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Obstacles to Accounting Information System Performance in Indonesian Public Sector

Diajeng Muliyani
Universiti Sains Malaysia
Email: diajeng.mulyani@gmail.com

Lian Kee Phua *
Universiti Sains Malaysia
Email: phualk@usm.my

Sin Yin Teh
Universiti Sains Malaysia
Email: tehsyin@usm.my

Tan-Chin Lim
Universiti Sains Malaysia
Email: tclim@usm.my

** Corresponding Author*

Abstract
Purpose: This study attempts to provide insights about obstacles that are accounted for the unsatisfactory accounting information system (AIS) performance pertaining to data quality in the public sector of Indonesia.
Design/methodology/approach: The SmartPLS was used to identify the factors influencing data quality of AIS from the information producer's perspective via a questionnaires survey.
Findings: The results reveal that management support, data quality characteristics, human factors and organisational factors significantly influencing data quality of AIS.
Research limitations/implications: Due to resource constraints, this study only surveyed work units under the Ministry of Education and Culture. Future studies may consider including respondents from other ministries under the Indonesian Central Government to gain in-depth insights about barriers to AIS performance in the public sector.
Practical implications: The findings provide useful insights to relevant authorities in identifying obstacles that hinder AIS performance in the public sector.
Originality/value: The study presents evidence to extant literature on AIS performance in a developing country as an element of instrumental accountability according to institutional logics perspective.
Paper type: Research paper

Keywords: Data quality, Accountability, Public sector, Accounting information system (AIS), SmartPLS, Indonesia

Introduction

Financial reporting is a fundamental element to enhance transparency and to demonstrate the government's openness in the management of public resources in the public sector. Tran, Nguyen and Hoang (2021) revealed that financial reporting information plays an essential role in ensuring the quality and enhancing performance in the public sector. The Indonesian

government institutions have established specific Accounting Information Systems (AIS) to generate financial statements in discharging their accountability to multiple stakeholders (Mardiasmo, 2002). To ensure the credibility of the financial information, the Supreme Audit Board (Badan Pemeriksa Keuangan, BPK) will then release an unqualified opinion to those government bodies that have exhibited a high level of responsibility and accountability based on the audit reports prepared by the independent auditors.

In auditing the financial reports of the Central Government (Laporan Keuangan Pemerintah Pusat, LKPP), the BPK has identified deficiencies related to the application of the Accounting System of the Central Government (SAPP). The audit reports, for instance, revealed that the Ministry of Education and Culture had consecutively failed to attain unqualified opinion over the period of 2006 to 2012 from the BPK (Badan Pemeriksa Keuangan, 2013). The Ministry of Education and Culture is liable for administering numerous organisations across the country and thus this ministry had received huge budget allocation (around 20%) from the state budget over the years. In 2018, the Ministry of Education and Culture secured Rp. 444.131 trillion appropriations out of the total budget of Rp 2,220 trillion and this amount is equivalent to 20% of the state budget (Office of Assistant to Deputy Cabinet Secretary for State Documents & Translation, 2018). Given the increasing demand for higher accountability to gain public trust, the poor financial reporting quality among government institutions has drawn great concern in the public sector.

Due to its geographical factor, over thousands of the public sector AIS in Indonesia were set up at different locations to carry out their respective functions. Some of these work units operate on systems that depend heavily on the usage of desktop (Nasrun et al., 2012) without good internet connections support. In practice, data taken into desktops will have to be integrated and then transferred separately between the work units at different hierarchical levels. This raises the concern over high risk of human and application errors in the process to prepare financial reports. Moreover, the facilities and human resources also vary among the work units. As such, it often causes an extended delay in reconciling the data and information on every phase of the work units. One of the areas that calls for considerable attention is regarding the data collection process that integrates manual recording and reporting of all financial transactions among the State Ministries or Agencies into electronic form.

