

Issues and Challenges in Accounting for Infrastructure Assets in the Malaysian Government and the Way Forward

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Abstract

Purpose: The current study seeks to examine the issues and challenges encountered by the Malaysian government accounting staff in recognising and measuring infrastructure assets. Additionally, recommendations for further actions by the Accountant General's Department of Malaysia (AGD) and suggestions for future research were delineated.

Design/ Methodology/ Approach: This study employed a qualitative approach through archival search and semi-structured interviews. Interviews were conducted with 52 government staff representing 10 ministries, three state governments, and three local governments. The respondents were selected through purposive sampling and snowballing techniques.

Findings: Accounting for infrastructure assets in Malaysia adheres to Malaysian Public Sector Accounting Standards (MPSAS) 17 and several other government guidelines. Several ministries experienced difficulties in identifying the infrastructure assets due to lack of clarity in the definition and flexibility of the current accounting standards and guidelines. Moreover, the unique features of infrastructure assets, namely a long useful life and being part of an asset system or network, led to challenges in recognition and measurement.

Practical Implications: The findings provided several practical recommendations for the AGD's understanding of the issues and challenges encountered by the accounting staff, which would assist in formulating policies and guidelines for infrastructure asset accounting.

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Originality/ Value: The present study significantly contributed to the existing body of literature on accounting for infrastructure assets which remains scarce in Malaysia.

Keywords: Infrastructure assets, recognition, measurement, IPSAS 17, MPSAS 17.

1.0 Introduction

Governments acquire and maintain huge amounts of infrastructure assets in delivering services to society. The Organisation for Economic Cooperation and Development (OECD) defines infrastructure asset 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 physical structures and systems encompassing infrastructures for transportation, utilities, water, energy, and public buildings employed by governments to serve citizens.

Nonetheless, numerous countries reported significant challenges in ensuring the performance of quality infrastructure assets over the life cycle of assets (OECD, 2023). The recent incident of the collapsed dam in Libya was reported as a “disaster of epic proportions” and associated with poor infrastructure maintenance and misappropriation of public funds (Al Jazeera, 2023). Therefore, proper accounting and management of the infrastructure assets are integral to high service quality while preventing calamities.

The Malaysian government has consistently allocated a significant portion of the budget for infrastructure developments through numerous Malaysian Plans. High investments provided via the 11th Malaysia Plan have contributed to various improvements in basic infrastructure and amenities. For instance, access to public health centres achieved 92.6% in 2019. Access to clean and treated water supply was 95.1%, access to broadband coverage in populated areas was 95.5%, and access to electricity supply was 98% in 2020.

In addition, access to rural paved roads reached 3,982 km from 2016 to 2020 (Economic Planning Unit, 2021). Subsequently, the government allocated RM400 billion for infrastructure development in the 12th Malaysia Plan, which was revised to RM415 billion in 2023. Thus, the plan signifies a higher governmental commitment towards infrastructure development (Key Developments, 2023).

The Malaysian government has adopted accrual-based International Public Sector Accounting Standards (IPSAS) since 2011. A total of 36 MPSAS out of 44 IPSAS developed by the International Public Sector Accounting Standards Board (IPSASB) were issued by the AGD in 2023. While the adoption of accrual accounting was challenging, introducing MPSAS and implementing the Integrated Government Financial Management Accounting System (iGFMAS) facilitated the move towards full adoption in the public sector (Abu Hasan, Saleh & Isa, 2022).

Specifically, IPSAS 17 is the reference point to account for all assets, including infrastructures. IPSAS 17 was adapted as MPSAS 17 in Malaysia to guide all governmental accounting treatments of assets. Nevertheless, IPSAS 17 and MPSAS 17 did not provide detailed descriptions and accounting treatments for infrastructure assets. As such, relevant accounting offices must clarify and standardise respective treatments of infrastructure assets within the boundaries provided by the MPSAS 17 to ensure accurate records.

Accounting for assets was found to be the most challenging in the early stages of accrual accounting adoption. Issues varied from asset identification, recognition, valuation, and disclosure (Abu Hasan et al., 2022; Rosli, Kasim & Kamaluddin, 2020; Rosli, Hasbolah & Yahya, 2019; Ismail, Abdullah & Zainuddin, 2013). Many trainings and human resources development were conducted to support the accrual accounting adoption. Numerous fixed assets were successfully accounted for after several years of introducing MPSAS 17.

Nevertheless, certain ambiguous areas persist, especially for assets commonly possessed only by governments, such as heritage, intangible, biological, and infrastructure assets. Currently, government accountants encounter challenges in recognising, measuring, and disclosing infrastructure assets, which may reduce the efforts in enhancing public spending accountability and transparency in terms of acquiring, maintaining, or disposing of assets. The brief guidelines on the assets provided in MPSAS 17 also resulted in variations in accounting practices, which was compounded by the limited comparable practices in the private sector as infrastructure assets are only common for governments.

