity measured in kilobits per second (kbps), has grown exponentially between 2003 and 2013 (Figure 2)[2]. With this development, potentials for policymakers, private sector and researchers to generate economic and social value as well as to solve local and global challenges with data are aplenty.

Figure 1: World's capacity to store information, in optimally compressed bytes, 1986 – 2014
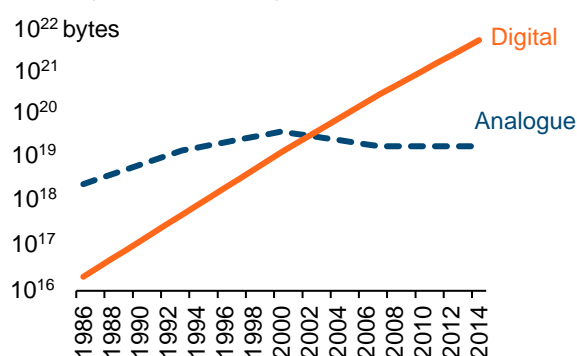
Source: World Bank (2016)

Figure 2: Telecommunications capacity, in optimally compressed kbps, 2003 – 2013
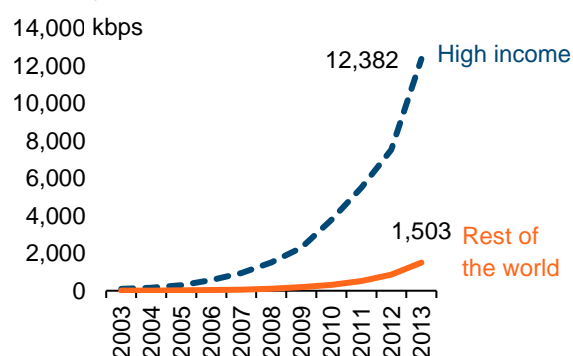
kbps: kilobits per second
Source: World Bank (2016)

This paper discusses the (i) <u>principles</u>, (ii) <u>benefits</u> and (iii) <u>evaluations</u> of open government data. This is the first paper of the open government data series. Throughout this paper, references to Malaysia will be made, but further discussion on Malaysia will be in the next discussion paper. The concept of open data is not only applicable to government data but also data generated by businesses, civil society and research community. However, this paper and the next discussion paper will focus on government data because:

    a.   **The open data movement finds its roots in open government**[3], which has been recognised as a key in ensuring governments' transparency and accountability[4].

    b.   **Governments collect and hold a large volume of data using public funds**. Therefore, it is imperative to maximise the potential value of this data.

    c.   **Open government data is one of the Malaysian government's focus areas** as stipulated in the Department of Statistics Malaysia (DOSM) Transformation Plan 2015 – 2020, the Public Sector Information and Communication Technology (ICT) Strategic Plan 2016 – 2020 and the Communications & Multimedia Blueprint 2018 – 2025.

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[1] World Bank (2016)

[2] World Bank (2016)

[3] Refer to **Box 2** for the explanation of open government. The distinctions between open data, open government and open science are discussed in **Box 3**.

[4] Cremean (2011)

In May 2013, then US President Obama signed an executive order asserting open and machine-readable data the new default for government information in order to strengthen democracy, promote the delivery of efficient and effective public services, and contribute to economic growth[5]. For similar reasons, Group of Eight (G8)[6] governments signed the Open Data Charter in the following month, which lays out five strategic principles including releasing government data openly by default and increasing the quality, quantity and re-use of the data published[7]. Some countries started to embrace open government data much earlier; for example, the UK[8] in 2009 and Australia[9] in 2010. By mid-2014, around 50 countries around the world have started open data initiatives[10].

Box 1: What is data?

Different fields define *data* differently. Information systems and knowledge management fields typically define data based on the data-information-knowledge-wisdom (DIKW) framework. This framework could be traced back to Milan Zeleny's 1987 and Russell Ackoff's 1989 papers that consider data, information, knowledge and wisdom[11] as a hierarchy where each stage is an input for the next. Ackoff[12] defines *data* as "symbols that represent the properties of objects and events", which Zeleny[13] considers as devoid of meaning. Only when data is processed (e.g. via labelling and combining with different datasets), does it become useful and is called *information*. Bellinger et al. (2004) describe data as representing "a fact or statement of an event without relation to other things" while information embodies "the understanding of a relationship of some sort, possibly cause and effect"[14].

On the other hand, in defining 'personal data', the legal field deems data and information the same. For example, personal *data* is defined as "any *information* in respect of commercial transactions …" in the Malaysian Personal Data Protection Act 2010 (Act 709)[15]; "any *information* relating to an identified or identifiable natural person" in the European Union (EU) General Data Protection Regulation 2016[16]; and "any *information* relating to an identified or identifiable living individual" in the United Kingdom Data Protection Act 2018[17].

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[5] The White House (2013)

[6] Group of Eight (G8) countries include France, Germany, Italy, the United Kingdom, Japan, the United States, Canada, and Russia.

[7] G8 (2013)

[8] Cabinet Office & HM Treasury (2009)

[9] Minister for Finance and Deregulation Australia (2010)

[10] Davies (2014)

[11] Ackoff (1989) stipulates an additional stage, *Understanding*, before the *Wisdom* stage.

[12] Ackoff (1989)

[13] Zeleny (1987)

[14] Bellinger, Castro, and Mills (2004)

[15] Government of Malaysia (2010)

[16] European Union (2016)

[17] UK Legislation (2018)

While the rigid distinction of *data* and *information* is perhaps useful in information systems and knowledge management, it may have little benefit outside those fields. Data only has a meaning if it could give birth to information. Otherwise, it would remain as 'symbols'[18]. Information is made up of data. Without data, there is no information. For this reason, data could be viewed as a smaller unit of information that by itself, is (usually) meaningless. To demonstrate this idea, consider an analogy where letters and words represent data and information respectively. Words cannot be formed without letters, but a letter on its own usually has no meaning. They are structurally different but functionally inseparable.

For the said reason, this discussion paper and the next will use data and information interchangeably. This is also consistent with their use in the open data discourse.

Box 2: Open Government

Open government refers to governments that are more accessible, responsive and transparent in their operations, guided by three key principles. These principles can be put into practice through appropriate legislation, policies, and formal and informal institutional frameworks[19].

  a. **Accountability**: Identifying and holding public officials accountable for their actions are possible.
  b. **Transparency**: Reliable, relevant and timely information about the activities of the government is made available to the public.
  c. **Openness**: Suggestions from citizens and businesses are taken into account when designing and implementing public policies.

Open government data is one of the features of open government, but is *not* the only feature. Open government also protects the ability of civil society to operate in line with their freedom of expression and association; has robust anti-corruption policies, mechanisms and practices; and harnesses technological advancement for information sharing, public participation, and collaboration[20].

The concept of open government goes beyond e-government, which is traditionally understood as the application of information and communication technology (ICT) for delivering government information and services[21]. E-government is a valuable method to reach open government but is not an end in itself[22].

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[18] Ackoff (1989)
[19] OECD (2003)
[20] Open Government Partnership (n.d.b)
[21] UN (2002)
[22] Ruesch, Basedow, and Korte (2012)

> **The Open Government Partnership (OGP) is an organisation that helps governments create action plans** in consultation with civil society to promote accountable, responsive and inclusive governance[23]. Currently, OGP members comprise 70 national governments and 20 local governments. Malaysia is not one of the OGP members; among Southeast Asian countries, only Indonesia and Philippines are.

2. The Principles of Open Government Data

This section elaborates on the principles of open data based on four authoritative references. As mentioned in the previous section, open data is not only applicable to government data. From the four references surveyed, the Open Knowledge Foundation (OKF) conceptualises open data from a broader range of sources, not only government data. Sub-section 2.5 synthesises the various open data principles and lists the salient features that are relevant to government data.

2.1. The Sebastopol list

In 2007, 30 open government advocates gathered in Sebastopol, California in a workshop sponsored by the Sunlight Foundation, Google, and Yahoo[24]. The objective of the workshop was to **articulate ways that governments can make their data available to the public** in order to increase transparency and generate more economic opportunities[25]. They agreed on eight principles of open government data (Table 1).

Table 1: Eight principles of open government data based on the Sebastopol workshop

Principle	Elaboration
1. **Complete**	• All public data is made available. Public data is data that is not subject to valid privacy, security or privilege limitations. • Non-electronic information resources are encouraged to be made available electronically to the extent feasible.
2. **Primary**	• Data is as collected at the source, with the highest possible level of granularity. • If an entity chooses to transform data by aggregation or transcoding, it still has an obligation to make the full-resolution information available in bulk.
3. **Timely**	• Data is made available as quickly as necessary.
4. **Accessible**	• Data is available to the widest range of users for the widest range of purposes. • Data must be made available on the Internet. • Data must be published with current industry-standard protocols and formats, as well as alternative protocols and formats when industry standards impose burdens on wide reuse of the data.
5. **Machine processable**	• Data is reasonably structured to enable automated processing. • Data is properly encoded.
6. **Non-discriminatory**	• Data is available to anyone, with no requirement of registration. • Anonymous access to the data must be allowed for public data.

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[23] Open Government Partnership (n.d.a)

[24] OpenGovData.org (2007)

[25] According to Lawrence Lessig, one of the workshop participants, and founder of the Centre for Internet and Society. Source:OpenGovData.org (2007)

7.	**Non-proprietary**	• Data is available in a format over which no entity has exclusive control. • While some proprietary formats are nearly ubiquitous, it is nevertheless not acceptable to use only proprietary formats. Likewise, the relevant non-proprietary formats may not reach a wide audience. In these cases, it may be necessary to make the data available in multiple formats.
8.	**License-free**	• Data is not subject to any copyright, patent, trademark or trade secret regulation. • Reasonable privacy, security and privilege restrictions may be allowed.

Source: Simplified from OpenGovData.org (2007)

2.2. The Sunlight Foundation

In 2010, the Sunlight Foundation updated and expanded the Sebastopol list. Two new principles and additional elaborations for three of the existing principles were included (Table 2).

Table 2: Additional principles and elaboration to the Sebastopol list

Principle		Additional elaboration
1.	**Completeness**	• Metadata that defines and explains the raw data should be included, along with formulas and explanations for how derived data was calculated.
2.	**Primary**	No additional elaboration
3.	**Timeliness**	• Priority should be given to data whose utility is time sensitive
4.	**Ease of physical and electronic access**	• No barriers to physical access such as the requirement to visit a particular office in person or to comply with particular procedures (such as completing forms or submitting requests). • No barriers to automated electronic access such as making data accessible only via submitted forms or systems that require browser-oriented technologies (e.g., Flash, Javascript, or Java applets). • Providing an interface for users to download data in bulk and make specific calls for data through an Application Programming Interface (API).
5.	**Machine processable**	No additional elaboration
6.	**Non-discriminatory**	No additional elaboration
7.	**Commonly owned or open standards**	No additional elaboration
8.	**Licensing**	No additional elaboration
9.	**Permanence (New)**	• Information made available online should remain online, with appropriate version-tracking and archiving over time.
10.	**Usage costs (New)**	• No fees.

