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Benefits and Challenges of Digital Audit Implementation in the Malaysian Public Sector: Evidence from the Accountant General's Department of Malaysia

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Abstract

Purpose: The current study aims to investigate the important benefits or advantages of digital audit implementation perceived by the internal auditors of the Accountant General's Department of Malaysia (AGD), and examine the significant challenges faced by the AGD auditors in implementing digital audit.

Design/ Methodology/ Approach: A focus group discussion was conducted with AGD officers involved in digital audit implementation and a questionnaire survey was distributed to the AGD auditors to achieve the research objectives. All 124 auditors responded and returned the completed questionnaire. Thematic analysis was performed on the transcription of the focus group discussion while descriptive statistics of mean scores, standard deviations, and mean score ranking were utilised to analyse the questionnaire data.

Findings: The top five ranked benefits of digital audit implementation perceived by the respondents were improving the quality of audit report, increasing the efficiency of audit, assisting auditors in identifying material misstatements, improving the quality of the audit processes and enhancing audit effectiveness. The top three challenges were requiring additional education and training to acquire the necessary digital skills, high implementation costs and the risk of data security (leakage) and confidentiality.

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Originality/ Value: The present study contributes to the existing limited empirical evidence on the fundamental advantages and challenges of digital audit implementation despite various conceptual discussions on the two implementation aspects.

Keywords: Digital audit, public sector, advantages, challenges, internal audit

1.0 Introduction

The rapid advancement of digital technologies has revolutionised various life aspects and has fundamentally redefined organisational operations and interactions. The public sector is a crucial pillar of service delivery with the primary goal of integrating digital technologies into public sector operations to promote higher transparency and efficiency (Alvarenga et al., 2020; Otia & Bracci, 2022). The digital transformation in Malaysia is a propagated agenda of the Malaysian government in line with the global response to the Industrial Revolution (IR) 4.0. The digital transformation is highlighted in the 12th Malaysia Plan (2021-2025) and the Malaysia MADANI or SCRIPT[1] (Ibrahim, 2022). The government has introduced a decennial Malaysia Digital Economy Blueprint (2021-2030) or MyDIGITAL to stipulate the direction and initiatives for Malaysia to become a digitally driven and high-income nation while serving as a regional leader in digital economy implementation. Recently, the Prime Minister of Malaysia, Dato' Seri Anwar Ibrahim, and the President of the World Economic Forum, Borge Brende, have announced the establishment of the Centre for the Fourth Industrial Revolution Malaysia (C4IR) in May 2023 as a further initiative to accelerate the digital transformation agenda of the country (World Economic Forum, 2023).

The auditing field is one of the public sector areas with the progress of digital transformation. Several governments, such as Belgium, the Netherlands, Brazil, and the European Union, commenced with taxation audits for subsequent digital audit transformation (Bezverkhyi & Poddubna, 2023). Nevertheless, the intricate regulatory environment in the public sector has prompted the creation of labs or incubators to experiment with potential innovations before being adopted for large-scale digital implementation (Otia & Bracci, 2022). Multiple distinct versions of tax audits have been implemented and customised to suit the specific requirements of each country (Bezverkhyi & Poddubna, 2023). Specifically, digital audits integrate advanced technological tools, including data analytics, cloud computing, and artificial intelligence (AI), to empower auditors to conduct more comprehensive and real-time assessments of financial records beyond the traditional audit processes (ICAEW, 2019). The shift towards digital audit provides numerous benefits. The automation of mundane audit processes effectively eliminates repetitive manual tasks while enhancing auditors' efficiency and productivity (Tiberius & Hirth, 2019; Kelly, 2020) by mitigating the risk of human errors (Moffitt et al., 2018). Big data and data analytics also elevate the quality of audit engagement (Kelly, 2020; Lazarevska et al., 2022). The establishment of an information analysis system (IAS) in Russia has empowered auditors to conduct remote audits, which facilitates assessments of over 130

[1]MADANI is the Malay acronym for SCRIPT which stands for Sustainability, Care and Compassion, Respect, Innovation, Prosperity, and Trust. It is a policy framework designed to achieve a sustainable and prosperous Malaysia.

information systems across more than 30 state agencies. The approach has discovered 650 procedural violations and concealments in public procurement within one year (Otia & Bracci, 2022). The application of the concurrent control model (CCM) in Peru has also resulted in savings of approximately USD26.5 million in construction and reconstruction costs associated with the El Nino phenomenon (Otia & Bracci, 2022).