The present study could assist the Malaysian government in understanding the issues related to accounting for infrastructure assets in public sector organisations. The findings could also assist the Malaysian government in searching for feasible solutions for the identified issues and determine the most optimal approach to implement the best accounting practices for infrastructure assets.

This study aimed to discuss the issues and challenges encountered by the Malaysian government in accounting for infrastructure assets while highlighting practices and guidelines from other countries. Several practical recommendations were also provided to resolve the encountered issues. The subsequent section reviews governmental guidelines, including MPSAS 17, and prior studies on accounting for infrastructure assets. The methodology is described in Section 3 and a discussion of the findings is delineated in Section 4. Section 5 concludes the study.

2.0 Literature Review

Infrastructure assets are the physical structures and systems possessed and operated by governmental entities at the local, regional, or national level. The assets are generally developed to provide essential services to the public and support economic activities (Miller, 2021). Well-maintained infrastructures also serve as a primary indicator to differentiate between prosperous and impoverished nations (Ojomo, 2018). Meanwhile, the infrastructure asset definition varies depending on a specific context even in governmental documents (Miller, 2021). For example, Investopedia (2023) defines infrastructure as the basic physical systems of a nation, which tends to be capital-intensive, costly, and highly vital to national economic

development and prosperity. Investopedia (2023) also categorises infrastructure into hard and soft types.

Comparatively, the Chartered Institute of Public Finance and Accountancy (CIPFA) states in Bulletin 12 that “infrastructure assets are inalienable assets, expenditure on which is only recoverable by continued use of the asset created (i.e., there is no prospect of sale or alternative use). They are often homogenous assets that work as a part of a continuous network that is maintained in a relatively steady state though there may be distinctive parts of this network, e.g., carriageways and structures, e.g., bridges. They are assets that generally have very long lives” (CIPFA, Section 1, para. 15, 2023). According to Merrit Research Services (2023), infrastructure assets are long-lasting capital assets providing value to land and tend to be part of a larger system. Certain examples are bridges, dams, tunnels, streets, sidewalks, water mains, and lighting systems.

2.1 Guidelines for Accounting of Infrastructure Assets

Public sector organisations generally adhere to the IPSAS developed by the IPSASB. Accounting treatment for infrastructure asset is included in IPSAS 17 on the Property Plant and Equipment (PPE) (IPSASB, 2020). In Malaysia, IPSAS 17 was adopted as MPSAS 17. All aspects of accounting treatments for infrastructure assets are not elucidated in IPSAS 17 except for a minimum definition. IPSAS 17 (IPSASB, 2020, para. 21, p. 542) on the PPE stated that while there is no universally accepted definition of infrastructure assets, these assets category comprises any which has 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; and
- iv. They may be subject to constraints on disposal.

IPSAS 17 will be replaced by a different standard, namely IPSAS 45, effective on 1st January 2025. While a specific definition of infrastructure assets is not provided in IPSAS 45, the characteristics to identify the assets are clearer. Furthermore, application and interpretation guidance are provided to assist in recognising and measuring infrastructure assets. Governments could distinguish infrastructure assets from other PPE types and apply suitable accounting treatments (IPSASB, 2023).

The MPSAS 17 guidelines on infrastructure assets in Malaysia are available in various circulars, including *Garis Panduan Pelaksanaan Perakaunan Akruan Bil. 1 Tahun 2013 - Aset Kerajaan Asas Akruan and Surat Pekeliling Akauntan Negara Malaysia (SPANM) Bil. 3 Tahun 2022 - Tatacara Perakaunan Aset Bukan Kewangan Kerajaan*. Infrastructure assets are categorised 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 infrastructures, such as airports, ports, jetties, electrical power supply systems, telecommunication systems, and power station complexes” (SPANM, 2022, p. 38).

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

2.2 Issues in Accounting for Infrastructure Assets

Infrastructure assets represents a major proportion of total assets in state, local governments and several ministries of federal governments (Ivannikov & Dollery, 2020). Infrastructure assets also consist of a significant portion of governmental budgets for maintenance and further development to stimulate economic growth while supporting governmental operations in delivering public services (Farias, 2020; Pallot, 1997). According to Pallot (1997), governments should account for the assets accurately to avoid underestimating the available resources. An increasing interest is also observed among researchers and academics in the topic related to how government identifies and accounts for infrastructure assets (Pallot, 1997; Vermeer, Patton & Styles, 2011).

