

## **PERCEPTIONS OF ACCOUNTING INFORMATION SYSTEM EFFECTIVENESS: PRELIMINARY FINDINGS FROM THE MALAYSIAN FEDERAL GOVERNMENT**

**Sharinah Puasa<sup>a\*</sup>, Julia Smith<sup>b</sup>, Sharifah Milda Amirul<sup>c</sup>**

<sup>a</sup> *Labuan Faculty of International Finance, Universiti Malaysia Sabah, Malaysia*

<sup>b</sup> *Strathclyde Business School, University of Strathclyde, Scotland, United Kingdom*

<sup>c</sup> *Faculty of Business, Economic and Accountancy, Universiti Malaysia Sabah, Malaysia*

### **A PEER-REVIEWED ARTICLE**

#### **ABSTRACT**

This paper presents preliminary work towards understanding the use of the Accounting Information System (AIS) in the Malaysian Federal Government setting, by investigating AIS users' perceptions of the system's effectiveness. Recently, the Government upgraded its AIS to cater for the function of accruals accounting treatment, as well as to improve financial reporting practice. The advancement of the system entailed a huge investment in both money and human capital preparation. As such, the installed system is expected to be effective in order to make the investment worthwhile. However, past literature has shown the measurement of system effectiveness to be rather ambiguous and inconsistent due to variations in the definition of system effectiveness. This has caused difficulties for both researchers and practitioners, in terms of making comparisons between studies to objectively assess AIS effectiveness. Therefore, this study is significant, in that it presents qualitative evidence from unstructured preliminary fieldwork, combining both group discussion and observational approaches. This preliminary study: (i) provides insight into the history of AIS enhancement and AIS current practice in the Malaysian Federal Government; (ii) provides an understanding of AIS users' perceptions of AIS effectiveness; and (iii) uncovers nine criteria for an effective system.

#### **ABSTRAK**

Makalah ini membentangkan permulaan kerja ke arah memahami penggunaan Sistem Maklumat Perakaunan (AIS) dalam persekitaran Kerajaan Persekutuan Malaysia, dengan menyiasat persepsi pengguna AIS tentang keberkesanan sistem. Baru-baru ini, Kerajaan menaik taraf AIS untuk memenuhi fungsi perakaunan akruan, serta untuk meningkatkan amalan pelaporan kewangan. Kemajuan sistem ini melibatkan pelaburan besar dalam penyediaan modal wang dan insan. Oleh itu, sistem yang dipasang dijangka berkesan untuk menjadikan pelaburan itu berbaloi. Walau bagaimanapun, literatur masa lalu telah menunjukkan pengukuran keberkesanan sistem menjadi agak kabur dan tidak konsisten kerana variasi dalam definisi keberkesanan sistem. Ini telah menyebabkan kesukaran untuk kedua-dua penyelidik dan pengamal, dari segi membuat perbandingan antara kajian secara objektif menilai keberkesanan AIS. Oleh itu, kajian ini adalah penting, kerana ia membentangkan bukti kualitatif dari kerja lapangan awal yang tidak berstruktur, menggabungkan kedua-dua perbincangan kumpulan dan pendekatan pemerhatian. Kajian awal ini: (i) memberikan wawasan tentang sejarah penambahbaikan AIS dan amalan semasa AIS dalam

\* Corresponding author: Sharinah Puasa, PhD., Labuan Faculty of International Finance, Universiti Malaysia Sabah, Labuan International Campus, Jln. Sg. Pagar, 87000 F.T. Labuan, Malaysia. E-mail: [sharinah@ums.edu.my](mailto:sharinah@ums.edu.my)

Kerajaan Persekutuan Malaysia; (ii) memberi kefahaman tentang persepsi pengguna AIS tentang keberkesanan AIS; dan (iii) menyalongkar sembilan kriteria untuk sistem yang berkesan.