Source: Simplified from Sunlight Foundation (2010)

2.3. The Open Knowledge Foundation (OKF)

The Open Knowledge Foundation (OKF) defines open data as "**data that can be freely used, shared and built-on by anyone, anywhere and for any purpose**"[26]. It is the most widely adopted definition of open data, used by the World Bank and the European Union[27].

The OKF concept of open data applies not only to government data but also data from all sources, unlike the concept of open data according to the Sunlight Foundation and the International Open Data Charter (IODC). The OKF strives to "build *knowledge* in government, business and civil society"[28]. Aside from *open government*, another related concept that is relevant to OKF's definition of open data is open science (see **Box 3** for an auxiliary discussion).

There are two important elements underlined by the OKF in regard to openness—legal openness and technical openness, explained in Table 3. The Open Definition by the OKF articulates a precise meaning of *open* with respect to knowledge that covers the aspect of openness of the works and of the license of the works. The former has four conditions, presented in Table 4, which describes the form of which a work (in this case, data) is considered open[29].

Table 3: Elements to openness according to the Open Knowledge Foundation (OKF)

Element	Explanation
Legal openness	• Users are allowed to get data legally, to build on it, and to share it. • Granted by applying an appropriate (open) license which allows for free access to and reuse of the data, or by placing data into the public domain.
Technical openness	• There should be no technical barriers to using the data. For example, providing data on printouts on paper or as tables in PDF documents makes the information extremely difficult to work with. • Technical openness requires data to be machine-readable and available in bulk.

Source: Taken directly from Open Knowledge Foundation (2013)

Table 4: Conditions for open work according to the Open Definition

Condition	Explanation
1. **Open license**	• The work must be in the public domain or provided under an open license. • Any additional terms accompanying the work (such as terms of use or patents held by the licensor) must not contradict the work's public domain status or terms of the license.
2. **Access**	• The work must be provided as a whole and at no more than a reasonable one-time reproduction cost and should be downloadable via the internet without charge. • Any additional information necessary for license compliance must also accompany the work.
3. **Machine readability**	• The work must be provided in a form readily processable by a computer and where the individual elements of the work can be easily accessed and modified.
4. **Open format**	• The work must be provided in an open format. An open-format is one which places no restrictions, monetary or otherwise, upon its use and can be fully processed with at least one free/libre/open-source software tool.

Source: Taken directly from the Open Knowledge Foundation (n.d.)

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[26] Open Knowledge Foundation (2013)

[27] World Bank (n.d.a) & European Data Portal (n.d.)

[28] Stihler (2019)

[29] Conditions of open license are elaborated in Table A.1 in Appendix A.

Box 3: Open Science

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), open science is "the movement to make **scientific research and data accessible to all**" and includes "publishing open scientific research, campaigning for open access and generally making it easier to publish and communicate scientific knowledge"[30]. The Organisation for Economic Co-operation and Development (OECD) defines open science as "unhindered **access to scientific articles, access to data from public research, and collaborative research enabled by ICT** tools and initiatives"[31].

Some potential benefits of open science are that it[32]:

- Allows a more accurate verification of scientific results through rigorous peer-review processes and greater reproducibility;
- Increases the productivity of scientific research by reducing duplication in collecting and creating scientific material;
- Increases the availability and accessibility of publicly funded research outputs for the benefit of not only scientific community, but also innovators and general citizens; and
- Promotes citizens' trust and engagement in science.

Governments can promote open science through open government data by making data such as environment and health data and scientific data from publicly funded research open. Nevertheless, open data is not the sole feature of open science and governments are not the only parties that have a role in realising open science. The relationship between open government, open science and open data is illustrated in Figure 3.

Figure 3: Relationship between open government, open science and open data
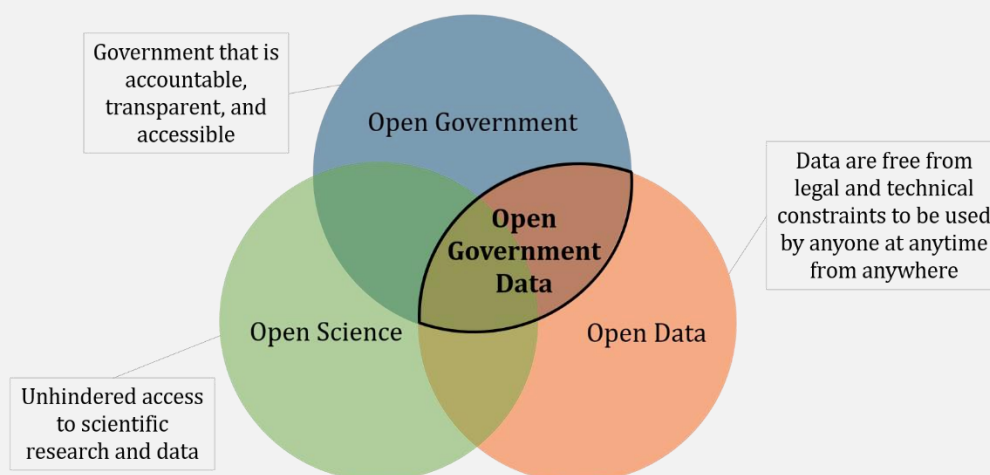
Source: Author's illustration

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[30] UNESCO (2017)
[31] OECD (n.d.)
[32] UNESCO (2017); OECD (n.d.; 2015). See also Ashraf (2020) on the role of open science in responding to the Covid-19 crisis.

2.4. The International Open Data Charter

The International Open Data Charter (IODC) defines open data as "**digital data that is made available with the technical and legal characteristics necessary for it to be freely used, reused, and redistributed by anyone, anytime, anywhere**"[33].

It lays out six principles of open data (Table 5). These principles were developed in 2015 by governments, civil society and experts around the world following the G8 Open Data Charter[34] signed by the G8 leaders in 2013[35].

Table 5: Six open data principles by the International Open Data Charter

Principle	Note
1. **Open by default**	• Presumption of publication for all. Governments need to justify data that is kept closed. • To make this work, citizens must also feel confident that their right to privacy is not compromised.
2. **Timely and comprehensive**	• Information published quickly. • As much as possible, data should be provided in its original and unmodified form.
3. **Accessible and useable**	• Data is machine-readable. • Data is free of charge and under an open license.
4. **Comparable and interoperable**	• Commonly-agreed data standards.
5. **Improved governance & citizen engagement**	• Transparency to improve public services and hold governments accountable.
6. **Inclusive development & innovation**	• To spur inclusive economic development.

Source: Adapted from International Open Data Charter (n.d.)

2.5. Summary: Salient features of open government data

By consensus, **open data are digital data that are free from legal and technical constraints to be used by anyone at anytime from anywhere**.

The OKF's concept of open data is meant for all types of data; hence, the OKF's conditions of open data are not as specific as that of the Sunlight Foundation and the IODC. The latter include criteria that are more applicable to and important for government data such as completeness, level of granularity, and timeliness.

Table 6 lists the salient features of open data gathered from the three references[36]. Elaborations are included, emphasising aspects that are particularly relevant for government data.

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[33] International Open Data Charter (n.d.)

[34] G8 Open Data Charter paved the way for the establishment of the Open Government Partnership (OGP).

[35] International Open Data Charter (n.d.)

[36] The principles of open government data outlined in the Sebastopol list are expanded by the Sunlight Foundation. The two references are therefore counted as one.

Table 6: Salient features of open government data

Feature	Aspects	References
1. **Complete**	• All data is **open by default**, unless with valid justifications for closure such as privacy and security concerns. • **Permanence**, i.e. data available online should remain online. • Comprehensive **metadata** included. • Initiative to **digitise non-electronic data** such as physical artefacts is encouraged.	SF, IODC
2. **Granular**	• Highest possible level of **granularity**. • If possible, data are provided in its **original and unmodified form**.	SF, IODC
3. **Timely**	• Data is made available as **quickly** as possible.	SF, IODC
4. **Accessible**	• **Open license**. • **Free** of charge. • **Downloadable** via the Internet. • **No legal/technical barrier**.	SF, IODC, OKF
5. **Machine processable**	• Data in a form **readily processable by a computer**	SF, IODC, OKF
6. **Non-proprietary**	• Data is available in **a format in which no entity has exclusive control**.	SF, OKF

Notes:
- Abbreviations: SF: Sunlight Foundation; IODC: International Open Data Charter; OKF: Open Knowledge Foundation.
- The principles of open government data outlined in the Sebastopol list are expanded by the Sunlight Foundation.

The list above does not include some 'optional features' that are deemed supplementary, at least at the initial stage of open government data development. The optional features are underlined by only one of the three sources. Following is the discussion of the optional features.

a. **No registration:** The SF states that open data should require no registration to access. Whereas this is not explicitly expressed by the OKF and the IODC, both define open data as data that is available to anyone from anywhere. In instances where registration is used to exclude some parties from accessing the data or make the process of accessing the data difficult, such data are not open data. However, registration for other purposes such as to gain insights into data users is acceptable.

b. **Comparable and interoperable:** The IODC states that open data should comply with commonly-agreed upon data standards. This is desirable to maximise the potential value of open data by facilitating combinations of different data sets. However, establishing commonly-agreed data standards is a challenging exercise in itself and may have to involve standardisation at the point of data collection.

c. **Embedded motive:** The IODC includes motives as criteria for open data. Based on the IODC, open data should improve governance and citizen engagement, and spur inclusive development and innovation. Emphasising motives in the concept of open government data guides the policy and implementation of open government data to achieve desired outcomes. However, there is hardly any objective way to assess the motive of open government data.

3. Why Open Government Data?

This section describes the benefits of open government data from the economic, governance and knowledge generation points of view.

3.1. Economic potential

Data is a valuable yet non-exhaustible commodity. Data needs to be used for its value to be realised. However, the use of data by a user does not reduce its availability for other users (refer to **Box 4**). The consumption of common-pool resources such as fishery and forest resources (in a non-sustainable way) will eventually reduce their availability, a scenario called "the tragedy of the commons". Data, in contrast, generates more (private or public) value with greater use[37], a scenario termed "the *comedy* of the commons"[38].

Box 4: Types of goods: Where data falls

Goods can be grouped based on their degrees of rivalry and excludability (Figure 4).

- **Rivalry** refers to the degree to which the consumption of a good reduces its availability for consumption by another consumer. Non-rival goods are goods that will not run out; this means that the cost of allowing additional use of the goods is zero.
- **Excludability** refers to the degree to which a person or a group of people can be effectively excluded from consuming a good. Non-excludable goods are goods that no one can be prevented from consuming or the cost of excluding a person/group from consuming them is very high.

Figure 4: Types of goods based on rivalry and excludability and examples

Source: Author's illustration

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[37] Nevertheless, while data can be used to generate either private or public value, the challenge is to reap the most public value possible from public data while also allowing public data to be used for private gain.
[38] Rose (1986)

The use of data does not diminish its availability for others to use. Data is thus regarded as non-rival good. Data in the public domain is considered a public good—it is non-rival, and no one can be excluded from using it. Private data, on the other hand, is a club good—while the use of it does not reduce its availability, not everyone is able to use private data. (Note: the term *public* and *private* data here refer to the accessibility of the data, not the ownership).