While digital audit transformation entails a comprehensive and strategic change that redefines the existing organisational operation (Gong & Ribeire, 2021; Otia & Bracci, 2022), public sector entities are not ready or willing to transform. Substantial financial investments are required, which is challenging for public sector entities constrained by budgetary limitations (Danielsen, 2021). Furthermore, concerns related to data security, the complex regulatory environment, resistance to change, and lack of expertise may deter or decelerate the adoption of transformative digital practices in the public sector (Danielsen, 2021; Otia & Bracci, 2022). The National Audit Department (NAD) in Malaysia is the primary entity responsible for auditing public sector entities. Article 106 of the Federal Constitution states that "The accounts of the Federation and the States shall be audited and reported on by the Auditor General" (National Audit Department, 2023a). Three auditing types conducted by the NAD auditors are compliance, financial, and performance audits (OECD, 2011; National Audit Department, 2023b). Meanwhile, a division under the AGD, namely the Internal Audit Management Division (BPAD), is responsible for auditing public sector entities by focusing on financial and compliance audits. The difference in the audit role between the two entities is that the NAD audit is referred to as an external audit, whereas the AGD audit is referred to as an internal audit. The present study recruited the AGD internal auditors as the respondents.

The present study evaluated AGD digital audit implementation and delineated relevant benefits and challenges. The research questions are as follows:

i. What are the key benefits of AGD digital audit implementation?
ii. What are the primary challenges of AGD digital audit implementation?

The findings on the benefits and challenges perceived by the AGD auditors provided insightful information towards understanding the current sentiment of digital audit implementation in the specific context of the BPAD of the AGD. The findings are crucial to various parties, including individual auditors, the BPAD management team, and the AGD top management, for charting and strategising the future direction of the digital audit implementation journey. Moreover, the information could assist various parties in leveraging respective strengths while resolving the current challenges to ensure the success of digital audit implementation by the AGD and the Malaysian government. The paper comprises several sections: Section 2 provides the literature review, Section 3 describes the data collection methodology, Section 4 presents the findings, and Section 5 discusses implications, limitations, future research suggestions, and conclusion.

2.0 Literature Review

Numerous studies have been conducted on public sector audits in recent years, although studies on audit digitalisation in the public sector are limited (Ferry et al., 2022, Otia & Bracci, 2022). While prior empirical studies on digital audit in the public sector are limited, Ahmad et al. (2023) reported in the bibliometric study an increasing research trend on digital

audit in the public sector. The information technology (IT) impact on businesses has grown exponentially and transformed the audit process, which results in both opportunities and challenges for auditors (Mahzan & Veerankutty, 2011). The present study focused on the benefits and challenges of digital audit implementation.

2.1 Digital Audit Advantages and Benefits

Digital technologies in public sector auditing assist in analysing the usage of budgetary funds by the auditee to solve the issue of budgetary resource allocation in each public sector unit (Antipova, 2019). Furthermore, digital audit enables public sector auditors to demonstrate higher professionalism and provides higher value to managing the public sector cost, which subsequently ensures the highest levels of accountability and transparency to the civil public. While the auditing profession is expected to transform due to digitalisation, the purpose of the audit function remains unchanged. A higher emphasis is also provided on accountability and transparency to foster stakeholders' trust that resources are being employed efficiently, effectively, and economically (Pilos, 2020). Simultaneously, big data analytics assist auditors in automating transaction testing and enabling the inclusion of the entire population (Earley, 2015). Digitalising the audit procedure could facilitate auditors to account for the entire population in the auditing process. Bonyuet (2020) also highlighted that digital transactions enable auditors to perform continuous audits as the obtained data are highly reliable for executing the reconciliation process. Huang and Vasarhelyi (2019) concurred that the adoption of robotic process automation (RPA) could significantly elevate the usage of certain procedures from sampling to testing the entire population. Kokina and Davenport (2017) also underscored that the employed technology enables auditors to identify irregularities from the entire population rather than a sample while assisting in locating relevant information before being processed for auditors' usage. Resultantly, auditors can comprehend complex judgmental areas in-depth as the time required for digital auditing is less than traditional auditing processes (Kokina & Davenport, 2017; Melin & Toezay, 2022).

Another result of digitalising the audit function is reducing repetitive and basic tasks as machines are more efficient at performing tedious and rule-based tasks (Cho et al., 2020) which could reduce the auditor's time to conduct an audit (Fossati, 2020). According to Moffitt et al. (2018), repetitive and manual audit work could be significantly reduced, which not only saves a significant amount of time but also guarantees fewer mistakes during the process. The 'man-machine cooperation' is considered the future auditing form (Zhang, 2019). Furthermore, Suffield (2020) highlighted that technological advancement in auditing processes could improve audit quality and contribute higher value to the process. The latest auditing standards must be developed to measure the quality of the audit process, including data management and relevant technologies (Tang & Karim, 2017). Traditional audit procedures could be less effective and efficient due to large databases and wider sources, which require proper consideration of the conventional auditing method (Dai & Vasarhelyi, 2016), especially in the public sector. The private sector audit in the Netherlands also integrated RPA into the audit process to mimic human actions, thereby reducing labour-intensive tasks, such as copying or re-typing data (Meuldijk, 2020). The assimilation of alternative evidence types through AI could also improve the effectiveness of audits (Issa et al., 2016). Additionally, developing algorithms on the historical data from engagement files enables suggestions of relevant risks, challenges, and strategies based on the derived characteristics, which could improve the audit process by providing input instantaneously to assist auditors in