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*Keywords: Accounting information system (AIS), System effectiveness, User satisfaction, System quality, Information quality.*

## 1. Introduction

Accounting department is one of the most important departments in an organization. It is responsible for managing financial records and communicating the information to respective stakeholders. In most organizations, the accounting department manages an Accounting Information System (AIS). The AIS is defined as the application of technology and computers in the accounting process (Pierre *et al.*, 2013; Nicolaou, 2000). In other words, the AIS combines human capital and machines, working together to undertake the accounting process. The capability and capacity of the system should always be on a par with the needs and wants of its users. Most importantly, the system should be able to cater for the changes in accounting practice as well for as advancements in technology. These are amongst the challenges faced by the accountant in this era of industrial revolution. These changes affect not only the private sector, but also the government sector. Therefore, this study aims: (i) to understand AIS practice in the Malaysian Federal Government, by focusing on the system and its users; and (ii) to investigate the perceptions by users of the system of the effectiveness of that system.

## 2. Significance of the study

In early 2018, the Malaysian Federal Government made significant upgrades to its AIS and changed their accounting treatment from a cash-based to an accruals-based accounting system. Earlier, the system had been upgraded on occasion to cater for changes in technology and fulfill the needs of its users. Specifically, the current system is known as iGovernment Financial Management Accounting System (iGFMAS)<sup>1</sup>, a result of the upgraded GFMAS. Prior to GFMAS, the Government had a Branch Accounting System (BAS) in place that performed the accounting process on a semi-manual basis. As the volume of accounting transactions has increased, the existing system requires an advancement in order to accommodate the high volume of transactions and changes in accounting treatment.

Many people may consider that the history of system improvement is not relevant to their work. As a result, many Government staff are unaware of how the Government's AIS has evolved; however, some of those are users of the system. The advancement of technology and the upgrading of the AIS are done continuously, in order to meet the needs of the system's users, as well as for the improvement of financial reporting. According to Chalu (2012), many organizations enhance their AIS by upgrading their technology, with the sole purpose of fulfilling the needs of the accounting operatives and decision makers. However, the occasional upgrading of the AIS can never promise to enhance the effectiveness of the system (Puasa, 2017). This is because the higher specification technology may not be effective, if its users do not operate it correctly (Wiechetek, 2012); nor may it optimize the function for which it was installed. In addition, Ilias *et al.* (2009) discussed the dissatisfaction with the computerized accounting system of users in the Malaysian Government. Satisfaction was used as and confirmed to be a valid measure of effectiveness (Gatian, 1994). Therefore, dissatisfaction can be used as an indicator of system ineffectiveness. Besides, current technology is said to be inefficient in coping with challenges in the accounting field (Belfo & Trigo, 2013); witness cases of fraud, corruption and the manipulation of accounting data which still occur today.

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<sup>1</sup> This was previously known as 1GFMAS, but was renamed after the general election of Malaysia, in May 2018.

In the majority of cases, upgrading a system requires a huge amount of money. It is therefore a significant waste if the upgraded functions are not fully understood and not optimized by the system's users. Therefore, the assessment of AIS effectiveness is important in order to ensure that the system is worthy of upgrade or to identify areas for improvement, either from the human capital or the technology side. However, there is no one best way to measure effectiveness (Puasa, 2017). The definition of system effectiveness varies from one study to another. To date, there are many ways of assessing system effectiveness in both the AIS and information system field (Chalu, 2012; Hamilton & Chervany, 1981). Specifically, previous studies have reviewed system effectiveness from the perspective of: user satisfaction (Chalu, 2012; Ilias *et al.*, 2009); information quality (Pornpandejwittaya, 2011); its capability in supporting decision making (Dehghanzade *et al.*, 2011; Kouser, 2011; Sajady *et al.*, 2008; Nicolaou, 2000; Thong & Yap, 1996); meeting users' requirements (Salehi *et al.*, 2010); multiple dimensions (e.g. system quality; information quality; usage of the information; user satisfaction; positive impact on both the individual and the organization) (Ismail, 2009); cost versus benefit (Sajady *et al.*, 2008); the achievement of system objectives (Iskandar, 2015; Hamilton and Chervany, 1981); or goals (Raymond, 1990). This leads to inconsistent assessment amongst practitioners in assessing the system effectiveness of their organization. From an academic perspective, this causes difficulties for researchers wishing to make a comparison between studies. In addition, there are limited studies about the perception of AIS users of the system's effectiveness. Hence, this paper is significant in studying and filling the research gaps in the extant literature.