Ouda (2016) explained the complexities in recognising governmental infrastructure assets are due to the different ways of acquiring those assets. Nevertheless, infrastructure assets must be appropriately accounted for owing to the significance of governmental operations and duties to citizens (Pallot, 1997; Farias, 2020). McDonough and Yan (2023) also highlighted that limited information is available on governmental capital asset accounting policies, although capital assets, including infrastructures, are crucial.

The International Federations of Accountants (IFAC) perceive accurate governmental accounting for infrastructure assets as critical due to the significant allocation amounts (IFAC, 2023). The IFAC also exerted that the deterioration and maintenance of public assets led to increasing public calls for accurate reporting. The challenges in determining the most optimal accounting treatments remain being debated and unresolved after more than three decades (Lombardi, Schimperna, Smarra & Sorrentino, 2021; Simpkins & Jensen, 1995; Micallef, Sutcliffe & Doughty, 1994; Pallot, 1994; Rowles, 1992). Particularly, determining depreciation costs is one of the significant issues in accounting for infrastructure assets.

Burns (1993) asserted that the unique characteristics of infrastructure assets (i.e. very long-life nature, almost infinite, and are renewable rather than replaceable) have led to complexities in determining their economic lives. Economic lives refer to the “period of time beyond which it is economically worthwhile to replace rather than to continue to repair and maintain” (Burns, 1993, p. 92). As a result, the determination of depreciation costs for these assets would be less straightforward and complicated.

Infrastructure assets are parts of governmental systems or networks with multiple interrelated components. The components require integration for the assets to optimally function and provide intended services. The interrelatedness is “the very essence of the infrastructure assets” (Burns, 1993, p. 92). The componentisation of the infrastructure asset network or system refers to “the disaggregation of assets into different parts with several useful lives and

replacement costs” (IPSASB, 2019, para 4.15), which allows for distinguishing the useful life of assets in the system and the depreciation methods. The author also argued that the residual value pattern could significantly impact the depreciation of the assets, which does not decline monotonically.

Furthermore, the Canadian Institute of Chartered Accountants (CICA, 2002) stated that the detailed information provided by componentisation would produce several benefits in asset management. IPSAS 17 requires the application of component approach. However, the componentisation practices observed in various countries differ with some countries adopt componentisation while others opt not to adopt the approach.

Lombardi et al. (2021) reported that only New Zealand adopted the component method while Canada allowed for both componentisation and whole asset. Australia, Austria, France, and the United States of America (USA) did not adopt the component approach. Subsequently, the IPSASB (2019, para 4.15) clearly expressed that it is not suitable to componentise infrastructure assets. Burns (1993) also supported the idea of no componentisation because infrastructure assets consist of interrelated and interdependent parts and effort to disaggregate the assets may outweigh the value of the information for decision-making.

Additionally, the distinctive features of infrastructure assets lead to higher complexity in recognition, valuation, reporting, and disclosures. The lack of specific accounting standards for infrastructure assets also exacerbates the situation by creating more barriers to establishing transparent and comparable information. Hence, IPSAS 17 specifies that governments must disclose relevant information about infrastructure assets in financial statements and other reports. Lombardi et al. (2021) discovered variations in reporting and disclosure practices in different countries, including Australia, Austria, Canada, France, the USA, and New Zealand.

The countries developed their own accounting standard for infrastructure assets, except for New Zealand which fully adopts IPSAS17. In the context of Malaysia, published literature specifically on accounting for governmental infrastructure assets is limited. Most studies on government assets generally reported the challenges and issues in accounting for governmental assets, such as obtaining sufficient information, determining ownership and control, complying with the MPSAS, dealing with the information systems, and resolving human resources issues (Abu Hasan et al., 2022; Rosli et al., 2020; Rosli et al., 2019; Ismail et al., 2013).

Abu Hasan et al. (2022) reported challenges faced in accounting for assets which include (i) recognition and valuation of the assets especially in specific cases where the assets are operated by a third party (concession assets), (ii) determination of initial value and the service life of assets which are taken over from the private sector, local authority, or state government, (iii) inadequate information on additional costs incurred by the third party for repairs and maintenance, and (iv) asset impairment, and asset disposal.

Ismail et al. (2013) also discovered issues related to IPSAS 17 implementation, such as inconsistencies in recognition of assets due to the lack of clear guidelines on the definition, shared ownership of assets which give rise to who should report the assets, and determination the asset value. Meanwhile, recent studies related to infrastructure assets primarily focus on asset management (Tajudin, Khan & Ismail, 2021; Syed Ali, Sheung & Mohd Razali, 2019).

