

Current Practices and Issues in the Accounting for Government Infrastructure Assets

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Abstract

Purpose: This paper aims to explore the current accounting practices and issues in accounting for infrastructure assets in Malaysian public sector organisations. Comparatively, this paper also provides an overview of current practices in other countries.

Design/ Methodology/ Approach: Data collection was through reviews of extant literature, accounting standards and guidelines by the Accountant General's Department of Malaysia (AGD), including guidelines and government publications in other countries.

Findings: Accounting practice for infrastructure assets varies across countries. There is no specific accounting standard for infrastructure assets. Instead, most countries including Australia, Austria, Canada, France, New Zealand and Malaysia follow the accounting standards for property, plant and equipment to account for infrastructure assets. However, given the unique nature of infrastructure assets, there are issues in identifying what constitute infrastructure assets and determining which government organisations have control over their assets. In addition, challenges in recognition and valuation of infrastructure assets, which include initial and subsequent measurement, depreciation and disclosure also exist.

Practical Implications: The government's spending for infrastructure assets represents a significant proportion of its budget. Therefore, accurate accounting treatments and reporting of the assets is pivotal. This paper aims

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to present an update to policy makers and practitioners on current pertinent accounting standards, issues and accounting practices at the international level as well as at the Malaysian federal government.

Originality/ Value: Research on accounting for infrastructure assets is still limited. Findings from this research will add to the body of knowledge by highlighting the main issues and providing basis for further investigation.

Keywords: Infrastructure assets, definition, recognition, IPSAS17, MPSAS17.

1.0 Introduction

The Malaysian Government has decided to follow the International Public Sector Accounting Standards (IPSAS) accrual-based accounting issued by the International Public Sector Accounting Standards Board (IPSASB) since 2011. The responsibility to convert IPSAS to Malaysian Public Sector Accounting Standards (MPSAS) is held by the AGD. By middle of 2022, Malaysia has adopted and introduced 36 MPSAS out of 44 IPSAS issued by the IPSAS Board.

Although the official mandate to report financial statements using accrual-based accounting method has not been observed, most government agencies, especially at federal and state levels, have started to record and report internally using the financial statements input via a computerised accounting system. Several studies have reported on problems faced by the accounting personnel in complying with MPSAS, especially in accounting for assets (Abu Hasan, Saleh and Isa, 2022; Rosli, Kasim and Kamaluddin, 2020; Rosli, Hasbolah and Yahya, 2019; Ismail, Abdullah and Zainuddin, 2013). Even though the AGD had conducted many trainings and workshops, the issues persist. One of the difficulties in applying the accounting standards for property, plant and equipment (PPE) is accounting for infrastructure assets. Studies and publications that examined and offered solutions to problems faced in the Malaysian public sector accounting treatment of assets, particularly on infrastructure assets, are limited.

Therefore, this paper aims to explore current accounting practices and issues in accounting for infrastructure assets in public sector organisations. Additionally, the paper will provide an overview of current practices in other countries. In the next section, background of accounting for government infrastructure assets are elaborated, followed by the methodology adopted, discussion on global issues which surrounded accounting for infrastructure assets by governments and the current practice in Malaysia. Then, this paper ends with a conclusion.

2.0 Background of Accounting for Government Infrastructure Assets

In serving the public, governments control and maintain a significant amount of infrastructure assets (Dollery, Kortt and Grant, 2013). Usually, infrastructure assets include roads, bridges, water and sewerage networks, stormwater drainage, buildings and structures related to utilities, energy, environment, social and defence. Infrastructure assets also take up a major proportion of the total assets, especially for local governments and several ministries of the federal government (Ivannikov and Dollery, 2020). Pilcher (2005) reported that the

carrying value of infrastructure assets in the New South Wales local government constituted an average of 60% of the total depreciable assets. Ivannikov and Dollery (2020) also wrote about the problems with depreciation and valuation of infrastructure assets in Australia that occurred since the public sector adopted accrual accounting in 1991. The Australian Government also struggles to apply the well-established private sector accounting principles as the accounting principles are mainly not relevant to government infrastructure assets (Ivannikov and Dollery, 2020). Government infrastructure assets are unique since they are significantly costly, have very long and sometimes uncertain lives. The assets are not meant to be sold and are operated to service the public and not for profits.

Ouda (2016) wrote that recognition for public infrastructure can be complex because it has been acquired in different ways. Consequently, governments cannot afford to ignore the infrastructure assets since they are significant and important in government operations (Farias, 2020; Pallot, 1997). Pallot (1997) highlighted the importance of capturing these assets to avoid underestimating resources which the government controls, while IPSAS also advised infrastructure assets to be accounted for adequately because of their service potential. There is also growing interest amongst researchers and academics on the topic of how government identifies and accounts for infrastructure assets (Pallot, 1997; Vermeer, Patton and Styles, 2011).