### **3. Background to the study: The Malaysian federal government**

The Malaysian Government consists of three tiers; the federal government; state government; and local authorities. Structurally, the federal government is the highest tier, consisting of 23 ministries and a Prime Minister's Department. The accounting operation for the Malaysian Government is served by the Accountant General's Department (AGD). Specifically focused on the Malaysian Federal Government, the AGD is assisted by accounting divisions located in every one of the 23 ministries and the Prime Minister's Department. Given the large size of the Malaysian Federal Government, the accounting divisions of each ministry are supported by responsibility centers throughout the country. In most situations, the responsibility center is responsible for collecting data, keeping records and reporting to the accounting division. Overall, the accounting operations are managed and monitored by the AGD.

The AGD was established under the Ministry of Finance Malaysia before 1957. Its responsibilities include: developing and improving accounting and its related systems (e.g. human resource management system); managing, monitoring and enhancing accounting-related operations; and enforcing the Unclaimed Monies Act 1965 for the Malaysian Government. The AGD also plays the role of parent to all accounting offices in the Malaysian Government. There are 10 divisions and two units under the AGD. Each division has specific roles and responsibilities related to the accounting services for the Government. The two units are the Integrity Unit and the Legal Unit, which are more concerned with the governance and administration of the AGD.

### **4. Literature review**

Prior to data collection, reviews were undertaken on prior studies about AIS effectiveness, measurement of effectiveness and AIS studies relating to the Government of Malaysia. The reviews were undertaken concurrently with conducting the fieldwork, in order to enhance understanding of the context of the study. Generally, system effectiveness was found to be applied widely as a dependent variable in the information system and AIS literature. The topic has been continuously debated among researchers due to its importance for an organization, as well as the inconsistent results found in prior research. Effectiveness is illustrated as a part of success in DeLone and McLean's 'Information System Success' model (DeLone &

McLean, 1992). Other studies have emphasized effectiveness in terms of the achievement of system’s objectives (Hamilton & Chervany, 1981), goals (Raymond, 1990), the improvement of performance (Gatian, 1994) and support for decision-making (Thong & Yap, 1996).

As regards AIS, the definition of system effectiveness has been studied and discussed in contexts that are more specific. For example AIS effectiveness is defined as the decision makers’ perception of the ability of the system to provide information that meets their requirements for coordination and control purposes (Kouser *et al.*, 2011; Nicolaou, 2000). The system is expected to benefit the system’s users and the organization in terms of operational improvements (Sajady *et al.*, 2008) and better decision-making (Kouser *et al.*, 2011). According to Salehi *et al.* (2010), AIS effectiveness refers to successfully applied systems that meet users’ requirements. Adapting the definition of Nicolaou (2000), Dehghanzade *et al.* (2011) take further consideration in their measurement by considering the capacity of the system in providing the expected information, considering the relevant legal obligations, preparing financial reports and providing adequate control structures in order to meet decision-makers’ requirements. A study by Chalu (2012) viewed AIS effectiveness as a multidimensional construct by taking into account four dimensions, including accounting information quality, system quality, user satisfaction and organizational performance. Another study conducted by Pornpandejwittaya (2012) specifically defined the effectiveness of the AIS according to features of information quality: reliability, relevance and timeliness. These definitions are more likely to focus on the role of the AIS in providing information for its users. Theoretically, a good decision requires a substantial amount of high quality information. However, not all AIS users use the system to retrieve information for decision-making (Chalu, 2012); it depends upon on the level of the user (Puasa, 2017). For example, low-level management, such as accounting clerks, may only use the system to perform the initial data entry. On the other hand, top-level management might not be involved in recording the data, but will retrieve the processed information for use in decision-making.