the decision-making process (Meuldijk, 2020). Summarily, advanced technologies, including big data analytics, AI, blockchain technology, and RPA, reduce human involvement in the auditing process while enabling the testing of a huge and wider population rather than just a sample (Said Almaleeh, 2021; Melin & Toezay, 2022). The automation would allow auditors to devote more time to more challenging auditing areas, such as estimating fair value investments or looking into probable anomalies, for higher audit quality (Moffitt et al., 2018).

2.2 Digital Audit Implementation Challenges

Digital transformation of the audit process poses several challenges for auditors. One of the challenges is that both the public and private sectors might be required to recruit fewer accounting graduates for audit work in the future. Digitalising the audit procedure suggests that certain areas could be automatically managed, such as the continuous audit aspect. Technological tools also allow more efficient processes with task automation for higher productivity (Pacific Standard, 2015). Issa et al. (2016) proposed that AI could potentially replace the auditor in various automated tasks in the future. Another challenge in digital implementation is the cost of the employed technology. The digitisation process could boost the economy while rendering a country uncompetitive owing to financial constraints in implementing the latest technology (Peterson, 2016; Melin & Toezay, 2022). In addition, the public and private sectors must allocate a budget for education and training purposes to digitalise the auditing process (Lois et al., 2020; Yilmaz, 2017). The skills acquired through training are imperative when the auditing process is automated despite higher costs. While digital auditing can be advantageous, several obstacles may decelerate the process. Data collection, preparation, and documentation processes must be automated before the auditor performs data analytics. The analytics can identify any outliers and exceptions and allow focus on the areas with higher risks. Nevertheless, the utilisation of digitalised data and data analytics in the public sector remains limited.

Numerous auditors have not gained sufficient skills for automated audit workflow and may not be ready for digital transformation, which is a significant challenge in appropriately training and educating future auditors (Joshi & Marthandan, 2018; Okab, 2013) to tackle the issue. The digital audit requires auditors to possess adequate knowledge, education, experience, and appropriate training in the IT field (Shaqqour et al., 2022). Specifically, auditors are anticipated to acquire the appropriate skillsets and competencies in utilising current information and communication technology (ICT) skills, working in various applications and fields, applying knowledge of programming languages, rapidly searching and processing data, and managing digital technologies (EY, 2015; Zhang et al., 2018; Alisherovich & Isoqovna, 2022). Other obstacles include the cost of specialised auditing software, the high prices of public programmes, and the lack of suitability for all business establishments (Okab, 2013). Hence, the public sector should invest in future auditing techniques and train auditors to resolve the issue of inadequate expertise (Ellul & Buttigieg, 2021). While various advantages or benefits and challenges of implementing digital audit in the public sector were acknowledged and emphasised in prior studies, empirical research work on the two research questions is limited. The present study sought to bridge the literature gap while contributing to the governmental digital transformation agenda by empirically investigating the key benefits and challenges of digital audit implementation in a developing economy, namely Malaysia.

3.0 Methodology

Two research methods were employed, namely (1) a questionnaire survey and (2) a focus group discussion. The following subsections describe the procedures of each method.

3.1 Questionnaire Survey

An online survey questionnaire was administered in June 2023 to appraise the advantages and challenges of digital auditing implementation in the public sector, specifically the BPAD of the AGD.

3.1.1 Research Instrument, Respondents, and Data Collection Procedures

A structured survey questionnaire was constructed based on existing instruments derived from prior literature (Okab, 2013; Issa et al., 2016; Kokina & Davenport, 2017; Antipova, 2019; Zhang, 2019; Pilos, 2020; Melin & Toezay, 2022, Otia & Bracci, 2022), with several additional questions included to suit the purpose of the present study. The questionnaire was segmented into two main sections as follows:

i. Section A: Demographic Profile (respondents' background)
ii. Section B: Advantages and Challenges of Digital Audit Implementation in the Public Sector

The respondents were the AGD auditors attached to the BPAD. The researchers utilised Google Forms as an online survey administration tool. The online survey was selected to efficiently collect, store, and visualise data at a cost-effective level, which allowed for swift administration (Nayak & Narayan, 2019). The researchers collaborated with the appointed BPAD staff to disseminate the survey to auditors and ensure a high response rate. As a result, all BPAD auditors responded to the survey. The questionnaire was pre-tested before being distributed to assess the comprehensibility level of the questions among the BPAD top management and accounting lecturers. Most feedback was received from the lecturers primarily on the construction of the sentences. Meanwhile, the BPAD top management team agreed with the questionnaire items. Adjustments were also made to the wording to develop more comprehensible questions and instructions.