Infrastructure asset is defined by the Organization for Economic Cooperation and Development (OECD) as “the system of public works in a country, state or region, including roads, utility lines and public building - in essence the tangible backbone of essential goods and services underpinning an economy” (OECD, 2021, p. 15). Infrastructure assets are the physical structures and systems owned and operated by government entities and are usually developed to provide essential services to the public and support economic activities. Some common examples of government infrastructure assets include:

- i. Transportation Infrastructure - which facilitates the movement of people, goods, and services within and between regions, including roads, highways, bridges, tunnels, railways, airports, seaports, and public transit systems.
- ii. Utilities Infrastructure - which ensures the provision of essential services like clean water, electricity, gas, and communication services, comprises water supply systems, wastewater treatment plants, electric power grids, natural gas distribution networks, and telecommunications networks.
- iii. iPublic Buildings - which serve various public functions and provide essential services to the community, including courthouses, government offices, schools, libraries, hospitals, prisons, and recreational facilities.
- iv. Water Infrastructure - which supports water storage, supply, and distribution for domestic, industrial, and agricultural purposes involving infrastructure for water management, including dams, reservoirs, canals, pipelines, and water treatment plants.
- v. Water Infrastructure - which supports water storage, supply, and distribution for domestic, industrial, and agricultural purposes involving infrastructure for water management, including dams, reservoirs, canals, pipelines, and water treatment plants.

- vi. Environmental Infrastructure which is designed to manage waste disposal, recycling, and environmental protection, encompassing landfills, recycling facilities, wastewater treatment plants, and pollution control systems.
- vii. Social Infrastructure which provides essential services and supports social well-being within communities, comprising facilities such as schools, hospitals, childcare centres, parks, and community centres.
- viii. Defence and Security Infrastructure - which contributes to national defence, public safety and disaster management, encompassing military bases, defence installations, police stations, fire stations, and emergency response facilities.

As infrastructure assets are quite robust, accounting standards for these assets are somewhat flexible, providing extent for countries to interpret and adapt towards their country's needs. IPSASB has decided that infrastructure assets require no separate definition because the assets are part of property plant and equipment. Nevertheless, IPSASB agreed on the importance of specifying the features of infrastructure assets so that the assets can be distinguished from general property, plant and equipment. Specifying the features of infrastructure assets also helps to avoid complexities in the application and implementation of existing principles.

The most notable accounting standards for infrastructure assets is the IPSAS, which is a set of accounting standards developed by the IPSASB for the public sector, including governments. IPSAS provides guidelines for recognising, measuring, presenting and disclosing infrastructure assets in government financial statements, which cover various aspects of infrastructure accounting, including valuation, depreciation, and impairment. Many countries have adopted IPSAS, including Malaysia.

Several countries which are exemplary in their governments' accrual accounting adoption are also considered excellent in their accounting practices related to government infrastructure assets. Amongst those countries are Australia, New Zealand, United Kingdom, Canada and Singapore. These countries are recognised for their transparent, consistent and comprehensive accounting practices for government infrastructure assets. They prioritise accurate valuation, depreciation estimation, disclosure, and effective asset management systems to ensure proper stewardship of public infrastructure.

In the United States, Governmental Accounting Standards Board (GASB) is the responsible body to create accounting and financial reporting standards for state and local governments. GASB Statements, for example, GASB Statement No. 34 and GASB Statement No. 42, provide guidance on accounting and reporting for infrastructure assets. These standards require governments to report infrastructure assets in their financial statements, including valuation, depreciation and disclosure of condition assessment information. In the United Kingdom, central government departments use the Financial Reporting Manual (FReM) for financial reporting. The FReM provides guidance on the accounting treatment of infrastructure assets, which covers recognition, measurement, depreciation and disclosure requirements.

In Australia, the Australian Accounting Standards (AAS) issued by the Australian Accounting Standards Board (AASB), provide accounting guidance for both private and public sectors in Australia. AASB 116 - Property, Plant and Equipment, and AASB 13 - Fair Value Measurement

are relevant accounting standards for government infrastructure assets. Therefore, Australia has a comprehensive accounting framework for infrastructure assets. The AAS provides guidance on recognition, measurement, and disclosure of infrastructure assets. The country has well-defined asset management plans, detailed asset registers and regular condition assessments. The use of advanced asset management systems and extensive reporting enhances transparency and accountability.