**5. Methodology**

This study applied a qualitative research method, using unstructured fieldwork to gather primary-source data. The fieldwork consisted of unstructured interviews and participant-observation at the Account General’s Department (AGD) and the accounting office of the Ministry of Finance of Malaysia. Initially, face-to-face interview was selected as the approach for conducting unstructured preliminary fieldwork. However, respondents were found to prefer a group interview, as they believed it would be more convenient to share their collective knowledge and experience in this manner.

Although the fieldwork was conducted on an unstructured basis, an interview agenda was prepared, listing specific aspects to be explored, in order to ensure a sufficient understanding was gained. However, this was not limited to the items listed. Any additional questions or considerations that were thought to be necessary were added during the fieldwork. The interview agenda is outlines in Table 1.

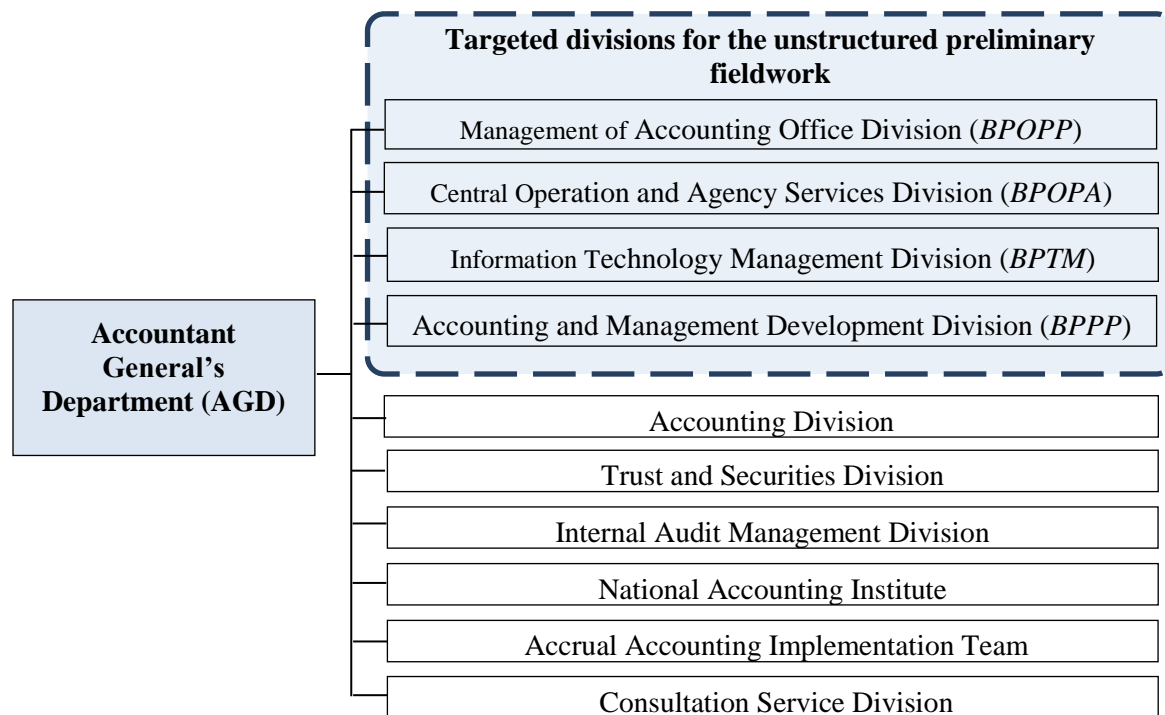
**Table 1: The checklist for the unstructured preliminary fieldwork**

Topic	Detail
i. General information about AIS	- Nature, function and objective.
ii. Operationalization of AIS	- Various types of users and their responsibility. - Workflow of the system. - The system’s integration with other eGovernment systems.
iii. Effectiveness of the system	- Opinions on the definition of AIS effectiveness. - Perceptions of effectiveness of the AIS.