3.1.2 Data Analysis

Data obtained from the survey were analysed via the Statistical Package for the Social Sciences (SPSS) software. Specifically, descriptive statistics were performed to quantitatively describe and summarise the results.

3.2 Focus Group Discussion

A semi-structured interview via a focus group discussion with four BPAD top management members of the AGD was conducted on 16 June 2023. The session lasted for three hours and was attended by the Deputy Director (Special Auditing Section), Deputy Director (Operations Section), Deputy Director 2 (Asset and Inventory Accounting Compliance Unit), and Chief

Assistant Director (Quality Control and Risk Management Unit). The primary objective was to identify and understand perspectives and directions towards digital audit implementation and the encountered challenges. The interview transcript was analysed and themes were developed to obtain insights into digital auditing practices in terms of the implementation advantages and challenges.

4.0 Findings and Discussion

4.1 Respondents' Demographic Profile

Table 1 depicts that the majority of the respondents were female, which constituted 73.4% of the total respondents. The largest age group was between 31 and 40 years old accounting for 46.8% of the total respondents. A total of 45.2% of respondents possessed a Bachelor's degree, followed by 46.7% with STPM or diploma qualification. More than half of the respondents were assistant accountants while 33% were accountants at different positions. The largest group of governmental officers were employed for 11 to 15 years, followed by 16 to 20 years. More than one-third of the total respondents were experienced in audit-related work in the private sector before joining the public sector. Most respondents with experience in private audit-related work possessed below five years of working experience.

Table 1: Respondents' Demographic Profiles

Category	Description	Frequency	Percentage (%)
Gender	Female	91	73.4
	Male	33	26.6
	Total	**124**	**100.0**
Age (years)	20-30	7	5.6
	31-40	58	46.8
	41-50	51	41.1
	51-60	8	6.5
	Total	**124**	**100.0**
Educational Level	STPM or Diploma	58	46.7
	Bachelor's Degree	56	45.2
	Master's Degree	5	4.0
	Professional Qualification	4	3.2
	Others	1	0.8
	Total	**124**	**100.0**
Current Position in the AGD	Deputy Director	3	2.4
	Chief Assistant Senior Director	6	4.8
	Chief Assistant Director	4	3.2
	Senior Assistant Director	10	8.1
	Assistant Director	18	14.5

Table 1: Respondents' Demographic Profiles (continued)

Category	Description	Frequency	Percentage (%)
Current Position in the AGD	Assistant Accountant	76	61.3
	Others	7	5.6
	Total	**124**	**100.0**
Employment Years as a Governmental Officer	1-5	15	12.1
	6-10	8	6.5
	11-15	44	35.5
	16-20	43	34.7
	Over 20	14	11.3
	Total	**124**	**100.0**
Years of Experience in Audit-Related Work (Private)	No experience	77	62.1
	Less than 1 year	20	16.1
	1-5	21	16.9
	6-10	5	4.0
	11-15	1	0.8
	Total	**124**	**100.0**
Years of Experience in Audit-Related Work (Public)	Less than 1 year	19	15.3
	1-5	58	46.8
	6-10	27	21.8
	11-15	9	7.3
	16-20	8	6.5
	Over 20	3	2.4
	Total	**124**	**100.0**

4.2 Perceived Benefits and Advantages of Digital Audit Implementation

Table 2 presents the mean score, standard deviation, and mean score ranking for each of the 16 statements on digital audit implementation advantages or benefits to the public sector. The mean scores range from 3.57 to 3.80, which posits that all identified advantages or benefits are perceived as crucial by the AGD auditors. The top five ranked perceived benefits or advantages of digital audit implementation in descending importance order are improving the quality of audit reports, improving the efficiency of audits, assisting auditors in identifying material misstatements, improving the quality of the audit process, and improving the effectiveness of audits. Comparatively, the three lowest-ranked benefits of digital audit

implementation are reducing the need for human resources, increasing public confidence in auditors, and being able to access auditees' financial statements in real-time. The following subsections explain and justify each identified top and least-ranked benefit of digital audit implementation.