New Zealand follows the IPSAS for its government accounting, including infrastructure assets. The government has a robust infrastructure asset management system which includes regular condition assessments, comprehensive asset registers and long-term planning. New Zealand's accounting practices focus on accurate valuation, depreciation estimation and disclosure of infrastructure assets. The United Kingdom has a strong accounting framework for government infrastructure assets. The FReM provides guidance on recognition, measurement and disclosure of infrastructure assets. The United Kingdom Government has implemented comprehensive asset management systems, including condition assessments and performance indicators to ensure effective management of infrastructure assets.

Canada follows the Canadian Public Sector Accounting Standards (PSAS) for accounting in the public sector, including infrastructure assets. The country has established rigorous asset management practices, including regular condition assessments, performance evaluations, and long-term planning. Canada's accounting practices emphasise accurate valuation, depreciation estimation and disclosure of infrastructure assets. Singapore has well-developed accounting practices for government infrastructure assets. The country follows the IPSAS and has established a robust asset management system. Singapore emphasises accurate measurement and valuation of infrastructure assets, regular condition assessments and effective long-term planning to ensure sustainability and proper maintenance of infrastructure assets.

Specific reporting practices for government's infrastructure assets vary across countries, depending on the adoption of specific reporting framework such as the IPSAS, GASB standards or country-specific regulations. Nevertheless, the reporting is usually done through various financial statements and reports, such as:

- i. Statement of Financial Position (Balance Sheet): Infrastructure assets are typically reported on the balance sheet as a component of PPE. Information on the carrying amount of infrastructure assets, including their historical cost, accumulated depreciation and net book value is provided in the balance sheet.
- ii. Notes to the Financial Statements: Detail disclosure is also made in the notes to the financial statements regarding infrastructure assets. Disclosures include the valuation methods used, depreciation policies, useful lives, major categories of infrastructure assets, significant accounting judgements, and any impairment assessments conducted.

- iii. Management Discussion and Analysis (MD&A): Some governments provide an MD&A section within their financial reports. This section will include discussions on infrastructure assets, such as changes in the condition or performance of assets, major projects completed or underway, funding arrangements and long-term infrastructure plans.
- iv. Infrastructure Asset Registers: Many governments maintain comprehensive infrastructure asset registers, which provide detailed information on each asset, including its location, characteristics, condition, maintenance history, and estimated useful life. Although these registers may not be part of the financial statements, they are considered a supporting documentation for accurate reporting.
- v. Performance Reports: Governments may issue separate performance reports or infrastructure asset management reports to provide more specific information on the condition, performance and future plans for infrastructure assets. These reports may include infrastructure investment strategies, asset maintenance plans, performance indicators and assessments of service delivery provided by the infrastructure assets.
- vi. Specialised Reports or Audits: In some cases, governments may commission specialised reports or audits, specifically focusing on infrastructure assets. These reports may assess the condition and performance of assets, evaluate their financial sustainability or provide recommendations for improvement in asset management practices.

3.0 Methodology

To achieve the aim of this paper, data were gathered through reviews of extant literature, accounting standards and guidelines by the AGD. These included Interpretation of Accounting Policies, *Garis Panduan Pelaksanaan Perakaunan Akruan Bil. 1 Tahun 2013 - Aset Kerajaan Asas Akruan*, *Surat Pekeliling Akauntan Negara Malaysia (SPANM) Bil. 3 Tahun 2022 - Tatacara Perakaunan Aset Bukan Kewangan Kerajaan* and *Manual Perakaunan Akruan*. In addition, public sector accounting standards and guidelines in other countries were also examined.

4.0 Issues in Accounting for Governments' Infrastructure Assets

Concerns over governments' accounting for infrastructure assets is substantial because of a large proportion of government's budget and spending goes to the assets (IFAC, 2023). Accurate accounting treatments and reporting of infrastructure assets is extremely important due to the political, social and economic importance of public infrastructure assets, even more so with the implementation of accrual accounting in the public sector (Ivannikov and Dollery, 2020; Pilcher, 2005). Heightened public concerns on the deterioration and maintenance of these public assets have further exacerbated the need for accurate reporting of these assets (IFAC, 2023). Even after more than 30 years of debate, the challenges in determining the best accounting treatments for the assets are still unresolved and no consensus is reached (Lombardi, Schimperna, Smarra and Sorrentino, 2021; Simpkins and Jensen, 1995; Micallef, Sutcliffe and Doughty, 1994; Pallot, 1994; Rowles, 1992).