*Source: The Authors’*

## 6. Sample

The sampling technique applied to this study was purposive sampling. The sample was chosen according to the suitability of respondents to assist in achieving the objectives of the study. In this case, members of the AGD were chosen because of the roles they serve within an organization that provides accounting services for the Malaysian Federal Government. AGD is the headquarters for all accounting divisions and responsibility centers in Malaysia. Practically, AGD is the most suitable organization, as it has the clearest picture of the AIS of the Malaysian Federal Government. With reference to the organization chart of the AGD (see Figure 1), there are 10 divisions that are related to the accounting matters of the Malaysian Federal Government. Four divisions and the top management office were proposed as subjects for this study. This choice was determined by the roles and responsibilities of the divisions. However, their willingness to participate was further dependent upon their preference and availability.



**Figure 1: Organisation chart of the Accountant General's Department of Malaysia**

*Source: portal.anm.gov.my*

The four divisions selected were: the Management of Accounting Office Division (BPOPP); the Central Operation and Agency Services Division (BPOPA); the Information Technology Management Division (BPTM); and the Accounting and Management Development Division (BPPP). These divisions held responsibilities in, primarily: planning, monitoring and managing the accounting operations; performing accounting functions and producing financial reports for the Government; developing and managing the accounting system; and enhancing the accountability of the Government, to mention some. In practice, BPPP was not available to participate in this study and thus was replaced by the Accounting Division of the Ministry of Finance (MoF) Malaysia, as recommended by the AGD; after considering the roles of the Accounting Division of the MoF as the department who operate the AIS, the suggestion of the AGD was accepted and the Accounting Division of the MoF was included in the sample, thereby replacing BPPP. In compensation, a meeting with the Accountant General of Malaysia was held in order to gain a fuller understanding of the system from the perspective of more senior management.

## 7. Data analysis technique

Qualitative data collected for this study are in the form of interview transcripts and observation notes. The transcripts were typed manually by listening to the audio recording saved from the interview sessions. In addition, the observation notes were taken during the time the observation session was conducted. Due to the length of conversations, the transcripts were done in MsWord and analyzed in NVivo 11 software.

The analysis applied to this study is a coding technique: ‘Coding provides a means of purposely managing, locating, identifying, sifting, sorting and querying data ... to stimulate and facilitate analysis’ (Bazeley, 2013, p. 125). Technically, similar codes in qualitative data are commonly grouped and themed accordingly into categories, in order to improve the findings, as well as to provide a better structure. Coding is therefore a useful way of organizing and managing qualitative data in order to draw out analysis and lead more scientifically to research findings (Saldaña, 2013).

There are many types of coding. Amongst all of the available types of coding, Saldaña (2013) asserted six types as grounded theory coding canon: in vivo coding, process coding, initial (open) coding, focused coding, axial coding and theoretical (selective) coding. These types of coding are not only used in grounded theory studies, but are also popular in non-grounded theory studies, especially those that are commonly applied by beginners in the qualitative research field e.g. in vivo and initial (open) coding. As far as this study is concerned, three types of coding were considered suitable to be applied: in vivo, initial (open) and focused coding.

## 8. Findings

### *8.1 The accounting information system of the Malaysian federal government*

iGFMAS is the current accounting system of the Malaysian Federal Government, a development of GFMAS. Prior to GFMAS, the Government had a Branch Accounting System (BAS) in place. The evolution of the accounting system in the Government is intended to cater for the needs and wants of Government, especially with regard to better reporting. Specifically, the BAS was a semi-manual accounting system in which some accounting tasks (e.g. reconciliation, review, analysis etc.) were done manually before the accounting data was entered into the system. As the volume of accounting transactions increased, there was a need for a more sophisticated and automated system to manage the high volume of transactions and improve the accounting processes.