Estimating the economic value of open government data is challenging, as it includes direct values such as investment and market value as well as indirect values such as wider social and economic benefits[39]. When more data is made open, more people (citizens, companies, researchers, etc.) are given access to these non-exhaustible resources, generating more value[40]. **Making data open circumvents the issues of information asymmetry on at least two levels.**

First, governments would not have to "pick winners" especially since they may not have full information of which organisation/individual could generate value[41]. For example, there are around 600 consumer and analytics applications used by around 42% of Londoners that are powered by Transport of London (TfL)'s data since TfL made its data open over a decade ago. This saved TfL from having to produce apps in-house. The use of TfL data by companies is estimated to generate between £70 and 90 million in gross value added (GVA) per year while supporting around 500 high-value jobs[42].

The Spanish government launched the Aporta Initiative in 2009 to "promote the opening of public information and development of advanced services based on data"[43]. In 2016, there were 662 companies in the *infomediary* sector[44] in Spain, generating €1.7 billion and employing 19,347 people. Three main areas within the sector are geographic information (23%), market research (23%), and economics and finance (21%)[45].

A study by Koski (2011) found that between 2000 and 2007, architectural and engineering-related firms in countries where fundamental geographical information (GI) is provided free or at marginal cost have grown on average about 15% more per annum than firms in countries in which GI is priced according to cost-recovery (average cost) principles[46].

The European Union (EU) Open Data Portal (ODP) compiles applications developed by the EU institutions and third parties that use the portal's open data. There are 115 web applications, 13 mobile applications and two desktop applications listed in the portal so far, offering various

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[39] Gruen, Houghton, and Tooth (2014)

[40] Value can be non-market/non-traded value such as better policies, environment and mental health.

[41] Frischmann (2006)

[42] Deloitte (2017)

[43] datos.gob.es (n.d.)

[44] The sector that uses public and private data to create value-added products and services

[45] datos.gob.es (2018)

[46] For simple understanding, average cost is usually higher than marginal cost since average cost includes fixed cost.

functions such as data visualisation and analysis, covering a wide range of topics including Covid-19, economics, environment, agriculture and international aid.

Second, an organisation/individual would not be restricted by limited information to generate the highest possible value. A large volume of data is needed to maximise the potential of emerging technologies such as big data and machine learning. For example, a farm-analytics firm Climate Corp., which is owned by Monsanto, one of the world's largest agribusiness companies, used 60 years of crop yield data and 14 terabytes of information on soil types provided freely by the United States Department of Agriculture to price crop insurance[47].

Sense-T, a partnership between the University of Tasmania, CSIRO[48] and several Tasmanian authorities, brings researchers and industry players to use data, sensing and telemetry technologies and data analytics to solve problems on the ground[49]. Past projects have mainly addressed issues in agriculture and aquaculture. Examples include developing tools to help vineyards avoid disease and make better management decisions and giving Tasmanian regulators real-time data about environmental conditions around shellfish farms[50]. They are also working in other areas such as health, tourism, financial services and logistics.

TradeData International and Sirca are two data-based business units of Australian higher education institutions that have expanded to serve many private sector players and international organisations since their establishment in 1997[51]. TradeData International provides international trade data analytics services using mostly data from countries' customs clearance documentation for imports and export declarations[52]. Meanwhile, Sirca offers financial market data analytics services to the financial industry as well as regulators[53]. The growth of these two business units demonstrates the demand for better data-driven business insights in the private sector.

With the growth of the solar industry in South Korea, a company called Haezoom uses data provided by several Korean ministries, the National Academy of Sciences, and the Korean Meteorological Administration to provide an impartial cost-benefit analysis of solar panel installation to consumers. It also suggests credible manufacturers to purchase solar panels from. The service allows consumers to make an informed decision in installing solar panels[54].

Countries that have higher GDP per capita have higher Open Data Barometer (ODB)[55] scores as shown in Figure 5 and Figure 6. While it is beyond the intention of this paper to assert the direction of causality between the two, these figures indicate open data as a likely feature of developed countries.

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[47] Kesmodel (2013)

[48] Commonwealth Scientific and Industrial Research

[49] Sense-T (n.d.b)

[50] Sense-T (n.d.a)

[51] Gruen, Houghton, and Tooth (2014)

[52] TradeData International (2015)

[53] SIRCA (n.d.)

[54] Center for Open Data Enterprise (n.d.)

[55] ODB will be elaborated further in Section 4.1.

It is worth noting that based on the level of gross domestic product (GDP) per capita, Malaysia is one of the underperforming countries in open data. Even though Malaysia's GDP per capita is above the global median, Malaysia's ODB score is below half of the full ODB score. On the other hand, Colombia and the Philippines are two countries with GDP per capita below the global median but with ODB scores above 50.

Figure 5: Gross domestic product (GDP) per capita (current prices in USD) versus Open Data Barometer (ODB) score, 2016

Figure 6: Log-transformed gross domestic product (GDP) per capita (current prices in USD) versus Open Data Barometer (ODB) score, 2016
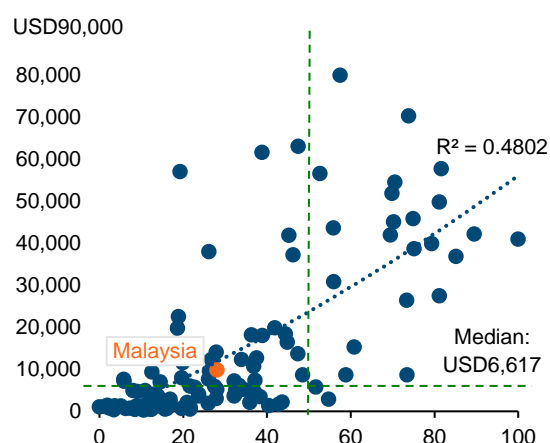
Note: Refer to the supplementary datasheet for the full data
Source: World Bank (n.d.b); World Wide Web Foundation (2017)
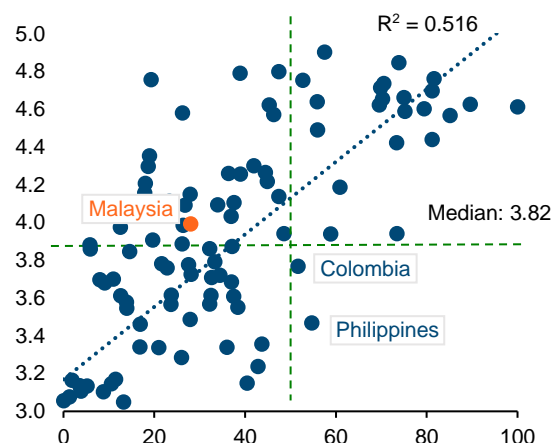
3.2. Government transparency, accountability and effectiveness

Open government data is one of the features of open government, as discussed in **Box 2**. With open data, information related to government activities, such as government spending and contracting, is accessible to the public. This allows better checks and balances and well-informed policy advocacy, as well as holding public officials more accountable. It is widely recognised that strong and inclusive institutions are key to economic prosperity[56].

Fundar, a Mexican civil society organisation, has persuaded the Mexican Ministry of Agriculture to open its data related to the PROCAMPO (Programme for Direct Assistance in Agriculture) and discovered that 57% of the subsidy went to only the wealthiest 10% of recipients[57]. A website is maintained by Fundar to publish regularly updated information on the agricultural support programmes in Mexico to promote accountability in subsidy delivery[58].

The United States Federal Reserve publishes full documentation of the FRB/US model including model equations, coefficients and data. The FRB/US model is a large-scale model of the US economy that contains all major components of the product and income sides of the US national accounts[59]. It is used by the government for forecasting and conducts analysis of monetary and

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56 Acemoglu and Robinson (2012)

57 World Bank (2016)

58 FUNDAR (2010)

59 The Federal Reserve (2018)

fiscal policies. The open documentation of the model allows anyone to use the model for their own forecasting as well as to conduct checks and balances.

The Ministry of Finance of Timor-Leste with support from the governments of Japan, Australia, and the United States, and the Asian Development Bank maintains the Aid Transparency Portal (ATP), which contains all aid information in Timor-Leste. The objective is to improve aid transparency, accuracy and predictability and to ensure that the assistance provided is efficient and effective[60].

The Opentender platform[61] provides comprehensive public procurement information from 33 jurisdictions (28 EU member states, Norway, the EU Institutions, Iceland, Switzerland and Georgia) free of charge in an easy-to-use format to increase market transparency, decrease transaction costs and facilitate government accountability[62].

A higher level of open data is correlated with better governance indicators (i.e. control of corruption, government effectiveness, regulatory quality, and voice and accountability) as shown in Figure 7 - Figure 10. It is beyond the scope of this paper to determine the direction of causality as it could be either way or both—open data improves governance and/or good governance implements open data.

Figure 7: Control of corruption estimate versus Open Data Barometer (OBD) score, 2016
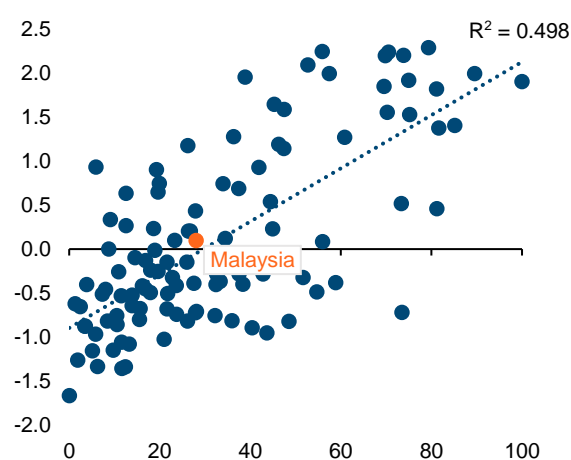
Figure 8: Government effectiveness estimate versus Open Data Barometer (OBD) score, 2016
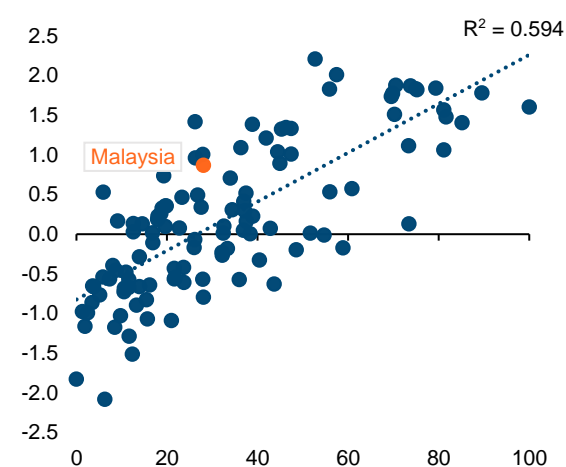
Figure 9: Regulatory quality estimate versus Open Data Barometer (ODB) score, 2016
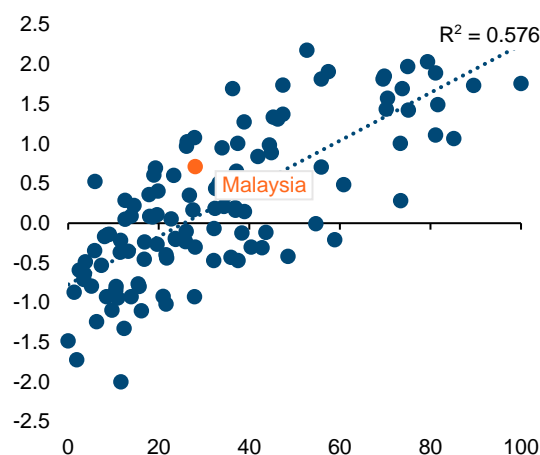
Figure 10: Voice and accountability estimate versus Open Data Barometer (ODB) score, 2016
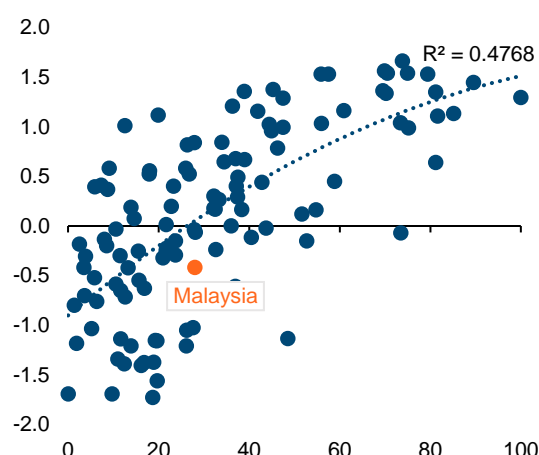
Notes:

- Refer to the supplementary datasheet for the full data
- ODB scores are scaled scores (i.e. maximum = 100)
- All governance indicators range from -2.5 (very bad) to 2.5 (excellent)
- Control of corruption: perceptions of the extent to which public power is exercised for private gain
- Government effectiveness: perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies
- Regulatory quality: perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development
- Voice and accountability: perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media

Source: World Bank (n.d.c); World Wide Web Foundation (2017)

3.3. Knowledge generation

Open data allows society to harness collective intelligence in generating knowledge. Detailed, timely, and good quality data is a valuable resource for both fundamental and applied research in the natural and social sciences. Researchers could save time and costs by utilising open data instead of collecting their own data to conduct research. Open data, instead of privately collected data, could also facilitate greater collaborations and replications among researchers in different institutions. Open government data contributes to open science (see **Box 3**).

Countries that have a higher level of open data produce a higher number of and more impactful academic publications (Figure 11 & Figure 12). Controlling for other variables such as the level of economic development, research and development expenditure and the number of researchers, open data is found to be a significant driver of academic publications (discussed in a forthcoming paper). Although the empirical analysis is done on academic research, it highlights the importance of open data to research in general, including non-academic research.

Figure 11: H-index (all field) versus Open Data Barometer (OBD) score, 2016
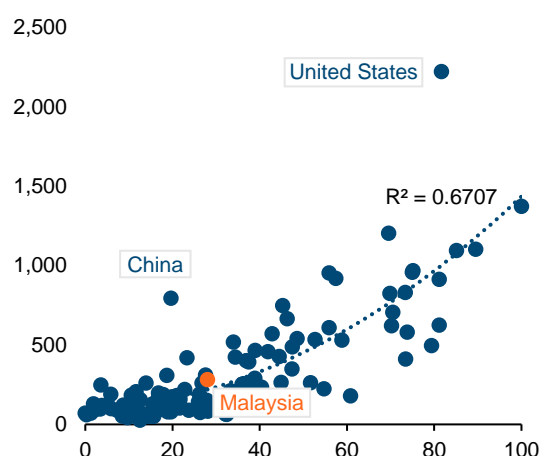
Figure 12: H-index (social science) versus Open Data Barometer (OBD) score, 2016
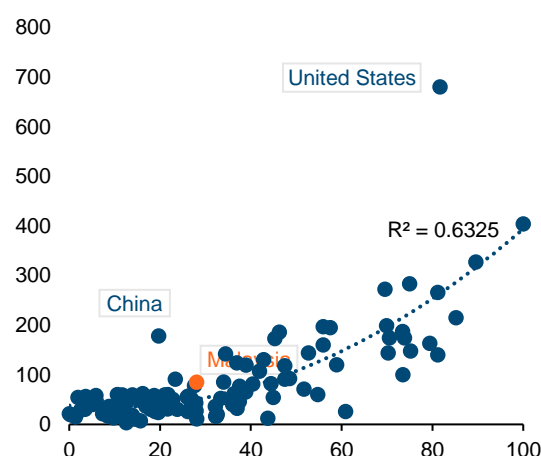
Note: Country's h-index is the country's number of articles (h) that have received a least h citation based on Scopus database
Source: Scimago Lab (2020); World Wide Web Foundation (2017)

Around the world, several initiatives have been carried out to open up data for crowdsourcing knowledge. For instance, New Zealand's LAWA is a web-based platform that provides a large amount of scientific data on land, air and water in the country[63]. It is an initiative by New Zealand's 16 regional councils, the Cawthron Institute and the Ministry for the Environment supported by the Tindall Foundation and Massey University.

InfoAmazania combines governments and satellite data to provide rich datasets of the endangered Amazon region. It is supported by the Earth Journalism Network, the International Center for Journalists, the Amazon Conservation Team and Dejusticia. The public is also encouraged to share data with the platform[64].

Pulse Lab Jakarta, a joint initiative between the United Nations and the Ministry of National Development Planning Indonesia, uses data from various sources including government datasets to generate policy-relevant insights and visualisation tools. Past projects include designing an interactive geospatial mapping tool of various financial services points and conducting a port network analysis for maritime development policy in Indonesia[65].

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[63] LAWA (n.d.)
[64] InfoAmazonia (n.d.)
[65] UN Global Pulse (n.d.)

3.5. Summary: A better society with open government data

Opening up government data would benefit all segments of society. Benefits gained by each segment of the society would, in turn, benefit other segments (Figure 13). The private sector could use the data to make informed business decisions and offer better products and services to consumers. Accessible government information would allow better policy advocacy and improve governance. Researchers could utilise data to generate knowledge to advance society.

The government collects and holds a large volume of data using public funds. In order to fully realise the value of this data, they need to be meaningfully used. Open government data gives everyone the opportunity to generate value from government data with little to no marginal cost[66].

Figure 13: Open government data reinforcing benefits
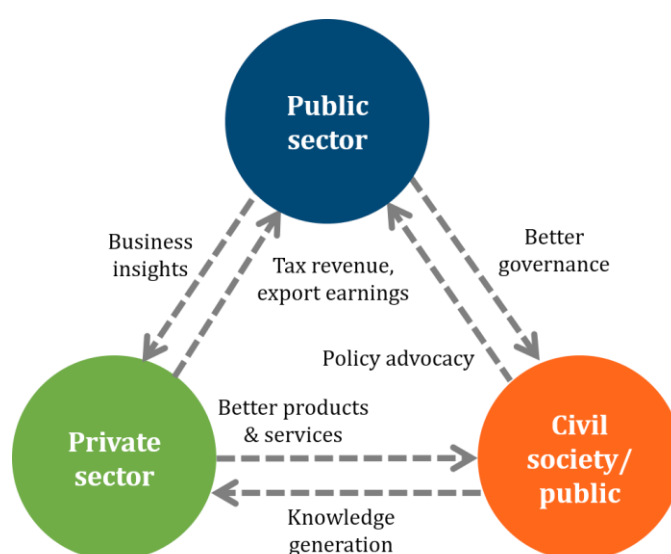
Source: Author's illustration

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[66] Marginal cost is the cost incurred with each additional use of a resource

4. Open Government Data Evaluations

This section surveys five popular open government data evaluations and describes briefly the position of Malaysia in each evaluation.

4.1. The Open Data Barometer (ODB)

Background & Methodology

The Open Data Barometer (ODB) measures the prevalence and impact of open data initiatives around the world. It is produced by the World Wide Web Foundation. Thus far, there are five instalments of the report (Table 7). The first edition was a joint product with the Open Data Institute (ODI). The Leaders edition looks specifically into 30 countries that have made commitments to open data either by adopting the Open Data Charter or signing up for the G20 Anti-Corruption Open Data Principles.

Table 7: Open Data Barometer (ODB) editions

Edition	Time of publication	No. of countries	Survey period	Funders
1st Edition (2013)	October 2013	77	July 2013 – October 2013	UK Aid & International Development Research Centre (Canada)
2nd Edition (2014)	January 2015	86	June 2014 – September 2014	UK Aid & International Development Research Centre (Canada)
3rd Edition (2015)	April 2016	92	May 2015 – September 2015	Open Data for Development (OD4D)
4th Edition (2016)	May 2017	115	May 2016 – September 2016	Omidyar Network & Open Data for Development (OD4D)
Leaders Edition	September 2018	30	October 2017 – March 2018	Omidyar Network

Source: World Wide Web Foundation (Various years)

The ODB uses an in-depth methodology that combines contextual data, technical assessments and secondary indicators. Following are the descriptions of the methodology:

a. **Peer-reviewed expert survey:** Carried out with a range of questions about open data contexts, policy, implementation and impacts and a detailed dataset survey completed for 15 kinds of data in each government, which touched on issues of data availability, format, licensing, timeliness and discoverability.

b. **A government self-assessment simplified survey:** With the same range of context, implementation, and impacts question as an additional source of information.

c. **Secondary data:** Used in the readiness section of the Barometer and is taken from the World Economic Forum, International Telecommunications Union, United Nations e-Government Survey, and Freedom House.

The barometer is based on a tri-partite structure of three indexes, each containing three components (Table 8). The implementation index is given higher weightage (2/4) than the other two (1/4 each) since the former is more comparable across countries.

Table 8: Open Data Barometer (ODB)'s measurement structure

Index	Component	Data source
Readiness	Government	Primary and secondary data
	Entrepreneurs and business	
	Citizens and civil society	
Implementation	Accountability dataset cluster	Dataset assessments
	Innovation dataset cluster	
	Social policy dataset cluster	
Impacts	Political	Primary data
	Economic	
	Social	

Source: World Wide Web Foundation and Open Data Institute (2013); World Wide Web Foundation (2015)

The data **implementation index** covers 15 categories of data, presented in Table 11. Following are ten questions asked in the assessment of each dataset. Note that except for question 9 and 10, other questions reflect the salient features of open data listed earlier in Section 2.5.

1. Does the data exist?
2. Is it available online from the government in any form?
3. Is the dataset provided in machine-readable formats?
4. Is the machine-readable data available in bulk?
5. Is the dataset available free of charge?
6. Is the data openly licensed?
7. Is the dataset up to date?
8. Is the publication of the dataset sustainable?
9. Was it easy to find information about this dataset?
10. Are (linked) data Universal Resource Identifiers (URIs) provided for key elements of the data?

Findings

The United Kingdom has always been at the top of the ODB ranking since its first edition with a perfect score of 100. Other countries that performed well based on the latest edition (2016) are Canada, France, the United States of America (USA), South Korea and Australia (Table 9).

Among Southeast Asian countries, Malaysia sat behind the Philippines, Singapore and Indonesia in 2016 with a score of only 28 out of 100 (Figure 14). Malaysia was also behind many other developing countries including Colombia, Kenya, South Africa, and Paraguay[67].