Furthermore, the absence of separate global public sector accounting standards for infrastructure assets has compounded the challenges in accounting for infrastructure assets. Currently, IPSAS 17 - Property, Plant and Equipment serves as the relevant accounting standards for infrastructure assets. However, various parties had challenged the suitability of IPSAS 17. For example, the European Commission commented that the standard is “problematic for the accounting and measurement of public infrastructure” (European Commission, 2013, p. 113). Consequently, in 2015 IPSASB decided to initiate a project brief to revise IPSAS 17 to provide additional guidance as well as clarity to accounting treatments for infrastructure assets (IPSASB, 2015). However, due to many technical difficulties in recognition, depreciation and measurement, the project was put on hold in December 2017. The project was reactivated in June 2019, with a new task force. The aim of the task force is to identify challenges and difficulties in applying the principles of IPSAS 17 to infrastructure assets and to develop an exposure draft and recommendation for revising IPSAS 17. Amongst the issues highlighted by the task force were definition, control of infrastructure assets, recognition of capital vs maintenance expenditure; measurement of initial value, depreciation, componentisation and disclosures (IPSASB, 2019a). In May 2023, IPSASB announced that IPSAS 17 was to be replaced by a new standard IPSAS 45 by 2025.

Issues involving recognition, measurement and disclosure of assets and liabilities are found to be one of the most difficult issues to resolve (Caruana, 2021). Difficulties in reporting assets and liabilities, including infrastructure assets, were found to be one of the stumbling blocks to full implementation of accrual accounting in many countries (Dollery et al., 2013; Ivannikov and Dollery, 2020; Pilcher, 2005). The common problems in accounting for infrastructure assets vary from identifying the assets, locating the assets, determining control/ ownerships, estimating initial values and subsequent maintenance costs, and many more. Upon reviewing previous published research on the challenges in accounting for infrastructure assets in the public sector, it can be summarised that the main obstacles are related to definition; control; valuation; componentisation; depreciation and useful life; deferred maintenance; capitalisation policies; intangible assets; and reporting and disclosures.

4.1 Definition and Control

4.1.1 Definition

The first challenge in accounting for infrastructure assets is to determine what constitutes infrastructure assets. This problem is further compounded by the absence of specific accounting standards for infrastructure assets. Internationally, the accounting standard for PPE, IPSAS 17, is used as guidance for accounting for infrastructure assets. Generally, infrastructure assets have been defined as assets “(a) held for use in the production or supply of good services, for rental to others, or administrative purposes; and (b) expected to be used during more than one reporting period” (IPSASB, 2020a, para 13). In Para 21, IPSASB (2020a) stated the features of infrastructure assets as immovable, highly specialised part of a system or network, and have no alternative or restricted uses.

The definition of infrastructure assets has been further refined by certain bodies. For example, the Canadian Institute of Chartered Accountants (CICA) defined infrastructure assets as “systems used for utility operations including water and sewer systems, hydro-electric systems and telecommunications; roads including highways, other roadways, bridges and traffic control;

transportation including transit systems, airports, seaports, tunnels and seaways; and flood control including dams, canals, locks and drainage” (CICA, 2002, p. 2). Fourie (2006) opined that infrastructure assets might be viewed from a social point and could include schools, libraries, universities, clinics, hospitals, courts, museums, theatres, playgrounds, parks, fountains and statues. On the other hand, the assets have been defined as “all non-current assets comprising the public facilities that provide essential services and enhance the productivity capacity of the economy” (Tasmania Treasury and Finance, 1995, para A2). The identified assets include roads, bridges, railroads, water supply and sewerage systems, power generation and distribution networks.

Most countries, except for the United States, do not have a specific definition for infrastructure assets but provide some examples of the assets. In essence, it could be concluded that there is a need for a universally accepted definition of infrastructure assets for the public sector to facilitate more accurate accounting treatments and reporting towards better accountability, governance and improved decision making.

4.1.2 Control

To establish control of infrastructure assets is another important issue in identifying parties responsible for recording the assets in their annual financial reporting (Farias, 2020). IPSASB (2019b, pp. 6-7) noted that the complexity in establishing control for infrastructure assets could be due to their unique features as follows:

- i. Infrastructure assets that are legally owned by other entities may be managed or operated by another entity.
- ii. Infrastructure assets may be jointly controlled by two or more entities. Land and infrastructure assets acquired together may be controlled or operated by different parties.
- iii. Access rights; right of ways; or easements are granted over the land for transportation purposes, electrical transmission lines and oil and gas pipelines, which may or may not revert to its original owners.
- iv. Infrastructure assets belonging to the central government are usually transferred to other public or private sector entities, which control the use of the infrastructure assets and can derive economic benefit or service potential from them.
- v. Infrastructure assets may cross more than one jurisdiction.