Studies on infrastructure assets in Malaysian public sector organisations are limited. Thus, this study sought to bridge the literature gap while suggesting future research avenues.

3.0 Methodology

The current study employed a qualitative approach comprising both archival search and semi-structured interviews. The approach is appropriate as the research objective involves exploring issues and challenges related to accounting practices for infrastructure assets in public sector organisations. Additional data were also collected by reviewing existing studies, accounting standards and guidelines issued by the AGD, and guidelines and governmental publications in other countries. The preliminary archival searches identified standards, practices, and issues, which enabled the preparation of interview guides.

Archival searches also informed researchers of the requirements, current practices, issues, challenges, solutions, and best practices in various countries. These include MPSAS 17 Property, Plant and Equipment (MPSAS, 2013), Interpretation of Accounting Policies (AGD, 2019), *Garis Panduan Pelaksanaan Perakaunan Akruan Bil. 1 Tahun 2013 - Aset Kerajaan Asas Akruan* (AGD, 2013), *SPANM Bil. 3 Tahun 2022 - Tatacara Perakaunan Aset Bukan Kewangan Kerajaan* (SPANM, 2022), and *Manual Perakaunan Akruan* (AGD, 2021). In addition, public sector accounting standards and guidelines in other countries are also examined. Preliminary discussions with AGD accountants were also conducted to confirm the scope and context of the study.

An interview guide was developed based on the issues related to accounting for infrastructure assets identified in the literature as well from the discussion with officers from the Accrual Accounting Implementation Team (PPPA). The interview guide was emailed to the respondents before the interview session to allow the respondents to thoroughly understand the issues to be discussed during the interview. Apart from the background information of the respondents, the interview guide comprises questions on current practices and challenges faced by the respondents in accounting for infrastructure assets. The data from interviews were analysed descriptively to gain insights into the current practices and issues or challenges. All responses were included in the discussion of findings with several quotes included to strengthen arguments.

The interview respondents were selected through purposive sampling and snowballing techniques. The target respondents were accountants, finance personnel, and technical staff related to the management of infrastructure assets in the relevant federal and state governments. Interviews were conducted with 52 personnel representing 10 ministries, three state governments, and three local governments within three months, namely from June to August 2023. A total of 16 organisations, including ministries, state governments, and local governments, were involved. Table 1 depicts respondent details.

Table 1: Organisations and Respondents

No.	Organisation	No. of Respondents
1.	Accountant General's Department of Malaysia (AGD)	9
2.	Valuation & Property Service Department (JPPH), Ministry of Finance (MOF)	4
3.	Ministry of Natural Resources, Environment, and Climate Change (NRECC)	2
4.	Ministry of Economy	1
5.	Ministry of Works (KKR)	3
6.	Ministry of Defence (MOD)	1
7.	Ministry of Education (MOE)	2
8.	Ministry of Local Government Development (KPKT)	3
9.	Ministry of Transport (MOT)	4
10.	Kedah State Treasury	3
11.	Kelantan State Treasury	2
12.	Selangor State Treasury	4
13.	Subang Jaya City Council (MBSJ)	2
14.	Shah Alam City Council (MBSA)	2
15.	Public Works Department (JKR) Selangor	2
16.	Kuala Lumpur City Hall (DBKL)	8
Total		52

The initial plan was to involve multiple ministries and a few state governments for triangulations. Local governments were included in the discussion with Selangor State Treasury teams. The DBKL was recommended after being referred to by other local governments. The KPKT was also included to obtain further information, which led to a total of 52 respondents with nine from the AGD office. Table 2 shows respondents' organisational positions. While the majority were accounting and finance staff, technical staff were also involved to obtain corresponding insights into the recognition, valuation, and measurement of the infrastructure assets.

Technical staff's perspectives were crucial due to their involvement in valuation of the infrastructure assets. Several organisations formed a team to identify, recognise and measure assets including infrastructures. The team would include accounting and finance staff, engineers and technical staffs as well as valuers and the staff that manage the assets. In view of the composition of respondents, it can be concluded that their insights are valid and useful to answer the objectives of this study.