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[67] Refer to the supplementary datasheet for the full list

Table 9: ODB 2013 – 2016 ranking, selected countries

Country	1ˢᵗ Edition (2013) (77 countries)	2ⁿᵈ Edition (2014) (86 countries)	3ʳᵈ Edition (2015) (92 countries)	4ᵗʰ Edition (2016) (115 countries)
United Kingdom	1	1	1	1
Canada	8	7	4	2
France	10	4	2	3
USA	2	2	2	4
South Korea	12	17	8	5
Australia	7	10	10	5
New Zealand	4	4	6	7
Philippines	47	53	36	22
Singapore	29	29	24	23
Indonesia	52	36	40	38
Malaysia	**N/A**	**41**	**51**	**53**
Thailand	31	57	62	53
Vietnam	N/A	57	57	79

Note: Rows in the box are Southeast Asian countries.
Source: World Wide Web Foundation (Various years)

Malaysia's ODB overall scaled score fell slightly from 31 in 2014 to 28 in 2016 (Figure 14). In contrast, other Southeast Asian countries recorded improvement over the years. While the scaled scores for the readiness and impact sub-indices have been improving for Malaysia, the scaled score for the implementation sub-index has dropped from 37 in 2014 to 20 in 2016 (Table 10).

Figure 14: ODB 2014 & 2016 overall scaled score, selected countries
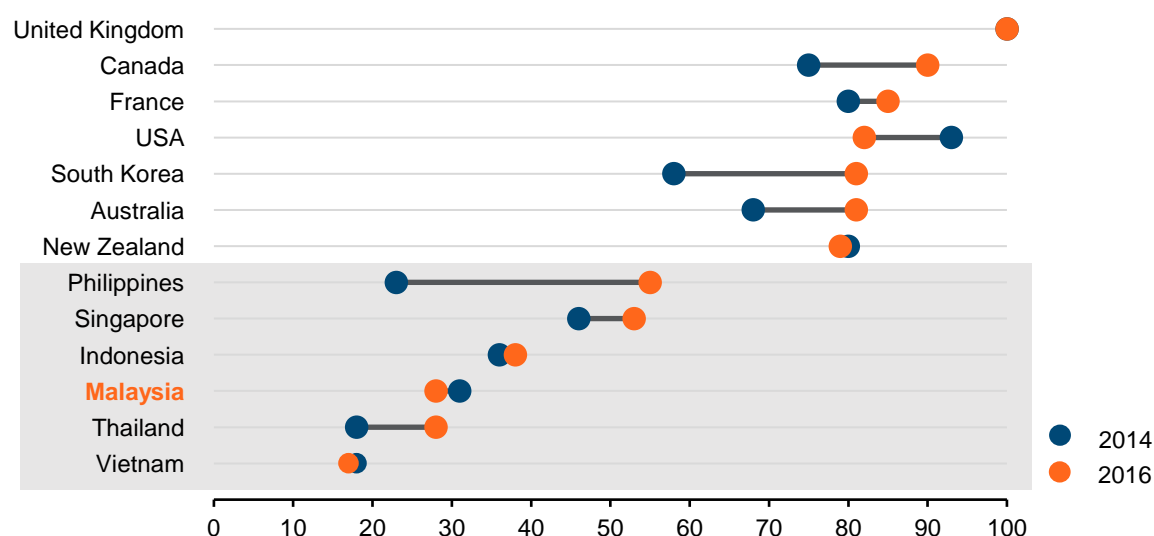
Note: Scaled scores are used for comparability across years. Scaled scores mean overall and by sub-index scores are scaled by normalising the highest score in each group as 100. In the shaded region are Southeast Asian countries.
Source: World Wide Web Foundation (2015; 2017)

Table 10: Malaysia's ODB 2014 – 2016 scaled score based on sub-index

Edition	Overall	Readiness	Implementation	Impact
2ⁿᵈ Edition (2014)	31	44	37	3
3ʳᵈ Edition (2015)	25	46	17	16
4ᵗʰ Edition (2016)	28	53	20	19

Note: Scores are out of 100.
Source: World Wide Web Foundation (Various years)

Out of the 15 datasets assessed by ODB, Malaysia only scored more than 15/100 for two datasets, which are census and trade data. A score of 15 simply means the data exists and is available online. Six datasets merely exist but are not available online (scored 5), which are land, government spending, transport, health, crime and environmental data. Malaysia's detailed ODB 2016 scores for the implementation index across datasets and assessment categories are shown in Table B.1 in Appendix B.

Table 11: ODB 2016 absolute score based on the dataset, selected countries

Dataset	ODB Score (/100)				
	Malaysia	Indonesia	Philippines	Thailand	Singapore
Map	15	45	65	15	65
Land	5	5	5	5	15
Census	80	65	15	65	65
Budget	15	15	65	15	65
Spending	5	5	5	55	5
Company	15	15	15	75	15
Legislation	15	15	15	15	15
Transport	5	80	60	15	65
Trade	65	65	15	15	65
Health	5	15	45	60	65
Crime	5	65	60	15	80
Environment	5	65	15	60	75
Elections	15	60	80	15	5
Contracts	15	15	95	5	15

Source: World Wide Web Foundation (2017)

4.2. The Global Open Data Index (GODI)

Background & Methodology

The Global Open Data Index (GODI) is run by the Open Knowledge Foundation (OKF). It measures the openness of government data according to the Open Definition (see Section 2.3). The initiative is supported by the Open Data for Development (OD4D) Program, a partnership funded by the Canadian International Development Research Centre (IDRC), the World Bank, the United Kingdom's Department for International Development (DFID), and Global Affairs Canada (GAC). So far, there is only a single GODI report published, that is for 2016/17, covering 94 places[68].

The GODI only assesses the *implementation* of open government data, unlike the ODB that also measures the readiness and impact of open government data. However, the GODI's methodology is stricter than the ODB. Each data category under GODI has mandatory characteristics. A data category has to meet all the mandatory characteristics for it to be qualified for evaluation. Otherwise, the data is considered not published (scored zero)[69]. Data categories assessed are

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[68] GODI ranks 'places', not 'countries', to meaningfully address countries with devolved power, for example, Northern Ireland is assessed separately from Great Britain

[69] For two categories, water quality and draft legislation, some characteristics are optional

listed in Table 13 and the mandatory characteristics of each data category are presented in Table C.1 in Appendix C.

Following are questions asked in the evaluation. Out of the eleven questions, five (italicised) are not scored (explanations for this are presented in Table C.2 in Appendix C).

1. *Is the data collected by the government (or a third-party related or linked to government)?*
2. Is the data available online without the need to register or request access to the data?
3. *Is the data available online at all?*
4. Is the data available free of charge?
5. *Where did you find the data?*
6. *How much do you agree with the following statement: "It was easy for me to find the data"?*
7. Is the data downloadable at once?
8. Data should be updated every [time interval]: Is the data up-to-date?
9. Is the data openly licensed/ in the public domain?
10. Is the data in open and machine-readable file formats?
11. *How much human effort is required to use the data? (1 = little to no effort is required, 3 = extensive effort is required)*

Findings

Malaysia ranked 87th out of 94 places, 8th from the bottom, in the GODI with a score of 10 out of 100 (Table 12). Regionally, Malaysia is behind Singapore, Thailand, Philippines, and Indonesia. Globally, Malaysia is behind many other developing countries including Afghanistan, Cameroon, Mozambique, Zimbabwe and Venezuela[70].

Table 12: GODI 2016/17 ranking, selected countries

Country	Rank (94 countries)	Score (/100)
Taiwan	1	90
Australia	2	79
Great Britain	2	79
France	4	70
Finland	5	69
Canada	5	69
Norway	5	69
Singapore	17	60
Thailand	51	34
Philippines	53	30
Indonesia	61	25
Malaysia	**87**	**10**
Myanmar	94	1

Note: Rows in the box are Southeast Asian countries
Source: Open Knowledge Foundation (2016)

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[70] Refer to the supplementary datasheet for the full list

Except for national budget, procurement and national statistics data, Malaysia scored zero for other data categories (Table 13). As mentioned, under the GODI, if a data category does not fulfil at least three of its mandatory characteristics, it is considered not published. Besides, unlike the ODB, the GODI does not give a score to data that exists but is not published online or requires registration to access. There seem to be large differences between ODB and GODI's scores for national budget and procurement; this is due to the different methodology of the two evaluations as explained earlier.

Table 13: GODI 2016/17 score based on data categories, selected countries

Category	GODI Score (/100)				
	Malaysia	**Indonesia**	**Philippines**	**Thailand**	**Singapore**
National budget	60	60	80	60	100
National spending	0	0	0	0	0
National procurement	45	45	65	70	100
Election results	0	0	0	0	0
Company registration	0	0	0	100	100
Land ownership	0	0	0	0	15
National maps	0	65	50	0	0
Administrative boundaries	0	0	65	0	0
Locations	0	0	0	0	70
National statistics	50	80	85	85	100
Draft legislation	0	0	45	45	30
National law	0	45	0	85	60
Air quality	0	85	0	70	85
Water quality	0	0	0	0	60
Weather	0	0	65	0	85

Source: Open Knowledge Foundation (2016)

4.3. The Open Data Inventory (ODIN)

Background & Methodology

The Open Data Inventory (ODIN) is produced by the Open Data Watch (ODW), a non-profit organisation working at the intersection of open data and national statistics[71]. The ODIN assesses the coverage (the availability) and the openness (the way data is made available) of statistics published by the national statistical offices on their website[72]. The first publication was in 2015, which only covered low- and middle-income countries. To date, there have been four ODIN reports.

There are 21 data categories assessed (Figure 16) based on 9 indicators (Table 14). The assessment is conducted independently by a group of researchers skilled in various languages hired and trained by the ODW[73].

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[71] Open Data Watch (n.d.)
[72] Open Data Watch (2019b)
[73] Open Data Watch (2019b)

Table 14: ODIN assessment indicators

Scope	Indicator
Coverage	Data available last 5 years
	Data available last 10 years
	First administrative level
	Second administrative level
Openness	Machine-readable
	Non-proprietary
	Download options
	Metadata available
	Terms of use

Source: Open Data Watch (2019b)

Findings

Based on the latest edition (2018/19), Malaysia ranked 69 out of 178 countries (Table 15). In Southeast Asia, Malaysia was behind Singapore, Philippines and Indonesia, which is consistent with ODB and GODI findings. Malaysia was also behind many other developing countries including India, Brazil, Palestine and Rwanda[74].

Malaysia's overall score improved from 36.4 in 2016 to 50.1 to 2018 (Figure 15). In the latest edition, Malaysia scored zero for three data categories: crime & justice, energy use and gender statistics (Figure 16). Other data categories that Malaysia scored less than 50 are education facilities, education outcomes and land use.