Table 2: Digital Audit Implementation Advantages

Advantage	N	Mean	Standard Deviation	Rank
Improve the quality of audit reports	124	3.80	0.74	1
Improve the efficiency of audits	124	3.78	0.79	2
Assist auditors in identifying material misstatements	124	3.77	0.71	3
Improve the quality of the audit process	124	3.75	0.74	4
Improve the effectiveness of audits	124	3.75	0.79	5
Reduce the number of repetitive tasks in the audit process	124	3.74	0.80	6
Able to perform continuous audits	124	3.73	0.73	7
Provide a greater possibility for detection of fraud	124	3.73	0.73	8
Improve the reliability of audited reports	124	3.72	0.73	9
Provide a better understanding of the auditees' work	124	3.70	0.72	10
Improve the professional judgment of auditors	124	3.69	0.72	11
Enhance government transparency	124	3.69	0.72	12
Enable to test 100% of the population rather than testing a sample	124	3.67	0.82	13
Able to access auditees' financial statements in real-time	124	3.67	0.74	14
Increase public confidence in auditors	124	3.62	0.73	15
Reduce the need for human resources	124	3.57	0.75	16

4.2.1 Improving the Quality of Audit Reports

The public sector digital audit benefit ranked highest is improving the quality of audit reports. The result was expected as employing technological tools for the audit process would assist in enhancing the credibility and reliability of the audit findings, which consequently led to audit reports with enhanced quality. Furthermore, digital audits could expand the range of items subject to audits (Power, 2022) to enhance the quality aspects of the resulting audit report. Consequently, higher assurance was provided to the interested parties, relevant authorities, and the public. The result is in line with Otia and Bracci (2022), wherein the interviewees highlighted the expected audit outcomes with higher quality after adopting digital audits.

4.2.2 Improving the Efficiency of Audits

The second highest-ranked digital audit benefit perceived by the respondents was improving the efficiency of audits. Generally, efficiency refers to achieving higher output with the available resources (Sundqvist et al., 2014). Employing technologies in the public sector audit, including big data analytics and RPA, enables the audit process to identify irregularities more efficiently and accurately (Huang & Vasaehelyi, 2019), which will ease auditors' workload and enhance the efficiency of the audit work. Kokina and Davenport (2017), Melin and Toezay (2022), and Otia and Bracci (2022) also demonstrated that auditors would be able to comprehend more of the judgmental aspects by reducing the time for the previous audit process, which led to higher audit efficiency. The current result is consistent with Lazarevska et al. (2022) investigating external and internal public sector auditors in North Macedonia and discovering that the auditors highly perceived the automation of routine audit procedures as improving audit work efficiency.

4.2.3 Assisting Auditors in Identifying Material Misstatements

Another top-ranked digital audit benefit was assisting auditors in identifying material misstatements. The technological component in the audit process would assist in pinpointing material misstatements automatically compared to the traditional and manual audit procedures. The red flags could be captured after auditors stipulated the justified limit of indicators in the system. The red flags are useful for the auditors to decide on further investigation. Previous research also revealed that digital tools in auditing potentially facilitated the detection of anomalies or irregularities in financial statements (Cunningham & Stein, 2018; Krahel & Titera, 2015; Lombardi et al., 2015). Similarly, Dagiliene and Kloviene (2019) discovered that external auditors in Lithuania acknowledged that the usage of data analytic tools assisted in identifying irregularities or red flags.

4.2.4 Improving the Quality of the Audit Process

Improving the quality of the audit process was ranked as the fourth digital audit benefit. According to Meuldijk (2020), digital audits provide useful inputs, such as risk levels and areas, challenges, and strategies, instantaneously from the historical data in the engagement files. The information could significantly assist the auditors in conducting audits, which improves the quality of the audit process. Similarly, Appelbaum and Nehmer (2017) and Suffield (2020) emphasised that the technology infused in the audit process is a value-added process, which enhances audit quality. For instance, utilising drones in conducting inventory inspection, counting, and observation would significantly improve the audit work (PwC, 2019).

4.2.5 Improving the Effectiveness of Audits

The fifth top-ranked digital audit benefit perceived by the AGD internal auditors was improving the effectiveness of audits. Prior studies, including Issa et al. (2016) and Otia and Bracci (2022), underscored achieving higher effectiveness through digital audits. Effectiveness in the public sector refers to the achievement of the outcomes from governmental activities and programmes, including higher life quality, improved transparency of public spending, and enhanced accountability of the government to the public. Effectiveness in public sector auditing pertains to the achievement of positive audit outcomes, which include enhancing public trust

in governmental spending of public monetary resources through more reliable audit findings and higher-quality public facilities and services by optimally utilising governmental resources.