Table 2: Profile of Respondents

No.	Organisation	No. of Respondents
1.	State Treasurer	2
2.	Senior Deputy Treasurer	1
3.	Chief Assistant State Treasurer	1
4.	Deputy Director	5
5.	Chief Assistant Director	1
6.	Senior Assistant Director	4
7.	Assistant Director	3
8.	Chief Accountant	3
9.	Deputy Chief Accountant	3
10.	Accountant	21
11.	Assistant Accountant	3
12.	Finance Director	1
13.	Senior Assistant Valuation Officer	1
14.	Project Engineer	1
15.	GIS Executive (Engineering)	1
16.	Engineer	1
	Total	52

No.	Years of Tenure in Current Position	No. of Respondent
1.	0 to 5 years	27
2.	6 to 10 years	11
3.	11 to 15 years	9
4.	16 years and more	5
	Total	52

No.	Education in Accounting	No. of Respondents
1.	Yes	42
2.	No	10
	Total	52

No.	Involvement in Accrual Accounting	No. of Respondents
1.	0 to 5 years	26
2.	6 to 10 years	7
3.	11 to 15 years	4
4.	16 years and above	3
5.	Not related	12
	Total	52

With respect to the respondents' tenure in their position and background in accounting, the table shows that although majority of the respondents have been less than 10 years in their current position, they were in accounting related position in the previous organisations. More than 80% of the respondents, 42 out of 52, have accounting education, while the rest includes the technical team which comprises engineers, and several with finance education, which further enhances the validity of responses for this study.

Table 2 also shows the respondents' involvement in governmental accrual accounting implementation. Most respondents were involved in the government's accrual accounting implementation except for very few who did not hold accounting position although they supported the valuation and maintenance of governments' assets.

4.0 Issues and Challenges in Accounting for Infrastructure Asset

The current section discusses the issues and challenges related to accounting for infrastructure assets in Malaysia. Issues related to the definition and recognition are discussed before the measurement, valuation, and depreciation.

4.1 Definition and Recognition

The Malaysian government started to collect data for assets since 2013, soon after the announcement of accrual accounting implementation. Since then, assets information has been collected and categorised under various classification under PPE. The process of identifying assets and determining the opening balances of PPE took many years because not all data is readily available to determine the book value objectively. In addition, issues such as difficulties in obtaining the original records for title, ownership and control of the assets as well as challenges in verifying the value of the assets have slowed down the process in accounting for some PPEs (Rosli et al., 2019; Ismail et al., 2013; Abu Hasan et al., 2022).

The requirement to specifically account for infrastructure assets in its own category came into effect later with the adoption of MPSAS 17 in 2018. Many ministries were uncertain as to what would be the infrastructure assets. Prior to that requirement, many of the infrastructure assets have been accounted for in various other fixed assets category such as land, buildings or equipment.

Effort to identify and reclassify them separately is another challenge. One of the respondents commented "we are not certain whether some assets can be classified as infrastructure assets because although the main purpose of the assets is to deliver services to the public, but they are not very long-lived assets as we normally see in other infrastructure assets".

Uncertainties with regards to control and ownership also posed another challenge in identifying infrastructure assets in government bodies. In many instances, respondents said that they decided to holdup the recognition of infrastructure assets which ownership or control are not certain. Respondent commented "we only account for assets that we certainly have ownership, while those that we are not certain were put on hold".

According to MPSAS 17, the book value of infrastructure assets is determined based on historical costs. Assets which are recently acquired or built do not typically present any issue

in determining their book value as the historical cost data are available. Comparatively, older assets present additional accounting obstacles owing to the difficulty in establishing the book values. Hence, the valuation department, namely Jabatan Penilaian dan Perkhidmatan Harta (JPPH), assists in determining the book value of the assets.

The JPPH also asserted that the department did not possess adequate expertise to value the assets. One respondent commented, "We do not have the experts to value certain types of infrastructure assets, such as dams, and currently, we can only manage the valuation of land and buildings. For older infrastructure assets, we had no choice but to recognise them as other PPE assets because we do not know their values".

Responsibility for infrastructure assets management, maintenance and accounting treatment lies upon each government departments or ministries. For example, SPANM 3/ 2022 stated that assets such as roads and buildings are under the purview of the Public Works Department, sewerage under the Sewerage Services Department and water under Irrigation and Drainage Department. Thus, variation in definition and recognition practices are obvious.

Nevertheless, during the initial stage of accrual accounting implementation, the government formed a taskforce comprising representatives from the AGD and the relevant departments, including technical personnel, to come up with plans for assets recognition. The technical personnel were responsible to determine the value of government's assets, but every government department and ministry will identify their own assets including the infrastructure assets. Thus, standardized identification and recognition would be very useful to ensure only specific infrastructure assets are chosen.

According to SPANM, infrastructure assets are the movable non-financial assets, 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" (SPANM, 2022, p. 38).

The AGD issued additional guidelines on the implementation of accrual accounting, the Federal Government Accrual Accounting Manual. However, the Accounting Manual for PPE (AGD, 2021), does not provide any reference to infrastructure assets. Another related policy issued by the AGD, Interpretation of Accounting Policies (Revised 2019), also does not specify any policies related to infrastructure assets (AGD, 2019). On the other hand, the *Garis Panduan Pelaksanaan Perakaunan Akruan Bil. 1 Tahun 2013* (AGD, 2013) contains guidelines on useful life of assets for depreciation purposes for various infrastructure assets, although no definition is given.