Table 15: ODIN 2018/19 ranking, selected countries

Country	1st Edition (2015) (125 countries)	2nd Edition (2016) (173 countries)	3rd Edition (2017) (180 countries)	4th Edition (2018/19) (178 countries)
Denmark	N/A	6	1	2
Netherlands	N/A	13	2	3
Poland	N/A	4	4	4
Slovenia	N/A	14	10	5
Finland	N/A	10	6	6
Singapore	N/A	63	20	1
Philippines	23	64	28	41
Indonesia	27	84	27	49
Malaysia	**98**	**95**	**65**	**69**
Myanmar	N/A	116	83	78
Vietnam	15	102	102	108
Thailand	76	91	119	126
Timor-Leste	113	128	150	150
Cambodia	80	159	152	154
Laos	96	142	158	162

Note: Rows in the box are Southeast Asian countries
Source: Open Data Watch (Various years)

[74] Refer to the supplementary datasheet for the full list

Figure 15: ODIN 2016 & 2018, selected countries
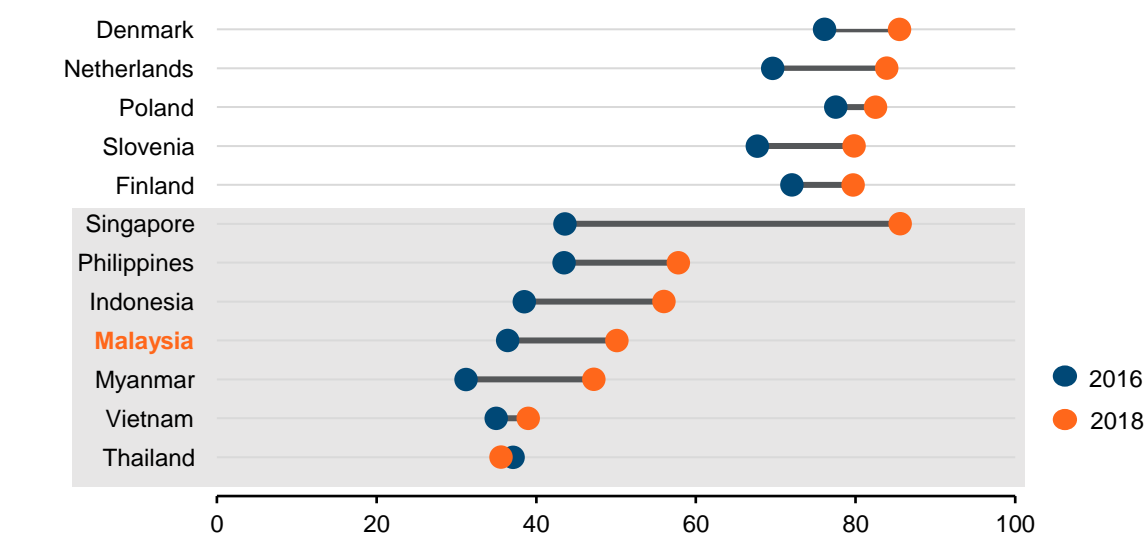
Note: In the shaded region are Southeast Asian countries
Source: Open Data Watch (2016; 2019a)

Figure 16: ODIN 2018/19 score based on data categories, selected countries

Category	ODIN Overall Score (/100)				
	Malaysia	Indonesia	Philippines	Thailand	Singapore
Balance of payments	75.5	0.0	75.0	56.3	100.0
Built environment	50.0	65.0	50.0	30.0	88.9
Crime & justice	0.0	0.0	45.0	35.0	88.9
Education facilities	40.0	50.0	45.0	35.0	72.2
Education outcomes	45.0	55.0	60.0	30.0	72.2
Energy use	0.0	66.7	72.2	0.0	88.9
Gender statistics	0.0	55.0	50.0	30.0	88.9
Government finance	66.7	66.7	61.1	55.6	88.9
Health facilities	60.0	65.0	60.0	35.0	88.9
Health outcomes	50.0	55.0	50.0	0.0	72.2
International trade	81.3	81.3	50.0	37.5	100.0
Labor	65.0	50.0	60.0	50.0	88.9
Land use	45.0	65.0	45.0	40.0	72.2
Money & banking	56.3	81.3	81.3	43.8	100.0
National accounts	50.0	77.8	72.2	33.3	88.9
Pollution	66.7	0.0	55.6	50.0	88.9
Population & vital statistics	65.0	55.0	55.0	45.0	88.9
Poverty & income	60.0	70.0	70.0	30.0	72.2
Price indexes	55.6	77.8	50.0	33.3	88.9
Reproductive health	50.0	55.0	50.0	35.0	88.9
Resource use	72.2	77.8	61.1	44.4	72.2

Source: Open Data Watch (2019a)

4.4. The Open Budget Survey (OBS)

Background & Methodology

The Open Budget Survey (OBS) assesses the extent to which governments release timely, comprehensive and useful budget information, as well as public participation in and oversight of government budgets[75]. The OBS has been published by the International Budget Partnership (IBP)[76] every two years since 2006 except for a three-year gap between 2012 and 2015[77].

The OBS is based on a questionnaire of 145 questions completed by country-based civil society groups or researchers[78]. Of those questions, 109 assess budget transparency, i.e. the degree to which each country makes eight key budget documents available online in a timely manner (Table 16) as well as the comprehensiveness of the budget information provided, which forms the **Open Budget Index (OBI)**. The remaining 36 questions measure the degree of public participation in the budget decision-making and monitoring, as well as the role of the legislature and supreme audit institution in the budget process.

Table 16: Key budget documents and release deadlines, Open Budget Index (OBI)

Stage of the budget cycle	Budget document	Release deadlines for "Publicly Available" documents
Formulation	Pre-Budget Statement	Must be released at least one month before the Executive's Budget Proposal is submitted to the legislature for consideration.
	Executive's Budget Proposal (including supporting documents)	Must be publicly released while the legislature is still considering it and before it is approved. In no case would a proposal, released after the legislature has approved it, be considered "publicly available."
Approval	Enacted Budget	Must be released no later than three months after the budget is approved by the legislature.
Formulation / Approval	Citizens Budget	Must be released within the same timeframe as the underlying Executive's Budget Proposal or Enacted Budget. For example, a Citizens Budget for the Executive's Budget Proposal must be released while the legislature is still considering the Executive's Budget Proposal and before it is approved.
Execution	In-Year Reports	Must be released no later than three months after the reporting period ends.
	Mid-Year Review	Must be released no later than three months after the reporting period ends.
	Year-End Report	Must be released no later than 12 months after the end of the fiscal year (the reporting period).
Oversight	Audit Report	Must be released no later than 18 months after the end of the fiscal year (the reporting period).

Source: International Budget Partnership (2020b)

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[75] International Budget Partnership (2020b)

[76] The IBP is an independent non-profit corporation funded by many donors including The World Bank, United Nations International Children's Emergency Fund (UNICEF), European Commission and the United States Department of State. Source: International Budget Partnership (2020a)

[77] The OBS methodology was modified beginning the 2015 edition. Source: International Budget Partnership (2015)

[78] The list of the questions and Malaysia's score are provided in the supplementary datasheet

All responses to the OBS questions are supported by evidence, including budget documents, the country's laws, and interviews with government officials, legislators or experts on the country's budget process. All questionnaires are peer-reviewed by independent experts as well as by the IBP to ensure cross-country comparability. Responses are also cross-checked against reports on fiscal transparency published by international organisations such as the IMF, the World Bank, and the OECD. Governments are invited to comment on the draft results and the Malaysian government is one of the governments that reviewed the draft results of the 2019 edition.

Findings

New Zealand topped the Open Budget Index (OBI) in the past three editions. Other countries that have been performing well include South Africa and Sweden. In the latest edition (2019), Malaysia was behind the Philippines, Indonesia and Thailand (Table 17). Malaysia was also behind many other developing countries including Zimbabwe, Benin, Afghanistan and Papua New Guinea[79].

Malaysia's score only improved by 1 point from 46 in 2015 to 47 in 2019 (Figure 17). In contrast, scores of most neighbouring countries increased rather significantly, which means budget information of these countries were more open in 2019 than they were in 2015 while there is virtually no change for Malaysia's budget information openness.

Table 17: OBI (transparency component of OBS) 2015 - 2017 ranking, selected countries

Country	5th Edition (2015) (102 countries)	6th Edition (2017) (115 countries)	7th Edition (2019) (118 countries)
New Zealand	1	1	1
South Africa	3	2	2
Sweden	2	3	3
Mexico	17	6	4
Georgia	16	5	5
Brazil	6	7	6
Norway	4	4	7
Philippines	23	19	10
Indonesia	26	23	18
Thailand	65	37	30
Malaysia	55	54	55
Timor-Leste	68	69	69
Vietnam	87	91	77

Source: International Budget Partnership (Various years)

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[79] Refer to the supplementary datasheet for the full list

Figure 17: OBI 2015 & 2019 score, selected countries
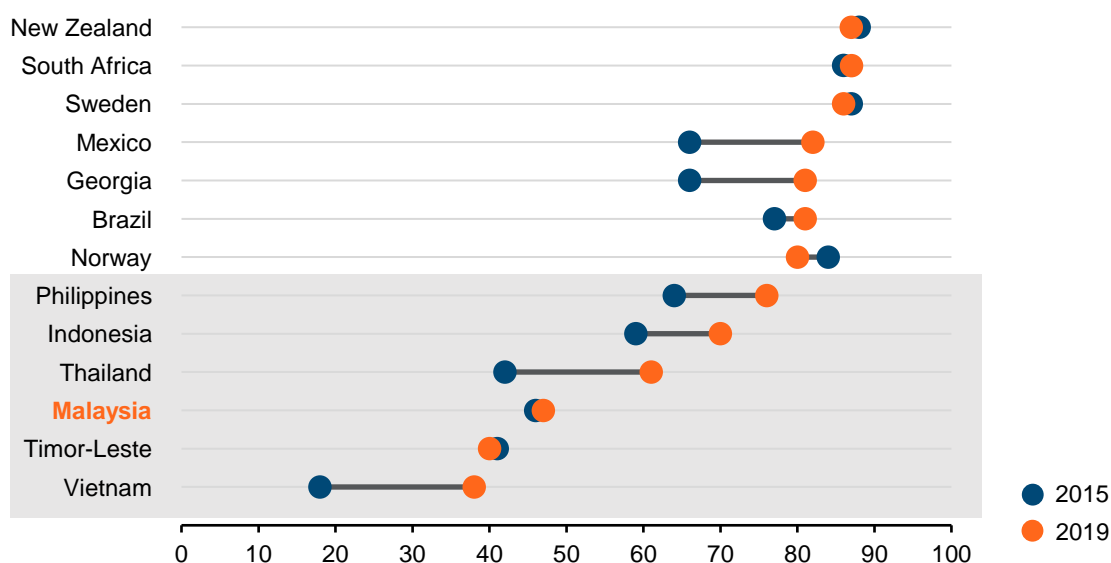
Note: Countries in the shaded region are Southeast Asian countries
Source: International Budget Partnership (2015; 2020b)

Box 5: Public participation in and oversight of the budget process

Starting from 2012, the OBS also assesses the opportunities for public participation in the budget process and the role of the legislature and the supreme audit institution in budget oversight. These components are not directly relevant to *open government data*, but are reflective of the level of *open government* (see **Box 2** for the distinction between the two).

Based on the OBS 2019, Malaysia was behind the Philippines and Indonesia in public participation. In terms of budget oversight by the legislature, Malaysia was behind all the other five Southeast Asian countries included in OBS 2019 and was only ahead of Thailand for oversight by the supreme audit institution (Table 18).