In the case of concession infrastructure assets, the issue of control is further deliberated by IPSASB as the current standard does not provide sufficient guidance. Control could not be clearly established, especially in cases when the grantor and operator are difficult to identify in the concession arrangement (IPSASB, 2019b, pp. 6-7). This identification is important because the assets are owned by grantor, and thus will be recognised in the grantor’s financial statements while operator operates and maintains the assets. Complications may also arise because the grantor does not have the capital expenditure and maintenance information as the assets are operated and maintained by a third party.

In determining control of infrastructure assets, Farias (2020) proposes the following practical approach as possible solution (Figure 1):

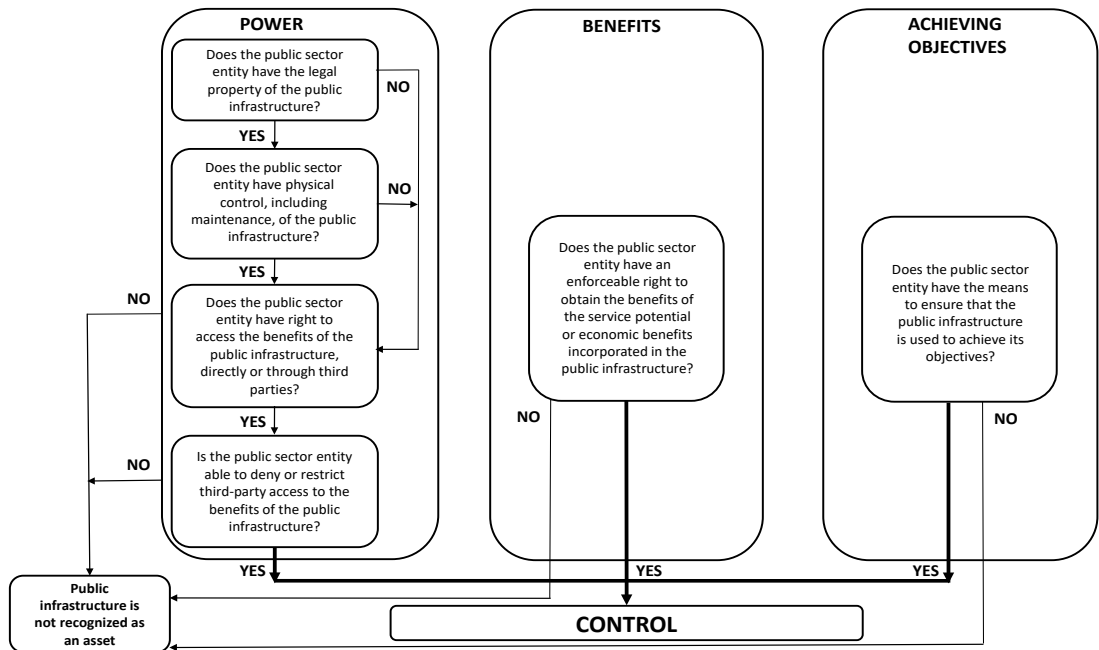


Figure 1: Practical approach for the evaluation of control. (Farias, 2020, p. 538)

4.2 Recognition and Measurement

Governments around the world allocate a huge portion of their budgets for infrastructure assets to spur economic growth and serve their citizens. Félio (2006) noted that developed countries tend to face more challenges with maintenance costs of existing infrastructure assets, while developing countries are more involved in new constructions. As infrastructure assets have longer service life, distinguishing capital and maintenance is critical in determining capital costs against expenditure. IPSASB recognised the lack of clear guidance on accounting for infrastructure assets in IPSAS 17 and embarked on a project with the objective “to develop enhanced guidance clarifying the recognition and measurement of infrastructure and heritage assets that are property, plant, and equipment” (IPSASB, 2022, p.1). Lombardi et al. (2021) asserted that it has been widely recognized that clear policies regarding what costs should be capitalised and what should be expensed during the construction or acquisition of infrastructure assets are critical in the recognition of infrastructure assets. Clearer guidance on which costs can be recognised as direct construction costs, overheads or financing costs can be subjective and require consistent application across different projects to ensure consistent capitalisation policies. This is relevant to the call for greater transparency in reporting, government faithful representation of spending on infrastructure assets as well as to ascertain the need for maintenance of those assets (IFAC, 2023). In addition, specific policies or guidance on how to account for additional costs to maintain and/ or upgrade the infrastructure assets are important. The practices observed in different countries are varied. The following subsections cover detailed discussions related to recognition and measurement.