The data collected from the interview suggests differing level of completion in terms of accounting for infrastructure assets, with some ministries accounted for almost all of their infrastructure assets, although not complete, while others are still at initial stage of identifying the assets. Certain government departments have very specific and clear infrastructure assets, thus, the task to identify and account for infrastructure assets is faster and less complicated. However, many other government departments recorded their infrastructure assets in the iGFMAS by their own interpretation of the general guidelines provided by the MPSAS 17 and SPANM.

This resulted in concerning trend because when many infrastructure assets being accounted for as 'other infrastructure assets' in iGFMAS, the default useful life is 100 years. The AGD commented that the asset owners can propose to the AGD for changes or to reclassify these assets, with appropriate justifications. However, majority of the respondents have not had the idea and assumed that the data is finite once entered to the iGFMAS. Table 3 below displays some of the infrastructure assets recognised by the respondents.

Table 3: List of Infrastructure Assets

• Main Roads	• Meteorology radar	• Water tunnel-SMART tunnel
• Secondary Roads	• Bridges	• Water treatment assets
• Agriculture Roads	• Sewage system	• Water pump house
• Flyovers	• Flood barrier	• Water processing plant
• Overpass	• Beach barrier	• Landfills
• Canopied walkway	• Main trench	• River Cleaning Projects
• Airport and runways	• Hydrology Station	• Federal Recreation Parks
	• Water drainage system	• Underground water ponds

The list of infrastructure assets above is not exhaustive as there are many others which are not yet recorded. According to the AGD, the iGFMAS record shows several instances where infrastructure assets are recorded with a value of less than a hundred, which warrants further investigation. This also suggests that many government departments are still unclear about what would be infrastructure assets. The interview findings revealed that ministries with a dedicated team, comprising accountants and technical staff, to identify and recognise infrastructure assets, tend to have a better understanding and more systematic process.

Moreover, ministries without a dedicated team will assign the task of identifying and recording infrastructure assets to the asset custodian, which may result in inaccurate accounting records. It is interesting to note that some respondents mentioned their plan to recognise assets in several phases, starting with the accounting staff accumulating and filtering the assets they own and followed by technical assessments and valuations.

Most respondents indicated that the main references are MPSAS 17 and SPANM. The iGFMAS provides a default or preset useful life for all subcategories of infrastructure assets. However, the subcategories provided in the iGFMAS are also causing confusion and mistakes. For example, when a department categorises an asset as 'Other Infrastructure Assets', it will result in a service life of 100 years which may be inappropriate for the assets. Thus, it is important for the accountants to be mindful of what entails with the account name prior to entering the information.

Most respondents also agreed that majority of their infrastructure assets are accounted for in 'Other Infrastructure Assets' although the 100 years' useful life may not be very appropriate for all assets. A respondent mentioned, "we struggled to include our asset in which category in iGFMAS, as it does not really suit the assets. We tend to record the assets as 'other infrastructure assets' although the useful life is long". Several government departments do propose for change in the useful life for their assets after a thorough discussion with accountants and technical staff.

A local government stated that it developed its own infrastructure asset description and list, and it also endorsed policies for the related accounting treatment where necessary. A respondent from a local government said, "We devise our own treatment for our pre-specified infrastructure assets, and our auditor suggested that we should endorse that as our accounting policies."

4.2 Measurement, Valuation, and Depreciation

The government departments with a dedicated infrastructure assets team tend to have a more systematic process in the selection and valuation of the assets. In the case of older or existing assets, the inputs from the technical staff and the custodian of the assets provide good guidance in the determination of the value of the asset to be recorded. In cases where the assets value is not readily available, the assistance from the valuation department, JPPH, is sought.

For the new assets, the historical cost values are easily determined as the invoices related to asset acquisition or development are available. The historical costs will be recognised as the opening book values of the assets once the certificate of completion is obtained. Nevertheless, the valuation of older assets with no prior records is very challenging and in most cases these assets are not yet recognised due to lack of expertise to determine the values.

Many respondents also perceived that the default useful life and depreciation might not represent the actual usage of the assets in certain cases, which resulted in inaccurate depreciation costs. Certain respondents opined that the roads maintained by state and local governments yielded high annual depreciation expenses due to the limited useful life, which negatively impacted annual income. A respondent from a local government expressed, "the council members are not happy with the depreciation value of roads, which reflected huge expenses".