Table 18: OBS 2019 score (out of 100), by component, selected countries

Country	Transparency (Open Budget Index, OBI)	Public participation	Oversight	
			by Legislature	by Supreme Audit Institution
New Zealand	87	54	72	100
South Africa	87	24	75	100
Sweden	86	19	86	95
Mexico	82	35	50	78
Georgia	81	28	78	89
Brazil	81	17	75	83
Norway	80	22	86	89
Philippines	76	31	67	89
Indonesia	70	20	83	78
Thailand	61	13	69	50
Malaysia	47	17	19	56
Timor-Leste	40	6	39	67
Vietnam	38	11	72	78

Source: International Budget Partnership (2020b)

4.5. The World e-Parliament Survey (WPS)

Background & Methodology

The World e-Parliament Survey (WPS) measures how ICT is being adopted by parliaments and their members to improve transparency and accountability[80]. It is conducted by the Inter-Parliamentary Union, an organisation of 179 member Parliaments and 13 associate members, financed primarily by the members out of public funds[81]. The first World e-Parliament Report was published in 2008 and since then, it has been published every two years, except in 2014[82].

According to the WPS, an e-Parliament places "technologies, knowledge and standards at the heart of its business processes and embodies the values of collaboration, inclusiveness, participation and openness to the people"[83]. There are four components of e-Parliament:

1. **People:** Users and beneficiaries as well as those charged with developing and supporting the e-Parliament.
2. **Process:** The underlying parliamentary or democratic functions that are being supported or transformed.
3. **Architecture:** The infrastructure, hardware and software required to instantiate the transformation.
4. **Data:** The information and documents created, stored, transmitted and shared.

The WPS evaluates more than open data. In its 2018 report, the WPS covered the following six topics, three of which (bold) reflect the open data level of parliaments.

1. **Oversight and management** (which include the capacity to publish open data, the timeliness of report publication and management of documents)
2. Infrastructure, services, applications, training
3. **Systems and standards for legislative documents and data** (which include document formats, accessibility of open data and digital archives practice)
4. Library and research services
5. **Parliamentary websites** (which include website content, usability and accessibility)
6. Communication between citizens and parliament

The survey questions ranged from open-text to multiple-choice, with a number of matrix questions and a related range of sub-questions. Two separate survey questions are distributed to two groups of respondents: national parliaments and parliamentary monitoring organisations[84].

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[80] Inter-Parliamentary Union (2018)

[81] Inter-Parliamentary Union (2020b)

[82] Inter-Parliamentary Union (2020a)

[83] Inter-Parliamentary Union (2018)

[84] Inter-Parliamentary Union (2016)

Findings

Table 19 presents scores of selected countries for three topics of WPS 2018 that are relevant to open data. For oversight and engagement, the Malaysian parliament scored better than parliaments of other Southeast Asian countries (except Indonesia that has the same score). However, in terms of systems and standards for legislative documents and data, and parliamentary websites, Malaysia was behind Indonesia and Thailand (Table 19).

Table 19: WPS 2018 score (out of 100), selected parliaments

Country	Parliament or Chamber	Oversight and engagement	Systems and standards for legislative documents and data	Parliamentary websites
South Africa	National Council of Provinces	48	65	39
South Africa	National Assembly	48	65	37
Brazil	Chamber of Deputies	23	81	50
Brazil	Senate	25	79	43
France	*Assemblee Nationale*	18	70	56
France	Senate	15	65	32
United States	House of Representatives	30	70	28
United Kingdom	House of Commons	20	60	32
United Kingdom	House of Lords	20	60	32
South Korea	National Assembly	15	63	32
Indonesia	House of Representatives	45	58	60
Thailand	House of Representatives	20	65	28
Thailand	Senate	20	65	30
Malaysia	House of Representatives	45	37	21
Malaysia	Senate	45	37	21
Myanmar	Parliament	20	12	17
Myanmar	Union Parliament	20	16	17
Singapore	Parliament	5	28	13

Source: Inter-Parliamentary Union (2018)

Figure 18: WPS 2018 score for oversight and engagement (left), systems and standards for legislative documents and data (middle) and parliamentary website (right), selected parliaments
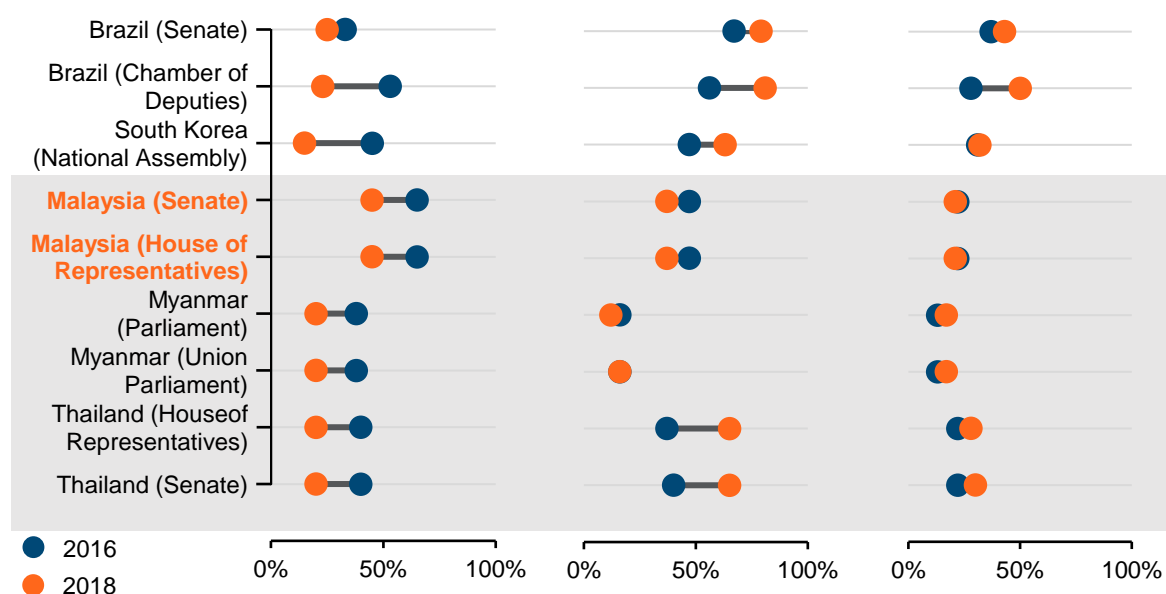
Note: Parliaments in the shade are Southeast Asian parliaments
Source: Inter-Parliamentary Union (2018)

4.6. Summary: Comparison of different open data evaluations

Section 4 surveyed five open data related evaluations, although two are not entirely open data evaluations. The GODI is the least established among the three purely open data evaluations. The methodology adopted by the ODB is more comprehensive than the GODI and the ODIN (Table 20).

While different methodologies would render different results, Malaysia did not perform well in all of the evaluations. In the latest ODB, GODI and ODIN, Malaysia was behind the Philippines, Singapore and Indonesia, as well as many other developing countries. Malaysia ranked eighth from the bottom out of 94 places in the latest GODI. Malaysia's scores in the ODB and the OBS have also not improved significantly over the years, reflecting very little progress in making government data more open.

Table 20: Summary of different open data evaluations

Open data evaluation	Open Data Barometer (ODB)	Global Open Data Index (GODI)	Open Data Inventory (ODIN)	Open Budget Survey (OBS)	World e-Parliament Survey (WPS)
Completely an open data evaluation?	Yes	Yes	Yes	No	No
Producer	World Wide Web Foundation	Open Knowledge Foundation	Open Data Watch	International Budget Partnership	Inter-Parliamentary Union
Subject of evaluation	15 categories of government data (for implementation component)	13 categories of government data	21 data categories published by the national statistics office	Transparency of, public engagement in and oversight of the budget process	Adoption of ICT by parliaments and their members
Methodology	Peer-reviewed expert survey, government self-assessment survey and secondary data	Independent survey	Independent survey	Country-based civil society groups or researchers survey	National parliaments and parliamentary monitoring organisations survey
No. of publications to date (most recent year)	4 excluding Leaders edition (2017)	1 (2016/17)	4 (2018/19)	7 (2019)	5 (2018)
Malaysia's ranking in the latest edition (Score)	53/115 (28/100)	87/94 (10/100)	69/178 (50.1/100)	Open Budget Index, 55/118 (47/100)	N/A

Source: Author's summary

Box 5: The Statistical Capacity Indicator (SCI)

The World Bank's Statistical Capacity Indicator (SCI) is a *diagnostic* evaluation of the capacity of a country's statistical system[85]. It is based on 25 indicators covering three categories as presented in Table D.1 in Appendix D. The SCI is *not* an open data evaluation. However, the ability of a country to make data open begins with its capacity to generate data.

Malaysia's overall SCI score in 2019 was 78.9, which was above the average score of East Asia & Pacific (75.1)[86]. Malaysia did not receive a full score for only 5 out of the 25 indicators, which are in red rows in Table D.1 of Appendix D. This indicates that Malaysia does not have issues in statistical capacity.

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[85] World Bank (2020a)

[86] World Bank (2020b)

Box 6: The United Nations (UN) E-Government Survey

UN E-Government Surveys have been conducted since 2001 (first report published in 2002) by the UN Department of Economic and Social Affairs (DESA). The surveys assess e-government[87] development, effectiveness in the delivery of public services, and ICT potential of UN member states[88]. The survey tracks the progress of countries based on the United Nations E-Government Development Index (EGDI), which is a composite index based on three indices:

a. **Telecommunications Infrastructure Index (TII)** based on data provided by the International Telecommunications Union (ITU)
b. **Human Capital Index (HCI)** based on data mainly provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO)
c. **Online Service Index (OSI)** based on data collected from independent online surveys conducted by UN DESA

Since 2014, the survey has captured information related to the development of open government data in member states and included them in the OSI. In 2020, the survey began to produce a supplementary index to the OSI called the Open Government Development Index (OGDI)[89], which focuses on open government data[90]. There are three key dimensions in the OGDI:

a. Policy and institutional framework (as the foundation)
b. Platform (existence of OGD portal and features)
c. Data availability in various sectors (such as health, education, employment, social security, environment and justice) and data application (such as through organizing hackathons).

A detailed methodology of the OGDI is not available in the 2020 report. However, based on the three key dimensions above, it is clear that the scope of the OGDI is very limited. The findings are also too highly contestable for it to be taken seriously as an open data evaluation. Based on the OGDI, Malaysia was grouped in the 'Very High' category together with Australia, New Zealand and the United Kingdom (which are top performers in other open data evaluations) as well as the United Arab Emirates, Saudi Arabia and China (which scored badly in other evaluations)[91].

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[87] See **Box 2** on the distinction between open government and e-government.

[88] UN (2020)

[89] UN (2020)

[90] Notice the misnomer. Although the index is called the Open Government Development Index (OGDI), it only focuses on open government data. See **Box 2** for the distinction between open government and open government data.

[91] Refer to the supplementary datasheet for the full score list.

5. Conclusion

Governments collect and hold a vast amount of data using public funds. To maximise the potential value of this data, it should be made open. Making data open circumvents the issues of information asymmetry on at least two levels. First, governments would not have to "pick winners" when they may not have full information of which organisation/individual could generate value. Second, an organisation/individual would not be limited by the information that they could access to generate the highest possible value. Open government data could generate not only economic value but also social value in terms of improved governance and knowledge production.