Prior to 2018, the Government’s accounting functions were assisted by an accounting system called GFMAS. This system was powered by SAP<sup>2</sup> 4.7 software that was customized to suit a cash-based accounting treatment. The system was first launched in 2006 at the AGD, and was then phased in by the ministries and their responsibility centers. The main function of the system was to process and retrieve the accounting data from eSPKB and eTerimaan, to process accounting transactions and to produce financial and accounting information (e.g. financial reports). The GFMAS, eSPKB and eTerimaan are intranet based networks<sup>3</sup> that can be accessed through any computer within the organization that has the application installed. Both eSPKB and eTerimaan were developed in-house and integrated with the GFMAS. The installation of the proprietary software (i.e. GFMAS), the development of in-house

<sup>2</sup> SAP is the acronym for System, Application and Products. SAP software is proprietary software, in which in the context of this study, this software offers accounting recording and reporting function.

<sup>3</sup> ‘A network which is accessible only by authorised company members, employees and/or agents’ (Boczko, 2012, p. 141).

accounting-related systems and the systems maintenance were assisted by external experts<sup>4</sup> appointed by the Government on a contractual basis. As explained by the top management of AGD:

“GFMAS is an accounting system used at the accounting office [ministry] level. The system supports accounting functions in reporting, monitoring, controlling and decision-making.”

eSPKB is a Budget Planning and Control System Electronic that is used to process payment and expenses-related transactions. eSPKB has been in place since the year 2000 to control and manage the Federal Government’s budget. This system was integrated with the Branch Accounting System (BAS) prior to the implementation of GFMAS. eSPKB was also developed to integrate with other eGovernment applications such as Human Resources Management Information System (HRMIS), Project Monitoring System and so on. The entered data in eSPKB is then be processed and forwarded to GFMAS for further action.

From another perspective, eTerimaan is a Standard Collection and Receipting System that processes the Government’s collection and accounting records related to revenue. eTerimaan was implemented in 2008 to smooth the accounting process, replacing the Government’s manual collection system. eTerimaan is integrated with GFMAS through eSPKB. Both eSPKB and eTerimaan use the same server and platform. The integration between systems allows for reconciliation between the accounting records of responsibility centers and the reporting from the accounting office, as well as at headquarters (i.e the AGD). The main functions of the accounting system are to manage the accounting data and to produce financial statements. The accuracy of data and classification of accounts entered into eSPKB and eTerimaan are ensured through digital checks and approval through GFMAS at the accounting office.

In early 2018, the Government upgraded its accounting system in order to cater for the transition from cash-based to accruals-based accounting. The upgraded system was called iGFMAS, before the name was changed to iGFMAS after the regime change subsequent to the Malaysian general election in May 2018. The iGFMAS uses SAP ECC 6.0<sup>5</sup>, integrated with SAP HANA<sup>6</sup>. The integration created an intelligent system to manage the accounting data, enhance the accounting operation and improve financial reporting for the Malaysian Federal Government. A huge investment amounting to more than 200 million Malaysian Ringgits (approximately GBP 37 million) was allocated for the iGFMAS project. The iGFMAS is applied to all accounting operations, replacing both the eSPKB and the eTerimaan. The iGFMAS is customized for cash-based and accrual-based accounting. The system was previously supposed to generate two different accounting-based reports (i.e. cash-based and accrual-based accounting) for the Malaysian Federal Government. Overall, the Government is continuously support the advancement of technology in order to respond to the changes in accounting practice as well as the challenges in the business world.

## 8.2 Accounting information system (AIS) effectiveness

Based on the group interviews conducted, the majority of interviewees described system effectiveness as being a system that was able to satisfy them. Regardless of any preferred criteria, a good system should be able to satisfy its users. Accounting key personnel from BPOPA mentioned that:

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<sup>4</sup> Such as XYBASE Sdn. Bhd., Innovation Associates Sdn. Bhd. and Teliti Computers Sdn. Bhd.