4.2.1 Determination of Initial Value

IPSAS 17 states that the initial value infrastructure assets can be recorded either at historical cost or current value. Determining the accurate value of government infrastructure assets is a complex exercise since infrastructure assets, such as roads, canals, bridges, and utilities, have very long useful lives and often involve huge initial costs. Determination of the value of these assets requires consideration of factors, such as construction costs, depreciation and estimated future maintenance expenses. Moreover, the process can be challenging because to acquire reliable valuation figures can be challenging and could potentially lead to inaccuracies in financial reporting (Ivannikov and Dollery, 2020).

4.2.2 Subsequent Measurement and Depreciation

Subsequent measurement of infrastructure assets represents another challenge in accounting for infrastructure assets. Specifically, IPSASB (2019b) highlighted the challenges in subsequent measurement, such as difficulties in deciding subsequent measurement bases, complexity in determining the threshold of subsequent costs, lack of guidance to distinguish subsequent costs and inadequate guidance for deferred maintenance costs.

Another challenging issue is to estimate the depreciation and useful life of government infrastructure assets. The unique nature of infrastructure assets, including very long service life which can extend to several decades, as well as uncertainty and subjectivity in predicting the future condition and lifespan of the assets can further complicate the issue. Therefore, appropriate depreciation method and useful life are pivotal for accurate cost allocation.

Furthermore, the issue of deferred maintenance, where infrastructure assets require repairs or upgrades beyond their typical maintenance schedules due to inadequate funding or budget constraints, can be perplexing. This is especially so in the case of concession infrastructure assets where maintenance expenditures are incurred by the operator of the assets not the grantor/ owner. Questions arise on determining proper treatments for these deferred maintenance costs and identifying the impact on asset values and depreciation calculations. The assets are recognised by the grantor who are not privy to the information related to the deferred maintenance costs incurred by the operator. In such cases, the grantor would not be able to account for deferred maintenance costs, which can lead to understated asset values and inaccurate financial statements.

4.3 Componentisation

Componentisation refers to “disaggregation of asset into different parts, with several useful lives and replacement costs” (IPSASB, 2019a, para 4.15). Componentisation enables the distinction between infrastructure assets and other long-term assets, which would have significant effects on their depreciation methods. IPSAS 17 states that only the component approach is to be applied. However, the practices worldwide vary (refer to Table 1). Certain countries, including New Zealand, adopt only the component method, while Canada permits both the component approach and whole asset approach. On the other hand, other countries, such as Australia, Austria, France and the US do not adopt the component approach (Lombardi et al., 2021).

However, in view of the complex nature of infrastructure assets, IPSASB in its subsequent review, stated that componentisation approach may not be suitable for infrastructure assets. The following statement was issued to support the view: “There can be the diversity of practice in what constitutes a component... Unnecessary detailed disaggregation of a network can lead to increased costs, as each component has to be valued and has a separate useful life” (IPSASB, 2019a, para 4.15).

On the other hand, CICA (2002) opined that componentisation is necessary for infrastructure assets as it would bring several benefits in managing the assets. Detailed information on each component would provide relevant information for better management and control of the assets.

4.4 Reporting and Disclosure

IPSAS 17 requires governments to disclose relevant information about their infrastructure assets in financial statements and other reports. Despite that, the accounting practices across countries vary, as shown in Table 1. The table summarises the accounting treatments (definition, recognition, measurement, measurement-component approach, disclosure) for infrastructure assets as required by IPSAS 17 and as practised in several countries worldwide, namely Australia, Austria, Canada, France, the United States, and New Zealand. The unique nature of infrastructure assets has resulted in complexities in recognition, valuation and disclosures. This is further exacerbated by lack of specific accounting standards for infrastructure assets, resulting in difficulties in establishing transparent and comparable information, which caused inconsistencies in reporting and disclosures across different countries.

Table 1: Accounting for Infrastructure Assets by the Main Standard Setters Worldwide

| | Definition | Recognition | Measurement | Measurement-Component Approach | Disclosure |
|----------|--|---|--|---|---|
| IPSAS 17 | No specific definition, only characteristics usually displayed by infrastructure assets are listed. Some examples of infrastructure assets are provided. | General property, plant and equipment recognition criteria are to be applied: (i) probable economic benefits; (ii) reliably measured. | Infrastructure assets are initially measured at cost (in exchange transactions) or fair value (in non-exchange transactions). Either the cost or the revaluation model can be applied for subsequent measurement purposes. | Only the component approach is to be applied. | General property, plant and equipment recognition criteria are to be complied with. |