4.2.6 Reducing the Need for Human Resources

The last ranked digital audit benefit perceived by the BPAD auditors was reducing the need for human resources. While the time for earlier audit processes is significantly reduced with digital audits, the additional time is crucial for auditors to thoroughly comprehend the initial findings in decision-making areas that require human judgments. Therefore, the need for human resources will not be reduced. Nonetheless, the need for human resources could be reduced by RPA adoption in various tasks (Huang & Vasarhelyi, 2019). Burgess (2016) highlighted that the operational cost of RPA software is approximately one-ninth of employing a human, and robots can operate continuously without pausing. Nevertheless, the focus group discussion revealed that a different division and not the BPAD incorporated RPA, although the AGD implemented RPA:

> "For the time being, at the AGD, we already have RPA, we use RPA for processing unclaimed money. That's already implemented, we have two robots for that purpose." (M4)

Hence, the benefit of reducing the need for human resources was ranked among the lowest by the respondents due to the limited benefit of RPA implementation. Tiberius and Hirth (2019) also concluded that digitisation impacts on auditing are positive, wherein the latest technologies will not replace auditors in the future but instead provide assistance and support.

4.2.7 Increase Public Confidence in Auditors

Increasing public confidence in auditors was ranked second last as the digital audit benefit. The finding was anticipated as BPAD auditors were yet to embark on a full-fledged digital audit. Therefore, the advantage of enhancing public confidence in auditors would not be immediately acquired as the public has yet to observe the positive outcome of digital audit implementation. Another justification for the ranking was owing to the ambiguous AGD image and status revealed in the focus group discussion:

> "…. People questioned why there is an internal audit department in the AGD. People sometimes confuse us as Accountant's General and National Audit Department" (M1)

Nevertheless, the internal audit plays a crucial role in fostering trust between departments and senior management (Ferry, 2022).

4.2.8 Able to Access Auditees' Financial Statements in Real-Time

The third lowest digital audit benefit ranked by BPAD auditors was the ability to access auditees' financial statements in real-time. According to M4, BPAD auditors were inclined to perform continuous audits. Nevertheless, the current system, namely the Audit Command

Language (ACL), could not be integrated with other systems, except for iGFMAS[2], which prohibited the action. Various systems were employed in each ministry, which presented a significant challenge for auditors to monitor real-time ministerial performance:

> "…if Python is successfully integrated, it will add value to the existing ACL." (M4)

Hence, the limitation of the current software employed by the BPAD led to the auditors exploring the usage of Python.

4.3 The BPAD Challenges in Achieving a Full-fledged Digital Audit

Table 3 potrays that BPAD auditors perceive additional education and training for digital skills as the most significant challenge to implementing digital audits. The finding indicated that further training and education were required to proficiently utilise digital audit tools and technologies. High implementation costs, data security risks, and the absence of clear guidelines and standards on digital audit implementation were also significant challenges. Meanwhile, inadequate job opportunities for accounting graduates, political interferences, and lack of management support were regarded as the least challenging. Accordingly, a certain support level was received from the top management in facilitating digital audit implementation, which resulted in BPAD auditors not perceiving management support as a significant challenge.

Table 3: Digital Audit Implementation Challenges

Challenge	N	Mean	Standard Deviation	Rank
Require additional education and training to acquire the necessary digital skills	124	3.80	0.76	1
Require high implementation costs	124	3.64	0.76	2
Risk of data security (leakage) and confidentiality	124	3.59	0.75	3
Lack of guidelines on digital audit implementation	124	3.57	0.71	4
Lack of standards for digital audit implementation	124	3.55	0.73	5
Limited financial resources	124	3.50	0.74	6
Impair the professional judgment of auditors	124	3.44	0.74	7
Fewer accounting graduates hired in the future for audit work	124	3.37	0.72	8
Improper political interferences	124	3.31	0.69	9
Lack of top management support	124	3.19	0.82	10

[2]iGFMAS is the accounting system of the Malaysian Federal Government.