To deliver a high level of transparency and accountability, an AIS that is capable of providing credible and timely information is critical in the public sector reforms. As suggested by the concept of garbage in garbage out, if input of data is subject to a high risk of errors, the output will be problematic and not able to produce useful information for decision-making. Moreover, in the contexts of most developing countries, even though some factors are well understood and widely perceived as important and critical in determining data quality, there could be significant deviation in the actual practice. Hence, this study aims to examine the gap between the perceived importance and the actual performance of vital attributes on data quality that can impair the quality of accounting information system and become obstacles in discharging accountability in the public sector. The study aims to alert Indonesian government and other relevant authorities to improve the quality of accounting input by the AIS in the public sector. Theoretically, the study contributes to the literature on barriers to discharging accountability in public sector accounting from the perspective of a developing country. The remaining sections will present the literature review, then followed by a research methodology used, analysis and discussion of the findings and concludes with implications, limitations of the study and suggestion for future research.

Literature Review

Inferior and substandard quality of information can impact on social and business activities (Ballou et al., 2004). Public sector institutions are facing increasing pressure to enhance their performance. Beshi and Kaur (2020) claimed that a transparent and accountable government would gain public trust in government. In the drive towards public sector reforms to promote good governance and better service quality, governments in the developing countries have shown strong commitment towards the adoption of new public management (NPM) practices in the 1980s and 1990s (Suparman et al., 2015). The efficient use of private sector management approach, control tool, as well as accounting and reporting methods served as the cornerstone of NPM (Alford & Greve, 2017). In the attempts to enhance the accountability of public organisations, the public sector of developing nations in Southeast Asia, such as Malaysia, Thailand, Indonesia and Vietnam have conveyed their commitment to prepare financial statements under accrual accounting (Nakmahachalasint & Narktabtee, 2018; Tran et al. 2021). Rakhman and Wijayana (2019) found that the quality of financial reporting in the Indonesian government sector is associated with characteristics of the governments, experience of mayors and financial incentives.

Rana and Hoque (2020), leveraging on the lens of institutional logics perspective, suggest that scholars have broadly classified accountability into two types of institutional logics, namely, 'instrumental accountability' and 'relational accountability'. Instrumental accountability involves the utilisation of accounting tools such as budgeting, costing and accrual accounting, whereas relational accountability tends to engage with non-financial tools that comprise preeminent and practical approaches (Rana & Hoque, 2020). Accounting numbers thus play a critical role in enhancing instrumental accountability. In Australia, accounting technologies have become essential components of NPM (Barrett, 2017).

In a study conducted by Thoa and Van Nhi (2021) on Vietnamese public sector, factors contributing to the quality of AIS are the degree of expertise and experience of the chief accountant, availability of communication network, readiness of software and hardware devices as well as the degree of financial independence. According to Fitrios (2016), the chief accountant plays an important role in establishing the system via the application of hardware and software equipment to improve the operation of collecting, processing and storing of data more effectively and efficiently (Xu et al. 2003). As such, the quality of financial accounting information will be improved. A good communication network system via internet is pivot in exchanging, connecting and sharing of data and information among various departments within an organisation.

Hypotheses Development

This study intends to adopt the research model developed by Xu (2003, 2015) that attempts to determine critical success factors in data quality in AIS implementation. Xu (2003) tested the critical success factors of quality data on AIS. A total of 25 factors were found from a case study and grouped into 4 categories, namely AIS characteristics, DQ characteristics, stakeholder related factors, and organisational factors.

- AIS characteristics

  According to Ismail and King (2005, 2007), AIS characteristics must match the needs of the organisation for an AIS package to have a significant impact on a firm's performance. Their studies focused on SMEs. They discovered that SMEs with high AIS configuration performed better than firms with low AIS configuration. In line with Ismail and King (2005, 2007), Tamoradi (2014) and Alsharayi (2012) also found that a suitable AIS will help workers to accomplish their tasks faster and achieve a higher performance. Xu (2003)

concluded that AIS characteristics were a key success factor in data quality of AIS. Thus, the first hypothesis of this study is:

H1: AIS characteristics positively influence the data quality of AIS in the public sector.