<sup>5</sup> SAP ECC 6.0 is one of the latest versions of SAP. ECC stand for ERP Central Component, which covers the SAP Business Warehouse, SAP Strategic Enterprise Management and Internet Transaction Server.

<sup>6</sup> SAP HANA is a platform for the real time data driven application that built with in-memory database. It allows integration with various data sources.

Source: <http://go.sap.com/developer.html>

“If the system is able to meet, support and fulfill their [users] concerns, then the system is considered effective.”

In consistent with that, an accountant from BPOPP viewed the system users in a wider context, which is stakeholder. The BPOPP’s accountant pointed out that: “Stakeholders’ satisfaction indicates the effectiveness of the system.”

Additionally, users looked for the accepted features of a good system, such as user-friendliness, ease of understanding, ease of use and easy access. These features may look easy to fulfill by having a simple system in the case of a straightforward organizational structure. Nevertheless, in the case of Government, dealing with a huge volume of transactions and a complex organizational structure, sophisticated technology is needed in order to deliver the required features, which, at the same time, are able to manage the complexity of transactions within that Government. Accounting key personnel from Accounting Division of the MoF and BPTM, respectively, explained:

“In my opinion, the system is effective when the system is user friendly, produces reliable data and is easier to access [as compared to previous ways of accessing the data].”

“I can say that the government has a sophisticated system that is quite complex but customized to be friendly to its user.”

In addition, key personnel from the top management of AGD emphasized the importance of speed of retrieving the accounting information as one of the system effectiveness criteria.

“The system is considered effective if the entered transactions can be quickly processed for reporting.”

Furthermore, the system is considered effective, based on its ability to produce reliable data with easy access. However, the easy access feature requires a high internal control system to secure the accounting data. In general, the use of accounting systems is expected to lead to the automation of most of the accounting functions (e.g. general ledger, cross-checking etc.). Furthermore, the effectiveness of the system may also be assessed according to the quality of the information generated by the system. Reliable information is important to support the decision-making process. Since a high quality of information is crucial for better decision-making, the system’s ability to provide such information is reflected in its effectiveness as mentioned by the key personnel from BPOPA:

“The system is considered effective when it can help in budget control and allocation. We use the system to retrieve the accounting data and support decision-making.”

“The system is effective when it is able to produce accurate data.”

Nevertheless, some users of the system were simply using it in their daily routine, or just to enter accounting data, such as the accounting clerk. This type of user expects the system to assist them in performing some of the accounting data entry process. The capability of the system in offering single entry record and automating another entry is of benefit its users. In addition, there are AIS users who use the system to process the accounting data entered and transform it into information. These users are likely to be concerned with the technical performance of the system. Specifically, the users want a system that enables the accounting process to be quicker. The top management of the AGD stated that:



“The system is effective when it speed up the accounting process..”

In general, system effectiveness is depending on the system capability in achieving its objective and fulfills organisation’s needs. This criterion of effectiveness is widely acknowledged in previous literature and also consistent with the opinion from accountant in BPOPA, who asserted that:

“The system is considered effective when it can achieve its objective.”

## 9. Discussion

Overall, the Malaysian Federal Government of Malaysia has one of the well-known installed proprietary software (i.e. SAP ECC 6.0 integrated with SAP HANA) to assist their accounting operations. Having seen the evolution of the Government’s AIS, it is clear that the Government of Malaysia has continuously encouraged the periodic improvement of the system to ensure that their system is not outdated. In addition, the advancement of technology is needed to cater the changes in accounting world. History shows that the Government took sufficient time to prepare carefully in order to ensure successful of the system updates. Every update made was planned well, in that the Government appointed experts, provided training, made reference to other countries and improved the facilities related to the system. In addition, the timeline of implementation was extended to allow for full preparation of both the system and its users.