4.3.1 Additional Education and Training for Digital Skills

Digitalisation and technology adoption past business operations, which necessitates high proficiency in speaking and writing the language of technology. The Association of Chartered Certified Accountants (ACCA) in 2016 emphasised the importance of the digital quotient as one of the skills that accountants must develop to remain relevant in the digital era (ACCA, 2020). The transition to digital audit processes requires auditors to develop personal digital skills appropriately, especially the knowledge of applications or tools and techniques to implement digital audits (Otia & Bracci, 2022). The majority of BPAD auditors in this study also recognised that digital audit implementation would entail significant changes to conventional audit processes, including the incorporation of digital or technological tools and data-driven strategies, which necessitates the development of digital skills. Therefore, developing digital skills was perceived as the most significant challenge. The result indicated a certain level of resistance to change (Danielsen, 2021; Otia & Bracci, 2022) or lack of preparedness for the transformation. Acquiring alternative skills frequently requires significant effort in terms of time and dedication. Attending courses and training sessions while simultaneously working on the current tasks could be exhausting. Moreover, changing the existing workflows to a different method could be overwhelming due to multiple adjustments, which could lead to resistance to change. Digitalisation initiatives in Norwegian public organisations led to citizens in the system concerned and being critical owing to increased responsibility and the difficulty of adapting to a completely different system, which resulted in continuing the current approaches (Danielsen, 2021). Otia and Bracci (2022) also discovered that managing traditional and conservative auditors who resisted change was more challenging. Certain organisations implemented additional initiatives to provide intrinsic and extrinsic motivations for auditors to enjoy learning alternative skills (Otia & Bracci, 2022).

4.3.2 High Implementation Costs

High implementation costs in acquiring and implementing necessary technologies were perceived by BPAD auditors as one of the significant barriers to digital audit implementation (Danielsen, 2021). The total cost of ownership (TCO) for a different system could vary depending on company size and expenses on purchasing different software and hardware, providing training, performing installation, and conducting maintenance, which could range from thousands to millions of dollars (Hall & Lutsey, 2019). Significant costs would also be incurred for automated systems, including RPA (Otia & Bracci, 2022). Public organisations are frequently required to manage limited resources and encounter competing demands for project funding, which leads to higher difficulty in prioritising investments in digital initiatives when the current method is cheaper (Danielsen, 2021). A similar concern was raised by the BPAD management team members during the focus group discussion:

> "…it comes down to budget constraints. If we had the budget, everything would be up and running already. We are ready though. But in terms of budgeting, if we want to do it properly, we [will] need around RM1 million…" (M4)

> "…it is not that we do not want to use certain things [technology], but one of our constraints and challenges is, of course, the budget." (M1)

4.3.3 Data Security and Confidentiality Risks

Data security and confidentiality risk was ranked the third digital audit implementation challenge by the BPAD auditors. Governmental data contains sensitive and confidential information, such as personal records and classified financial data, which could pose a threat to data losses during the integration process. For example, 400 different non-integrated systems required rigorous planning to integrate all systems into one digitalised system in a Norwegian public organisation, which led to users being sceptical about data privacy and security (Danielsen, 2021). Any data breach or loss would result in detrimental impacts, including legal implications and financial losses. Additionally, different governmental agencies were not highly prepared for disaster recovery plans (Al-Ruithe et al., 2018). A BPAD management team member highlighted the need to postpone RPA implementation in auditing processes due to security issues related to the cloud database location:

> "…we found many potential areas for RPA. We wanted to integrate RPA in ACL initially. However, RPA within ACL is not as good as using it in the UiPath platform. UiPath is specifically designed for RPA processes. The problem is that it [the data] has to be tagged to the cloud in Singapore [UiPath office]. This means that our data will flow [out of Malaysia], even within one second… that's not allowed…because of security reasons…so, we could not proceed with that [plan]." (M4)

4.3.4 Fewer Accounting Graduates Being Hired in the Future for Audit Work

The lack of job opportunities for accounting graduates was perceived by the BPAD auditors as a less significant challenge, which propounded that accounting skills remain essential despite increasing technological advancements. Ismail et al. (2020) examined the perceived employability skills of accounting graduates and revealed that IT skills were the most preferred skillset by Malaysian employers. Specifically, the ability to utilise spreadsheets and accounting software is vital for accounting graduates. Ebaid (2021) also demonstrated that analytical thinking, communication, and collaboration skills are the most desired skills for accounting graduates. Other empirical findings (Lim et al., 2016; Afolabi, 2014; Kwarteng & Mensah, 2022) discovered that computer or IT skills are the required skills in the execution of accounting tasks. Thus, accounting skills remain essential despite more mundane accounting tasks being automated or digitalised.

4.3.5 Improper Political Interferences

Political interferences occur when political leaders intervene in the decision-making processes of public administration, such as planning, organising, coordinating, reporting, budgeting, allocating, and utilising public funds (Mfuru et al., 2018). The BPAD auditors did not consider improper political interferences as a significant barrier to digital audit implementation, which postulated that the department functions independently without any political influence to perform work responsibilities effectively. Themsen and Skærbæk (2022) also discovered that the decision to terminate the internal audit department in the Danish central government was not attributed to politicians but rather to the input from civil servants.