- DQ characteristics
  Indriasari (2008) and Winidyaningrum and Rahmawati (2010) empirically found that the internal accounting controls affect the timeliness and reliability of financial reports of local government. This is supported by research conducted by Nugraha and Susanti (2010) who found the system's internal control positively correlated with the reliability of the financial reports. A report published by the Association of Certified Fraud Examiners in 2002 showed that a strong internal control is the most effective factor in the effort to tackle corruption compared with surveillance cameras. Xu (2003) and Nord et al. (2005) considered that DQ characteristics are one of the critical factors because of their role in getting the information right in the initial phase. The investigation conducted by Nord et al. (2005) and Saleh (2013) revealed that DQ characteristics have a significant effect on AIS data quality. The second hypothesis of this study is:

  H2: DQ characteristics positively influence the data quality of AIS in the public sector.

- Stakeholder related factors
  Studies found top management commitment in terms of how they set up goals, programs and policies for quality, level of employee autonomy (Han & Hong, 2019) and allocate resources as critical success factors to enhance quality, accountability and performance. The commitment from middle management to DQ became the critical success factor of data quality on AIS (Xu, 2003) and empirically proven by Saleh (2013). It has been found that the capability of the information system's personnel has a positive impact on the performance of those information systems (Choe, 1996). In line with this, Xu (2003) found that personnel competency is the critical success factor of data quality in AIS. The third hypothesis of this study is:

  H3: Stakeholder related factors positively influence the data quality of AIS in the public sector.

- Organisational factors
  The case study conducted by Xu (2003) explaining that organisational structure within the organisation is critical influencing data quality in AIS. Good organisational structures, such as a clear separation of each division could provide efficient controls to ensure data quality in AIS. Furthermore, Xu (2003) found that the lack of employee collaboration can impair data quality. Everyone involved with the systems has to work closely as a team and has good communication. not only within the division but also among different divisions. The fourth hypothesis of this study is:

  H4: Organisational factors positively influence the data quality of AIS in the public sector.

Methodology and Data Collection

In this study, the SmartPLS was used to inspect the factors influencing data quality of AIS from the information producer's perspective via sending questionnaires surveys. PLS is a method of modelling relationships between a dependent variable and other independent variables

(Garthwaite, 1994). Two benefits of using SmartPLS in this study are no assumptions are required and this method can give an accurate estimation with a relatively small number of samples.

The questionnaire was adopted from Xu (2003, 2015) studies. Five-point Likert scale is used to measure the level of data quality, AIS characteristics, DQ characteristics, stakeholder related factors and organisational factors. The unit of analysis on this study is organisational level, which is referring to the work unit in this study.

In order to obtain a higher validity of the questionnaires, a pre-test was conducted. The questionnaires were delivered to two academicians and five practitioners for their feedback on the design of the questionnaires. The five practitioners involved four operators and one verifier. Feedback was gathered to confirm that all the wordings and terms used in the questionnaires were easily understood, accurate and consistent with the hypotheses testing. After the pre-test, several minor amendments were made to enhance the quality of the questionnaires.

The Ministry of Education and Culture's treasury offices in Indonesia is a decentralised organisation that consist of 310 work units. This ministry is one of the largest budget allocation recipients in Indonesia. To conform with the reporting requirements, all work units have to follow a series of Standard Operating Procedure (SOP) issued by the General Secretary of the Ministry of Education and Culture. According to the SOP version 3/2009, Standar Akuntansi Indonesia (SAI) officers are responsible and accountable in preparing the financial statements. These SAI officers encompass validators, verifiers and operators. The process starts with the validators who authorise the recording of transaction into the SAI applications, followed by verifiers who will then verify the completeness of the source of documents. Lastly, the operators record the transactions into the SAI applications.

In this study, the population consists of validators, verifiers and operators of SAI in all 310 work units under the Ministry of Education and Culture, total up to 612 respondents. The questionnaires were distributed to SAI officers to get their perception as information producer in preparing financial reporting of the public sector. Based on the suggestions from Sekaran and Bougie (2010) and Israel (2013), this study targeted that the usable sample size is set at a minimum of 240 respondents. This study uses convenience sampling, in which the respondents are selected because of their accessibility and availability.