By consensus, open data are digital data that are free from legal and technical constraints to be used by anyone at any time from anywhere. Six salient features of open government data are complete, granular, timely, accessible, machine-processable and non-proprietary. Malaysia did not perform well in global open data evaluations including the Open Data Barometer (ODB), the Global Open Data Index (GODI), and the Open Data Inventory (ODIN). In the latest ODB, GODI and ODIN, Malaysia was behind the Philippines, Singapore and Indonesia, as well as many other developing countries.

Malaysia should make government data more open. With Covid-19, this is important more than ever. This pandemic is not only a public health crisis but also an economic crisis, hurting virtually all sectors as a result of heavy mitigation measures to stop the spread of the virus. Tackling the impacts of this crisis is, therefore, a complex task and we need to leverage our collective intelligence. Open data allows all segments of society to collaborate better. Merely publishing data online does not constitute open data. Data needs to be complete, in the highest level of granularity, timely, easily accessible, machine-processable and in a non-proprietary format.

The next discussion paper in the open government data series will discuss the challenges and considerations in the implementation of open government data in Malaysia.

6. Appendix

6.1. Appendix A – Open Knowledge Foundation

Table A.1: Conditions for *open license* according to Open Definition

Condition	Criteria	Elaboration
Required Permission (The license must irrevocably permit (or allow) the following)	Use	The license must allow free use of the licensed work.
	Redistribution	The license must allow redistribution of the licensed work, including the sale, whether on its own or as part of a collection made from works from different sources.
	Modification	The license must allow the creation of derivatives of the licensed work and allow the distribution of such derivatives under the same terms of the original licensed work.
	Separation	The license must allow any part of the work to be freely used, distributed, or modified separately from any other part of the work or from any collection of works in which it was originally distributed. All parties who receive any distribution of any part of work within the terms of the original license should have the same rights as those that are granted in conjunction with the original work.
	Compilation	The license must allow the licensed work to be distributed along with other distinct works without placing restrictions on these other works.
	Non-discrimination	The license must not discriminate against any person or group.
	Propagation	The rights attached to the work must apply to all to whom it is redistributed without the need to agree to any additional legal terms.
	Application to any Purpose	The license must allow the use, redistribution, modification, and compilation for any purpose. The license must not restrict anyone from making use of the work in a specific field of endeavour.
	No charge	The license must not impose any fee arrangement, royalty, or other compensation or monetary remuneration as part of its conditions.
Acceptable Conditions (The license must not limit, make uncertain, or otherwise diminish the permissions required above except by the following allowable condition)	Attribution	The license may require distributions of the work to include attribution of contributors, rights holders, sponsors, and creators as long as any such prescriptions are not onerous.
	Integrity	The license may require that modified versions of a licensed work carry a different name or version number from the original work or otherwise indicate what changes have been made.
	Share-alike	The license may require distributions of the work to remain under the same license or a similar license.
	Notice	The license may require retention of copyright notices and identification of the license.
	Source	The license may require that anyone distributing the work provide recipients with access to the preferred form for making modifications.
	Technical restriction prohibition	The license may require that distributions of the work remain free of any technical measures that would restrict the exercise of otherwise allowed rights.
	Non-aggression	The license may require modifiers to grant the public additional permissions (for example, patent licenses) as required for the exercise of the rights allowed by the license. The license may also condition permissions on not aggressing against licensees with respect to exercising any allowed right (again, for example, patent litigation).

Source: Open Knowledge Foundation (2013)

6.2. Appendix B – Open Data Barometer (ODB)

Table B.1: ODB 2016 score across datasets and assessment categories, Malaysia

Dataset	Open (0 or 1)	Exists (/5)	Available (/10)	Machine readable (/15)	Bulk (/15)	Free (/15)	License (/15)	Updated (/10)	Sustainable (/5)	Discoverable (/5)	Linked (/5)
Map	0	5	10	0	0	0	0	0	0	0	0
Land	0	5	0	0	0	0	0	0	0	0	0
Census	0	5	10	15	15	15	0	10	5	5	0
Budget	0	5	10	0	0	0	0	0	0	0	0
Spending	0	5	0	0	0	0	0	0	0	0	0
Company	0	5	10	0	0	0	0	0	0	0	0
Legislation	0	5	10	0	0	0	0	0	0	0	0
Transport	0	5	0	0	0	0	0	0	0	0	0
Trade	0	5	10	15	0	15	0	10	5	5	0
Health	0	5	0	0	0	0	0	0	0	0	0
Crime	0	5	0	0	0	0	0	0	0	0	0
Environment	0	5	0	0	0	0	0	0	0	0	0
Elections	0	5	10	0	0	0	0	0	0	0	0
Contracts	0	5	10	0	0	0	0	0	0	0	0

Source: World Wide Web Foundation (2017)

6.3. Appendix C – Global Open Data Index (GODI)

Table C.1: Global Open Data Index (GODI)'s list of data categories and mandatory characteristics

Category	Characteristics
Budget	• Budget for each national government department, ministry, or agency • Descriptions for budge sections • Level of granularity – budget separated into sub-department, political programme, or expenditure type
Spending	• Government office which had the section • Date of transaction • Name of vendor • The nominal amount of individual transaction • Individual record of each transaction
Procurement	• Tender per government office • Tender name • Tender description • Tender status • Awards per government office • Awards title • Awards description • Value of the award • Supplier's name
Election Results	• Results for major national electoral contests (such as general elections) • Number of registered voters • Number of invalid votes • Number of spoiled votes (not required, if a digital voting system is assessed, that does not recognize spoiled votes) Level of granularity • Data Available at polling stations level
Company Register	• Name of the company • Company address • Unique identifier of the company • Register available for the entire country (usually assessed through sample: it is answered with "Yes" if a register indicates companies in different regions
Land Ownership	• Parcel boundaries • Parcel ID • Property Value (price for transaction or tax value) • Tenure Type (public, private, customary, etc.)
National Maps	• Markings of the national traffic routes • Markings of relief/heights • Markings of the water stretches • National borders coordinates – Note: to qualify, data must contain geographic projections that enable to interpret coordinates
Administrative Boundaries	• Boundary level 1 • Boundary level 2 (not required, if the country has only one level) • Coordinates of the administrative zone (latitude, longitude) • Borders of polygon – Note: to qualify, data must contain geographic projections that enable to interpret coordinates • Name of polygon
Locations	• Zipcodes addresses (required if zip code does not include the address) • Coordinates (latitude, longitude) • Data available for the entire country – Note: to qualify, data must contain geographic projections that enable to interpret coordinates

National Statistics	• Country population (required: census data, updated every year, Optional: vital statistics of births and death) • Gross Domestic Product (measured in current or constant prices, updated quarterly, the last update must not be more than 3 months ago) • National unemployment (absolute numbers, or expressed as a percentage of the entire population, updated quarterly, the last update must not be more than 3 months ago)
Draft Legislation	• Content of bill • Author of bill • Status of bill • Available for current legislation period • Votes on bill per member of parliament (Optional) • Transcript of debates on a bill (Optional)
National Law	• Content of the law/status • Date of last amendment • Amendments to the law (if applicable)
Air Quality	• Particulate matter (PM) • Sulphur oxides (SOx) • Nitrogen oxides (NOx) • Carbon monoxide (CO) • Ozone (O3) • Available per air monitoring station (at least for 3 major cities) • Volatile organic compounds (VOCs) (Optional)
Water Quality	• Faecal coliform • Arsenic • Fluoride levels • Nitrates • Total dissolved solids • Data per water source • Available for the entire country

Source: Open Knowledge Foundation (2016)

Table C.2: Non-scored questions under the Global Open Data Index (GODI) and rationale

Question	Rationale
Is the data collected by the government (or a third-party related or linked to government)?	Data collection by itself is not a characteristic of 'open' data. Our knowledge of edge cases or exceptions from the rule (such as legal arrangements of data publication in cases of public-private partnerships) is too limited to develop valid statements about a reasonable scoring.
Is the data available online at all?	We currently do not aim to reward mandatory registration. Administrative processes may entail terms of use that contradict open data: such as agreeing to terms of use. A zero score is a indicates to governments that their way of online publication is not ideal for all user groups.
Where did you find the data?	This is a subjective assessment. The results may be affected by a submitter's topical expertise or familiarity with government websites.
How much human effort is required to use the data? (1 = little to no effort is required, 3 = extensive effort is required)	The question is a subjective assessment. Furthermore, usability depends on the context and the purposes for which a person wants to use the data.

Source: Open Knowledge Foundation (2016)

6.4. Appendix D – Statistical Capacity Indicator (SCI)

Table D.1: Statistical Capacity Indicator (SCI) assessment

Category	Indicator	Score
Methodology	Balance of payments manual in use	1 if adopting the latest edition
	Consumer price index base year	1 if the base year is within the last 10 years
	External debt reporting status	1 if data is for preliminary and actual
	Government finance accounting	1 for consolidated accounts
	Import and export price indexes	1 if data is available monthly
	Industrial production index	1 if data is available monthly
	National accounts base year	1 if annual chain linking is adopted or base year is within the last 10 years
	National immunization coverage	1 if the government's official estimate on measles vaccine coverage is consistent with the WHO/UNICEF estimate
	Special Data Dissemination Standard	1 for subscribing countries
	UNESCO reporting	1 if the country reported at least 3 times in the past 4 years
Source Data	Agricultural census	1 if the country had a census at least once in the last 10 years
	Health survey	1 if the survey is conducted at a frequency of 3 years or less; score ½ if 5 years or less
	Population census	1 if the country had a census at least once in the last 10 years
	Poverty survey	1 if the survey is conducted at a frequency of 3 years or less; score ½ if 5 years or less
	Vital registration system coverage	1 if the country is judged to have complete registries of vital (birth and death) statistics
Periodicity	Access to water	1 or ½ if primary estimates are observed for at least 2 or 1 for the past 6 years respectively
	Child malnutrition	1, 2/3 or 1/3 if the periodicity of the indicator is 3 years or less, 5 years or less, or more than 5 years respectively
	Child mortality	1 if the national or international estimate is available for reference years
	Gender equality	1, 2/3 or 1/3 if the indicator is observed for 5, 4-3 or 2-1 out of the latest 5 years respectively
	HIV/AIDS	1 if a national or international estimate is available in the last 3 years
	Immunization	1 if the periodicity of the indicator is annual
	Income poverty	1, 2/3 or 1/3 if the periodicity of the indicator is 3 years or less, 5 years or less, or more than 5 years respectively
	Maternal health	1, 2/3 or 1/3 if the periodicity of the indicator is 3 years or less, 5 years or less, or more than 5 years respectively
	Per capita GDP growth	1, 2/3 or 1/3 if the periodicity of the indicator is annual, 1.5 years or less, or more than 1.5 years respectively
	Primary completion	1, 2/3 or 1/3 if the indicator is observed for 5, 4-3 or 2-1 out of the latest 5 years respectively

Note:
- For each indicator, 1 is the full score. If an indicator does not fulfil the criteria in the 'Score' column, the score is 0.
- Rows in red are indicators that Malaysia did not receive a full score in 2019.

Source: World Bank (2020b)

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