| | Definition | Recognition | Measurement | Measurement-Component Approach | Disclosure |
|----------------------------|--|---|--|---|---|
| CGAS 6 (France) | No specific definition. Three specific categories of infrastructure assets are identified. | General property, plant and equipment recognition criteria are to be applied: (i) controlled; (ii) reliably measured. Additional guidance is provided for determining economic ownership of the infrastructure assets and for the recognition of successive expenditures. | Infrastructure assets are initially measured at cost (in exchange transactions) or fair value (in non-exchange transactions). Only the cost model is used for subsequent measurement purposes. | The component approach is not applied. | General property, plant and equipment recognition criteria are to be complied with. Disaggregation of the infrastructure assets in the notes. |
| National rule (Austria) | No specific definition. Two specific categories of infrastructure assets are identified. | General property, plant and equipment recognition criteria are to be applied: (i) probable economic benefits; (ii) reliably measured. Additional guidance is provided for the recognition of successive expenditures. | Infrastructure assets are initially measured at cost. Only the cost model is used for subsequent measurement purposes. | The component approach is not applied. | General property, plant and equipment recognition criteria are to be complied with. Disaggregation of the infrastructure assets in the notes. |
| GASB 34 (United States) | A more specific definition is provided. Some examples of infrastructure assets are provided. | General property, plant and equipment recognition criteria are to be applied. | Infrastructure assets are initially measured at cost. 'Modified approach' can be used for subsequent measurement purposes. | The component approach is not applied. | General property, plant and equipment recognition criteria are to be complied with. Description of 'modified approach', if any, in the notes. |
| PSAB section 3150 (Canada) | No specific definition. No examples of infrastructure assets are provided. | General property, plant and equipment recognition criteria are to be applied. | Infrastructure assets are initially measured at cost. Only the cost model is used for subsequent measurement purposes. | Either component approach or whole asset approach can be applied. | General property, plant and equipment recognition criteria are to be complied with. |

| | Definition | Recognition | Measurement | Measurement-Component Approach | Disclosure |
|----------------------------|--|---|--|---|---|
| AASB 116 (Australia) | No specific definition. No examples of infrastructure assets are provided. | General property, plant and equipment recognition criteria are to be applied: (i) probable economic benefits; (ii) reliably measured. | Infrastructure assets are initially measured at cost (in exchange transactions) or fair value (in non-exchange transactions). Either the cost or the revaluation model can be applied for subsequent measurement purposes. | The component approach is not applied. | General property, plant and equipment recognition criteria are to be complied with. |
| PBE IPSAS 17 (New Zealand) | No specific definition, only characteristics usually displayed by infrastructure assets are listed. Some examples of infrastructure assets are provided. | General property, plant and equipment recognition criteria are to be applied: (i) probable economic benefits; (ii) reliably measured. | Infrastructure assets are initially measured at cost (in exchange transactions) or fair value (in non-exchange transactions). Either the cost or the revaluation model can be applied for subsequent measurement purposes. | Only the component approach is to be applied. | General property, plant and equipment recognition criteria are to be complied with. |

(Source: Lombardi et al., 2021, p. 209)

5.0 Current Practice of Accounting for Infrastructure Assets in Malaysia

This section provides an overview of current practice on accounting for government infrastructure assets in Malaysia. The discussion is based on information available from archival search which include documents available on the AGD's website. There are several studies in Malaysia which reported on issues faced in government's asset management and accounting, but close to none reported specifically on the infrastructure assets. Although the Malaysian federal government has implemented the accrual basis MPSAS since 2018, there are still issues related to accounting treatments and reporting (Abu Hasan et al., 2022). Syed Ali, Sheung and Mohd Razali (2019) who studied the asset management system (adoption of MPSAS 17, IPSAS 21, and IPSAS 26) at public universities reported that MPSAS 17 had not been strictly adhered and the recognition were still at initial stage, which was possibly due to the five-year transitional provision given. Abdullah and Muhammad (2020) reported the opening balance of assets were overstated because depreciation was not accounted for during data migration into the Integrated Government Financial Management Accounting System (iGFMAS) as of July 2019. Opening balance of the asset was imported directly from the previous asset information system known as Movable Asset Management Monitoring System (SPA) and Immovable Asset Management system (mySPATA). The asset management information system is commendable because it supports the asset management of

government agencies in terms of registering, monitoring the movement of assets, maintenance and disposal records (Mahadi and Hussin, 2007). However, according to Basnan et al. (2013), mySPATA has limited capacity, it records assets only by categories without the maintenance costs or depreciation which leads to difficulty in determining the actual value of assets.