Out of 240 targeted respondents, the researchers managed to collect 215 responses, representing a response rate of 79.60%. Out of 215 responses, 47 were discarded due to incomplete answers. Hence, the usable response rate was 78.14%.

Analysis of Findings

The authors used factor analysis to examine validity of the variables. A total of 25 items of critical factors were examined to obtain underlying dimensions. The result from factor analysis with principal component analysis as extraction method indicates that there are four components having eigenvalues of more than 1. The four factorial groups extracted are named as human factors, DQ characteristics, organisational factors and management support (see Table 1). Note that Table 1 shows strong factor loadings values ranging from 0.56 to 0.83 after the removal of the 4 items below 0.5 loading coefficients (Hair et al., 2019).

Table 1: Factorial Group after the Deletion

Items	Variable			
	Human Factors	Organisational Factors	DQ Characteristics	Management Support
Employee relationship	**0.74**	Factors	0.31	0.05
Continuous improvement	**0.73**	0.12	0.01	0.32
Risk management	**0.65**	0.38	0.24	0.32
Personnel competency	**0.61**	0.55	0.04	-0.15
Physical environment	**0.67**	0.29	0.25	-0.06
Audit and Review	**0.65**	0.35	0.11	0.23
Internal control	**0.68**	0.14	0.44	0.12
Training and education	0.09	**0.65**	0.48	0.14
Clear DQ vision	0.32	**0.62**	0.24	0.32
DQ manager position	0.55	**0.68**	0.21	0.43
Organisational Structure	0.26	**0.79**	0.19	-0.16
Relevent DQ policies and standards	0.12	**0.75**	0.15	0.28
Organisational culture	0.28	**0.75**	0.11	0.31
Input control	0.50	0.22	**0.61**	0.09
Management of change	0.17	0.27	**0.83**	0.09
Performance evaluation and reward	0.28	0.07	**0.73**	0.13
Information supply quality management	0.55	0.16	**0.80**	0.17
Teamwork	0.27	0.19	**0.64**	0.45
Understanding of system and DQ	0.50	0.15	**0.51**	0.30
Top management comitment	-0.43	0.29	0.41	**0.54**
Middle management support	0.22	0.07	0.14	**0.79**

Note: Bolded values are the indicators on its designated construct.

The outer or measurement model illustrates the relationship between the constructs and their corresponding indicators. In order to evaluate the measurement model, one has to confirm with the reliability, convergent and discriminant validity. Internal consistency reliability is determined by Cronbach's alpha and composite reliability. Referring to Table 2, the reliability is confirmed as the values of both Cronbach's alpha and composite reliability were above the threshold value of 0.50 (Hair et al., 2014; Nunally & Bernstein, 1994). As for convergent validity, we tested the factor loadings and Average Variance Extracted (AVE). Results were indicated in Table 2 that both measures exceeded the recommended value of 0.7 (Hair et al., 2019). These confirmed that the constructs meet reliability and validity.

This study examined the relationship between the DQ characteristics, management support, organisational factors, and human factors with data quality. As shown in Table 3 and Figure 1, the model displays R^2 value of 0.1224, suggesting that 12.24% of the variance in the extent of data quality can be explained by DQ characteristics, management support, organisational factors, and human factors. According to Gujarati (2003), the purpose of regression analysis is not to get a high R^2 per se, but to attain some reliable and trustworthy estimates of the actual population regression coefficients and draw statistical inferences and interpretation of them. Furthermore, Gujarati (2003) expressed that a low R^2 is not necessarily bad. The results presented in Table 3 indicate that the relationship between DQ characteristics, management support, organisational factors, human factors and data quality are statistically significant.