Currently, MPAS 17 requires the use of straight-line method of depreciation for all infrastructure assets. An exception is given to the federal road infrastructure assets whereby a method called condition-based method (CBM) is used by the Ministry of Works. The CBM is based on the Federal Road Accounting Policy (FRAP). Under the CBM method, depreciable values of federal roads assets are allocated on a systematic basis over their best estimates of useful life. The depreciation expenses under the CBM are calculated based on actual condition of the road at the reporting date using road quality report issued by the Ministry of Works. 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, AGD, 2019).

With regards to componentisation, many respondents revealed that they are not yet ready to implement it. Currently, much of the efforts are devoted towards data compilation. As many are still in the phase of data collection, the respondents admitted that they have not embarked on componentisation but most of them are aware of the requirements. Many suggested that infrastructure assets are a network or system that must be connected to function, and the components cannot work on its own, thus, componentisation deems unnecessary. In addition, the costs of gathering the information may far outweigh the expected benefits to be derived from the information. The respondents also viewed that some parts replacement could be

charged as expenses. Furthermore, componentisation practices are also uncommon and varied internationally.

4.3 Recommendations

In Malaysia, different ministries tend to own different types of infrastructure assets with unique characteristics, which is not simple for the AGD to apply one rule for all in accounting for infrastructure assets. While certain ministries accounted infrastructure assets by the codes in the chart of accounts provided by the AGD, several ministries requested for amendments to the rule. On the other hand, local governments that have their own source of power endorsed their own policy regarding infrastructure assets.

While challenges and inconsistencies exist in the accounting practices for infrastructure assets, the current findings recommended the following steps to be implemented by the AGD to streamline the accounting practices in government organisations:

- i. **Specific Team and Person in Charge:** Every ministry can form a dedicated team comprising technical staff, personnel in charge of the assets, and accountants to collect information on the infrastructure assets and suggest appropriate accounting policies for the assets.
- ii. **Standardised Policies:** The proposed infrastructure assets and relevant policies can subsequently be validated at the AGD level, which is the gatekeeper of accounting standards and guidelines. Hence, accurate and standardised practices can be guaranteed to be followed by all ministries and state and local governments. While ministries, states and local governments have varying assets and jurisdictions, several assets are similar across them which should be accounted for similarly. Generally, the accounting staff have good grasp on accounting for infrastructure assets and only few had confusion in identifying the assets.

Table 4 below lists several practical recommendations for the AGD's next course of actions:

Table 4: Practical Recommendations

No.	Recommendations
1.	To develop a specific definition for infrastructure assets limited to assets with long or unlimited useful life, involving huge investments, and comprising larger systems or networks.
2.	To record infrastructure assets through a master account for every network or system of infrastructure assets and subsidiaries for componentisation. The record can also support the planning for asset management when relevant assets are grouped.
3.	To form a team comprising accountants, technical staff, and personnel in charge of the assets in every ministry to identify infrastructure assets and relevant treatments.
4.	To carefully confirm the assets as infrastructure with relevant values and measures for every ministry before recording in the iGFMAS.
5.	To prepare a list of recommended and verified infrastructure assets for every ministry endorsed by the AGD based on the proposals from various ministries.
6.	To propose suitable policies for certain infrastructure assets when necessary and when the guidelines are highly general.

In addition to the practical recommendations above, the following decision flow for infrastructure assets' recognition and accounting is proposed as shown by the Figure 1 below:

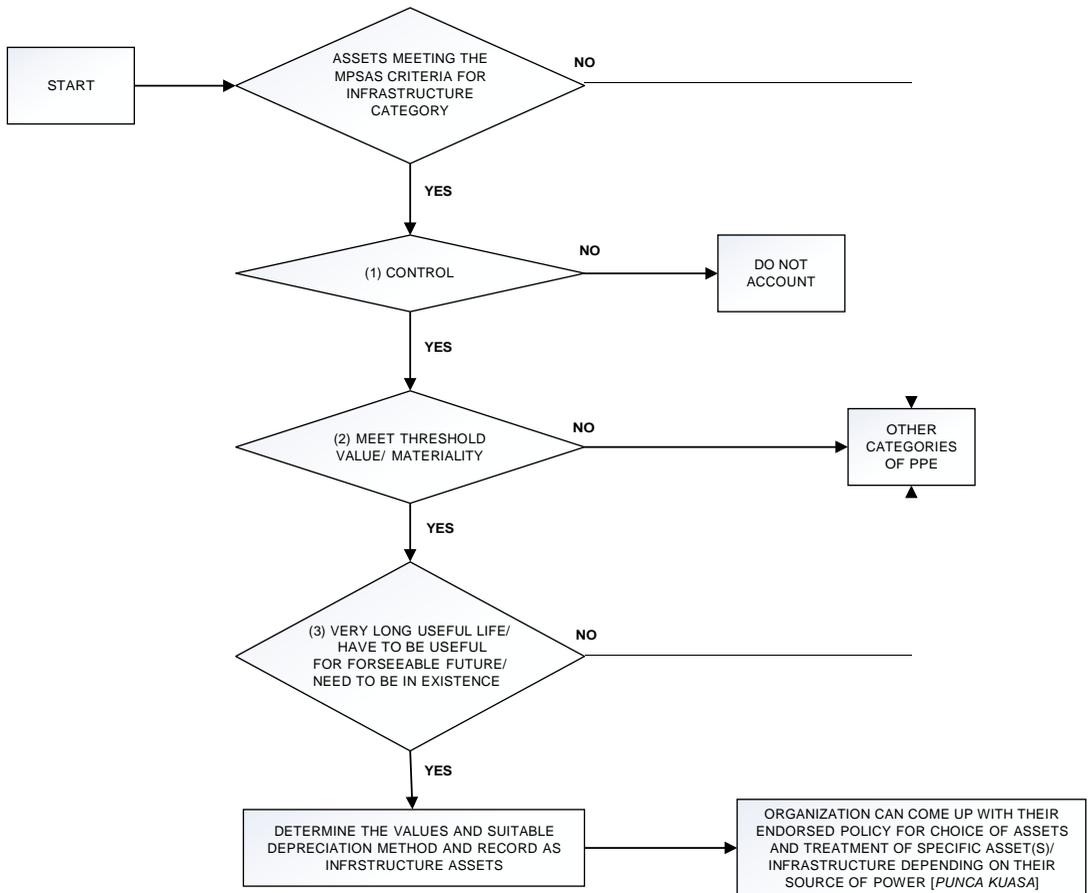


Figure 1: Proposed Decision Flow on Accounting for Infrastructure Assets

The following are the steps of the decision flow:

- i. MPSAS 17: The recognition shall begin with the assets meeting MPSAS 17 criteria for infrastructure category followed by whether the government departments have control over those assets.
- ii. Threshold value: The next important step will be filtrations for minimum threshold value endorsed by the AGD (recommended to be much higher than the current minimum assets value).
- iii. Useful life: The next important step will be filtrations for very long useful life or expected to be useful for a foreseeable future.
- iv. Determination of Book Value & Depreciation Methods: After the assets passed the four steps filtration, the determination of book value and suitable depreciation methods can be made.

5.0 Conclusion and the Way Forward

Issues related to accounting for infrastructure assets are not isolated to Malaysia or developing countries only. Developed countries, including Australia, Austria, Canada, France, New Zealand, and the USA, that have started implementing accrual accounting much earlier encounter similar challenges. The current findings from this study indicated issues, such as the limited description provided in the IPSAS where infrastructure assets are accounted for using the same accounting standards for property, plant and equipment.

Recognition and measurement of infrastructure assets were also not specified clearly and were subject to different interpretations, which led to inconsistencies in practices. The standards and other guidelines for infrastructure assets in Malaysia also provided a minimum definition similar to the IPSAS 17. Going forward, IPSAS 17 will be replaced by IPSAS 45, which provides better clarity in the recognition and measurements of infrastructure assets.

The current findings provided several practical recommendations for the AGD understanding of the issues and challenges experienced by the accounting staff to formulate relevant policies and guidelines. The findings and recommendations would also assist governmental departments in infrastructure assets accounting. In addition, a decision flow for infrastructure asset recognition and accounting was proposed to guide the AGD and accounting officers.

This study has several limitations:

- i. The data in this study were collected through archival search and semi-structured interviews with selected respondents from both federal and state governments. The conclusions might not be generalisable to other governmental departments.
- ii. The data were collected from semi-structured interviews, wherein the findings might not represent other respondents' perspectives.
- iii. The interview findings might be subject to respondent bias as the responses to the interview questions could be influenced by the respondents' prior knowledge or experiences. Moreover, the conclusions drawn by the interviewers might be subjected to their personal perceptions and experiences.

Infrastructure assets represent a huge proportion of government's assets, thus appropriate accounting treatments are pivotal in ensuring the assets are recorded and reported accurately. There are still many issues that remain unresolved in accounting for infrastructure assets including definition, control, valuation and measurements, deferred maintenance and depreciation methods.

Future research on accounting for infrastructure assets can explore further the definition, control, valuation and measurements, deferred maintenance and depreciation methods. One area that perhaps requires a more urgent attention is depreciation method for infrastructure assets. In addition, further research can be taken to find solutions to resolving recognition issues for infrastructure assets which ownership or control is uncertain.

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