Specifically, as regards system effectiveness, previous studies (e.g. Chalu, 2012; Ilias & Razak, 2011; Ilias *et al.*, 2009; Ilias *et al.*, 2007; Doll & Torkezadeh, 1988) were found to apply user satisfaction as one of the measures for system effectiveness. Naturally, satisfaction comes from the fulfilment of requirements or expectations (Cameron, 1980; Pitt *et al.*, 1995). In reality, it is very difficult to set the same expectation for everybody. Everyone has different expectations due to their different experience, role and requirements from the system. Nevertheless, there is always a general understanding amongst system users about system effectiveness. In this study, satisfaction with the system is considered to be a generally accepted perception of the system, regardless of any specific criterion.

In addition, other criteria found in this preliminary study are consistent with measures applied in the literature, such as user-friendliness (Ismail, 2009; Mitchell *et al.*, 2000), ease of understanding, ease of use (Cohen *et al.*, 2016; Ilias & Zainudin, 2013; Ismail, 2009) and easy access. Nevertheless, the criteria of ease of understanding and easy access are commonly considered to be of lesser importance, or are merged with ease of use criteria. Furthermore, this study found that users of the system perceived system effectiveness to be the ability of the system to provide high quality information to support decision-making.

Nevertheless, not every user of AIS is a decision-maker (Chalu, 2012). As the function of technology is to assist in operation, its users perceived system effectiveness as a system that was capable of assisting in the accounting process. In other words, they were more concerned with the ability of the system to improve the accounting process. In particular, this study found that system effectiveness was perceived in terms of the benefit of the system in speeding up the accounting process. In addition, there were users who were responsible for processing the accounting data into information and producing accounting reports. In order to have that, the system should be able to perform real time transaction and be integrated with other related systems. Previous studies discussed and applied these criteria under the benefit of the system (Ilias & Zainudin, 2013; Seddon, 1997) and some other researchers considered this measure under the production of accounting information (Sacer & Oluic, 2013, Mitchell *et al.*, 2000).

As discussed, the findings of this study are consistent with prior studies. However, previous studies applied the measures separately or differently from one another. Some studies applied three measures discussed in this study, while some other studies applied five or more measures in assessing system effectiveness. As such, this study would like to suggest an integrated understanding of system effectiveness by proposing nine characteristics of system effectiveness, being: user satisfaction, user friendliness, easy access, information quality, meeting users' requirements, assisting in operations, improving productivity, supporting decision-making and speeding up the accounting process.

## 10. Conclusion

An inability to adapt and embed the advancement of technology in an organization may cause that organization to be left behind. However, installing a high-technology system does not guarantee the effectiveness of the system (Puasa, 2017). In fact, its installation entails large amounts of money as well as massive human capital preparation. Therefore, the assessment of system effectiveness is highly important. Nevertheless, inconsistent measures and various definitions in the literature have all led to difficulties amongst researchers and practitioners in choosing the best measure for system effectiveness. Thus, this preliminary study provides insight into the historical evolvement of the AIS and the current system in use by the Malaysian Federal Government. Most importantly, this paper offers an early view for the definition of AIS effectiveness from the perspective of the system's users. In particular, this study has discovered integrated characteristics for an effective system. The findings from this study are suggestive of the direction for a comprehensive or integrated measurement of AIS effectiveness that can be generalized to a wider context.

Nevertheless, we acknowledge that this study is a preliminary study on the system effectiveness in the context of the Malaysian Federal Government. Its findings are therefore limited to the Malaysian Federal Government, and may not be generalized to other settings until further study has been conducted in a wider context. The data used in this study were gathered and assessed using qualitative methods, and are based on peoples' perception. Thus, respondents may be misleading in sharing their opinion. However, consideration was taken accordingly to minimize such potential bias. As such, further study is suggested, to consider a larger sample of the population through quantitative study and analysis.

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