Table 2: Result of Measurement Model

Model Construct	Measurement Item	Loading	Cronbach Alpha	Composite Reliability	AVE
Data Quality	d_1	0.99	0.98	0.99	0.97
	d_3	0.97			
	d_4	0.98			
	d_2	0.98			
DQ Characteristics	dq_1	0.78	0.87	0.57	0.89
	dq_2	0.86			
	dq_5	0.84			
	dq_4	0.81			
Management Support	man_1	0.96	0.68	0.83	0.73
	man_2	0.73			
Organisational Factors	Org_2	0.55	0.89	0.78	0.52
	Org_3	0.82			
	Org_4	0.59			
	Org_5	0.77			
	Org_6	0.68			
Human Factors	Hum_1	0.65	0.88	0.51	0.51
	Hum_2	0.75			
	Hum_3	0.62			
	Hum_4	0.59			
	Hum_5	0.60			
	Hum_6	0.73			
	Hum_7	0.91			

Table 3: The Path Coefficient and Hypothesis Testing after Bootstrapping

	t-value	Path Coefficient	Supported
H1: DQ Characteristics → Data_Quality	2.19*	1.19*	YES
H2: Management Support → Data_Quality	1.98*	1.18*	YES
H3: Organisational Factors → Data_Quality	2.00*	1.22*	YES
H4: Human Factors → Data_Quality	1.97*	0.998*	YES

Note: *$p < .05$ at $t_{0.05, 166}$ - value = 1.974

Discussion

The result of factor analysis from this empirical study showed that the factors on data quality created four independent variables, namely human factors, DQ characteristics, organisational factors, and management support. The PLS regression result showed that all the four factors, namely DQ characteristics, management support, organisational factors, and human factors are supported.

Practically, the operator, verifier, and validator are the persons to ensure the implementation of SAI. In particular, these three categories of officers who involve in inputting data into the SAI play crucial roles in determining the data quality in the AIS. To illustrate further, validator grants the authorisation to record transaction data into the SAI application. Then verifiers corroborate and justify the completeness of the source document before the transaction is recorded by the operator into the SAI application. In terms of hierarchy of position, it is common that the top manager or middle manager acts as the validator in a work unit. Whereas verifier is the middle manager or the lower manager in a work unit or the ex-operator who is

appointed as a verifier., Usually operator is the junior employees in an organisation. In order to execute their jobs successfully, proper skills and a comprehensive understanding of the procedures and rules related to the preparation of financial reports are requested in the management of SAI by these different categories of officers.