Accounting for infrastructure assets follows the requirements of MPSAS 17. In addition, guidelines on infrastructure assets can also be found in various circulars, including *Garis Panduan Pelaksanaan Perakaunan Akruan Bil. 1 Tahun 2013 - Aset Kerajaan Asas Akruan* and *SPANM Bil. 3 Tahun 2022 - Tatacara Perakaunan Aset Bukan Kewangan Kerajaan*.

The management of infrastructure assets is placed under various departments. As stated in *SPANM Bil. 3 Tahun 2022*, infrastructure assets and buildings are under Public Works Department, sewerage is under Sewerage Services Department while water is under Irrigation and Drainage Department. When the government decided to implement accrual accounting, a taskforce was formed. The taskforce comprising representatives from the AGD, accountants and technical personnel from the relevant departments. The technical personnel were responsible for determining the value of government's assets.

One of the main issues in accounting for infrastructure assets is lack of clarity in the definition of the assets, which is what constitutes infrastructure assets (IPSASB, 2019a; European Commission, 2017). MPSAS 17 (para 21) on PPE stated that while there is no universally accepted definition of infrastructure assets, the assets category comprises some or all the following characteristics:

- i. They are part of a system or network.
- ii. They are specialised in nature and do not have alternative uses.
- iii. They are immovable.
- iv. They may be subject to constraints on disposal.

In Malaysia, infrastructure assets are grouped under immovable non-financial assets and defined as: "A basic facility construction that forms a network system to provide services to the community, which include roads, water, sewerage and other infrastructure such as airports, ports, jetties, electrical power supply systems, telecommunication systems and power station complexes" (AGD, 2022, p. 38).

AGD issued the Federal Government Accrual Accounting Manual to provide further guidelines for the implementation of accrual accounting. However, the Accounting Manual for Property, Plant and Equipment (MPA 5, 2021) does not provide any references to infrastructure assets. The *Garis Panduan Pelaksanaan Perakaunan Akruan Bil. 1 Tahun 2013* provides guidelines on useful life of assets for depreciation purposes for various infrastructure assets, but no definition is given. Infrastructure assets are also not specified in the Interpretation of Accounting Policies (Revised 2019) issued by the AGD.

Abu Hasan et al. (2022) studied the state governments adoption of MPSAS has reported several issues or challenges with regard to valuation of the assets, especially in specific cases whereby the assets are operated by a third party (concession assets), assets which are

taken over from private/ local authority/ state government - determination of initial value and the service life, lack of information on additional costs incurred by the third party for repairs and maintenance, asset impairment and asset disposal.

Currently, straight line method of depreciation is used by the government, except for federal road infrastructure assets which are measured using the condition-based method (CBM) based on the Federal Road Accounting Policy (FRAP). Specifically, according to FRAP:

Under this method, depreciable amount of federal roads assets shall be allocated on a systematic basis over their best estimates of useful life. CBM of FRAP are calculated based on actual condition of the road at the reporting date using road quality report issued by the Ministry of Work. The depreciation rate is measured by calculating the difference between the maximum quality and the actual quality reported based on road quality report. (Appendix A of the Interpretation of Accounting Policies Revised, 2019).

In determining depreciation, the government must decide on the useful life of infrastructure assets. The schedule provided in the *Garis Panduan Pelaksanaan Perakaunan Akruan Bil. 1 Tahun 2013* shows useful life ranges between 5 and 100 years. Facilities such as recreational and parks have a useful life of 5 years to 10 years, while facilities related to land, air and water transports, irrigation, flood control, sewerage can go up to 100 years.

Based on the above discussion, definitions of the infrastructure assets have been wide and open for inclusion of assets that are not significant in value or that should belong to other categories of property, plant and equipment. Furthermore, specific guidance to determine the useful life of infrastructure assets are unavailable which could lead to a variety of interpretation and mislead the measurement of the assets. Consequently, there could be inconsistency in the accounting and reporting of infrastructure assets across different government ministries and agencies.

6.0 Conclusion

Issues related to accounting for infrastructure assets are common in many public sectors, including Australia, Austria, Canada, France, New Zealand and the United States. Currently, there are no specific accounting standards for infrastructure assets, as they are considered to be part of property, plant and equipment. Most standards adopted by various countries do not provide a clear definition of infrastructure assets, but only characteristics and examples. Guidelines on recognition and measurement that are too general may result in inconsistent accounting treatments over time and incomparable information across governments.

This paper reports the findings from an archival search of published studies and official documents, which are only parts of a larger study on accounting issues related to infrastructure assets in Malaysia. The next phase of this study will include empirical findings from in-depth interviews with relevant stakeholders and benchmarking of best practices around the globe.

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