4.3.6 Lack of Management Support

Top management plays a crucial role in ensuring the success of any change implemented within a business by effectively articulating and properly communicating the vision and strategy to the entire organisation (Otia & Bracci, 2022). The changes frequently involve organisational restructuring, in which effective communication is crucial to address potential concerns or resistance (Hall & Lutsey, 2019). Table 3 illustrates that the BPAD auditors do not consider lack of management support as one of the significant challenges to implementing digital audits, which suggests that the BPAD top management is supportive of implemented changes and initiatives within the organisation. Each BPAD management team member in the focus group discussion was enthusiastic about the digital audit implementation plan:

> "We all, especially BPAD, have been focusing on implementing online auditing since the Movement Control Order (MCO). Even the highest management, Datuk [Dr. Yacob] AG [Accountant General] is looking forward to digital audits." (M1)

> "…we have an ICT Strategic Plan. This plan was developed by the AGD… emphasising digital audit implementation in the BPAD." (M3)

> "…we are exploring Python, but there is no specific model [audit] for it. We have tried asking PwC, Deloitte, and KPMG…we even went to UTM [Universiti Teknologi Malaysia] for that purpose because they have experts there." (M4)

> "…the Accountant General's aspiration for the ACL is not just limited to using the analytic module. If possible, we want to take [adopt] the automation module as well." (M3)

5.0 Implications, Limitations, Suggestions for Future Research, and Conclusion

The present study empirically examines the advantages and challenges of digital audit implementation in the public sector. The study respondents were the BPAD auditors of the AGD. The perceived digital audit advantages included enhancing the quality, efficiency,

and effectiveness of audit work processes and outputs or outcomes. The challenges faced were the lack of financial resources and expertise and data security and confidentiality risks, which required a strategic approach to ensure the success of digital audit implementation. An explicit strategic plan and initiatives are recommended for digital audit implementation to be included in the ICT Strategic Plan of the AGD to ensure the strategies are aligned. Furthermore, the strategic initiatives on BPAD digital audit implementation should not only be accessible within the division but also among other AGD divisions and other governmental auditing entities, including the NAD and internal audit divisions of other government agencies and departments. The initiatives could encourage synergetic collaborations between government entities responsible for auditing in terms of expertise and technology usage.

Various parties involved in public sector digital audit implementation play unique roles in ensuring smooth and successful implementation. The AGD and BPAD top management should also formulate the optimal digital audit implementation strategies, restructure the organisation to suit the digital and technological environment, transform the work processes to increase the acceptance level, create the appropriate digital culture in the organisation, incorporate necessary technologies to fully support the digital audit work, and provide sufficient monetary allocation to support the digital transformation and progress. A new position, namely the Chief Digital Audit Officer (CDAO) or Chief Information Officer (CIO), could be created to lead the digital audit implementation agenda. The CDA or CIO must be a leader with sufficient audit knowledge and expertise to drive digital transformation by overseeing the implementation of digital technologies, employing the latest technologies and data, and transforming the organisational culture and work processes. Procuring more advanced tools, such as Python, is also pivotal. Currently, the BPAD utilises the ACL to perform analytics with data extracted from iGFMAS. Python is integral as the software could extract data other than from iGFMAS and allow the audit team to perform extensive statistical and advanced data manipulation to identify data anomalies, patterns, and trends.

Specific IT expertise is crucial among the BPAD auditors, such as the knowledge and skills to use audit software and advanced technological and analytical tools, apart from the knowledge and skills related to AI and machine learning (ML). Empowering BPAD staff with essential skills is fundamental to higher productivity and efficiency in adapting to digital transformation. Regular training and workshops related to IT or digital audits should be regularly provided to the staff internally or externally. Knowledge sharing and training by the trainers or during the workshops will encourage the immediate application of knowledge and skills acquired from the training sessions or workshops.

Meanwhile, the present study contains several limitations. This study only focused on digital audit implementation in the BPAD of the AGD. The NAD is also the primary entity responsible for auditing all other public sector entities. Including NAD auditors to understand the current digital audit implementation status is equally vital for future research. Moreover, future studies could compare the two entities on various implementation aspects to identify the potential collaboration to accelerate digital transformation and digital audit advancement.

Digital auditing is relatively less widespread in the public sector, especially in developing countries. Hence, more research is required to scrutinise the current implementation state. Future research could appraise the readiness of developing countries for digital auditing by considering the resource-constrained environment in terms of financial or human skills. Future research could also conduct a comparative analysis of digital auditing frameworks comprising technologies, regulations, and human and financial resources implemented in developed countries and the applicability level in developing countries. Simultaneously,

evaluating data security and privacy concerns in data sharing, which is the core of digital auditing, would be a valuable avenue for future research.

In conclusion, the Malaysian government demonstrated a commitment to digital transformation, namely digital audit implementation, via various initiatives and support. Revealing the advantages while mitigating the challenges with practical solutions will assist in advancing digital audit implementation in Malaysia.

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