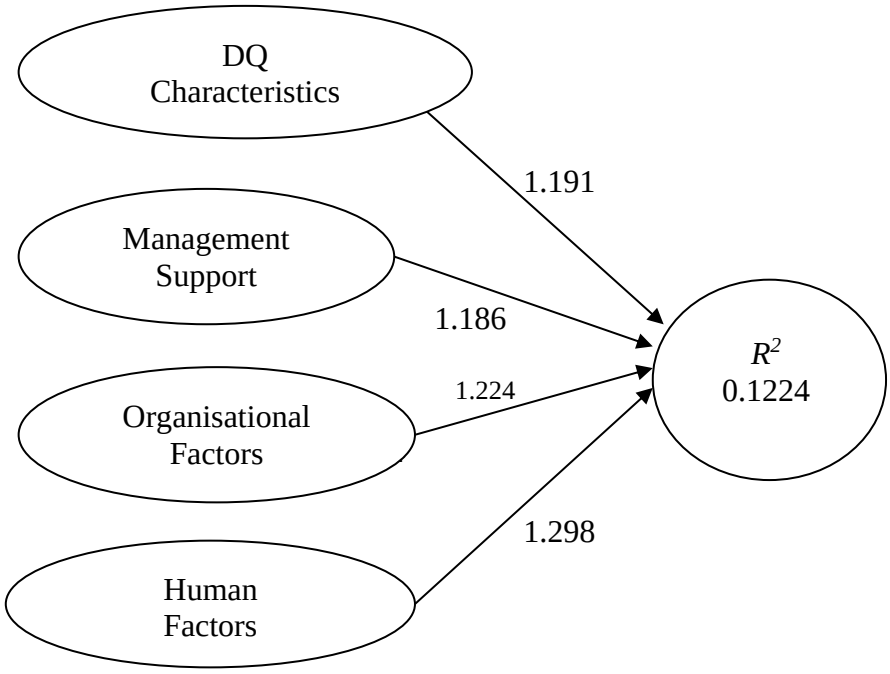

Figure 1: The *t*-statistics Result of Bootstrapping Procedure

In the current practice, most of the operators of SAI are non permanent employees or junior employees in a work unit. As a result, there is a high turnover and job mutation among the employees. In Indonesian's public sector, there are two types of employment, permanent vs contractual basis. The permanent employees are civil servants (Pegawai Negeri Sipil, PNS) whereas the temporary employees are engaged to work under contract for one year. Each year, non-permanent employee performance will be evaluated. If his/her performance is good, then the employment contract will be extended for another one year. Sometimes, the temporary employee did not extend his/her contract even though she/he has good performance. This is because the temporary employees moved to new jobs in a larger external organisation with better salary.

Due to most of the SAI personnel do not possess accounting qualification, the Finance Ministry has allocated some budget to provide technical skills training for operators and verifiers of SAI. The Finance Ministry will issue a letter to the work units and request the head to send their employees for SAI training. Usually, the training is conducted for 2 weeks. Employees are trained with relevant rules and law that become the basic reference for financial reporting. Moreover, to improve the technical skills of SAI personnel, the ministry also carries out technical assistance training for the preparation of financial statements for work units under the auspices of that particular ministry. Technical assistance is conducted about 3 days. Employees learn about problem-solving skill or case studies about how to apply an event or transaction into SAI. However, it is not mandatory for the existing employees to attend further training. The participation of the work units to attend the training is built on the awareness and initiative of their leader to direct them for the training. This has made the training become optional for the employees.

Furthermore, for permanent employees, SAI training is a non-degree training that does not contribute to the promotion of employment or salary increment. As a result, employees are not motivated to participate in the trainings. Nevertheless, the training of SAI is crucial to increase the understanding of SAI personnel. Eventually, the objective of the training to provide a good understanding of the financial statements and the importance of quality information has not been successfully achieved.

Conclusion

This study presented an empirical study which investigated the factors affecting data quality of the AIS performance in Indonesian's public sector. PLE-SEM was used to assess the four hypotheses. The study finds that human factors, DQ characteristics, organisational factors, and management support have significantly contributed to data quality issue. In fact, this phenomenon is common among public sector in emerging countries such as Indonesia and Malaysia in which modified cash basis is still accepted in the preparation of public sector financial statements.

Theoretical Implications

From the theoretical perspective, this study extends the research model on critical success factors in data quality in AIS implementation proposed by Xu (2003) to the public sector by providing empirical evidence from four specific dimensions, namely DQ quality characteristics, management support, human factors and organizational factors. The findings also contribute to the extant literature on public sector accountability by presenting the attributes that are critical in discharging instrumental accountability in the public sector, particularly in the contexts of developing countries.

Practical and Social Implications

This study firstly presents evidence about critical success factors in data quality in the implementation of AIS. These factors highlighted the gap that the policy-makers should consider in introducing necessary measures to improve the data quality in the public sector AIS. In particular, under the modified cash basis that is currently widely implemented in the public sector in developing countries, accounting qualification is not a critical criterion in recruiting employees. However, with the move towards accrual basis accounting in the public sector in many emerging countries, accounting skills and knowledge have become crucial to ensure that those critical success factors can be achieved. It is therefore high time for the respective governments to allocate more resources and imposed more stringent requirements to enhance government servant's competency.

Limitations and Suggestions for Future Research

Due to resources constraint, this study only surveyed work units in the Ministry of Education and Culture. Future studies may consider taking into account of respondents from other ministries under the Indonesian Central Government to gain in-depth understanding of factors affecting the data quality of AIS performance. On 30 March 2021, a new Ministry of Education, Culture, Research and Technology was born out of the merger of the Ministry of Education and Culture and the Ministry of Research and Technology. Therefore, future study can investigate the new critical factors for the allocation of resources under this new ministry. The model can also be tested using cross-countries data to allow the results to be generalised to the public sector of other developing countries.

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