

The Adoption of Generalized Audit Software (GAS) and Digital Analytics by Shariah Auditors in Islamic Banks

M R Yaso^a[0000-0003-0377-6341] S F Muhamad^b[0000-0002-3119-1861] T Abdullah^c[0000-0002-3732-8056]
M N H Yusoff^d[0000-0003-1368-1610] N M Said^e[0000-0002-3687-3597] S A Zainuddin^f[0000-0001-7808-8434]
N A M Nasir^g[0000-0003-1117-9256]

¹ Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan,
City Campus, 16100 Pengkalan Chepa Kota Bharu,
Kelantan, Malaysia
E-mail: rushdan.y@umk.edu.my

Abstract This paper identifies the adoption of information systems (IS) in the form of generalized audit software (GAS) and digital analytics by Shariah auditors (SAR) in Islamic banks (IBs). To explore further, this paper identifies this practice among four types of banking groups, namely full-fledged Islamic banks (FFIB), Islamic banking subsidiaries (IBS), development financial institutions (DFI), and Islamic windows (IW). In attaining its objective, this study employs a qualitative method by utilizing semi-structured interviews with six (6) key individuals in Malaysian IBs. Our findings support the notion that most SARs adopt and use GAS in their audit execution. Interestingly, few of them use digital analytics in conducting their audit assignments. This digital analytics application will undoubtedly help SAR seek the Shariah non-compliance (SNC) cases effectively. The samples selected by GAS would be much bigger compared to manual audit exercise, which depends on few selected samples only. However, there is an argument that the audit software application is not enough since SAR must pay visit physically to their auditee's premises. Finally, this study suggests that there should be some training for the SARs, especially regarding the GAS application, to detect the SNCs thoroughly in IFIs operations. Eventually, GAS can assist SAR in mitigating SNC cases while strengthening the public confidence and achieving *Maqasid As Shariah*.

Keywords: *Shariah auditor, GAS, digital analytics, IS Applications, Islamic banks.*

1 Introduction

In general, auditors use generalized audit software or (GAS) as tools to automate various audit activities. Accounting data auditing is likely to be computerized since most accounting transactions are also computerized. Despite the fact that GAS is the most common of the computer-assisted audit tools and techniques (CAATs), studies indicate that it is not universally used by internal auditors (Kent and Ahmi, 2013). Thus, this paper intends to explore the adoption of GAS by SAR in the IBs. Most other GAS studies have looked at regular internal and external auditors, but this paper focuses on SAR in IB.

According to Singleton (2006), more than 60% of all frauds are discovered due to a tip or by accident. Thus, using GAS to build a cornucopia of automated anti-fraud audit procedures that are run routinely against corporate databases is a space for more aggressive anti-fraud programs. Because of the design of computer-based accounting systems, auditors can use the audit client business's computer, or their own, as an audit tool to aid them in their audit procedures (ACCA, 2016). Accordingly, the extent to which an auditor may choose between using GAS and manual techniques on a specific audit engagement is determined by many factors. Those factors, among others, are the feasibility of conducting manual testing, the cost-effectiveness of using GAS, the availability of audit time, the availability of the audit client's computer facility, the level of audit experience and expertise in using a specific GAS, the level of GAS carried out by the audit client's internal audit function and the extent to which the external auditor can rely on this work.

In the Islamic banking environment, SAR assists in developing Islamic banks' (IBs) work (Khalid, Haron, & Masron, 2018). However, there is a relative lack of research on adopting the GAS among SAR in the IBs. Likewise, in IBs, there is a need for SAR to leverage on the GAS to support the internal control mechanism and monitoring system while strengthening the internal auditing functions. This situation will eventually support SAR in accomplishing the organization's objective (Abdul Wahab & Abdul Rahman, 2011). This issue definitely triggers the need of full adoption of GAS in IBs.

On the contrary, the lack of GAS adoption in IBs might create problems in audit execution. If IBs through its governance mechanism such as Shariah audit does not adopt GAS in their audit execution, they might fail to supervise the internal control and enhance the banks' lines of defense effectively. Thus, the likelihood of Shariah non-compliance (SNC) cases to happen is very high (Lahsasna, 2014).

Consequently, the SNC cases' presence may deteriorate the reputation of IBs and may weaken the confidence of customers, depositors, shareholders, and other stakeholders towards the banks (Dusuki, 2011; Shafii, Salleh, & Shahwan, 2010).

Considering the rapid growth of the banking industry and the strict consequences for the SNC as specified in the Islamic Financial Services Act (IFSA, 2013), it is indispensable for the IBs to have a proper 'check and balance' mechanism (Yaacob & Donglah, 2012). Undeniably, this mechanism is vital specifically for the SAR and for Islamic finance's sustainability in general. Thus, the investigation of GAS adoption by SAR in the IBs as undertaken in this study could significantly contribute to the literature.

The following section will review prior literature and a debate on the significance of GAS in the audit execution of SAR in the Islamic banking industry. Then, the paper describes a research methodology, and in the next section, the paper provides some analyses into the GAS adoption by SAR in the IBs. Finally, the conclusion is drawn by emphasizing the significant issues related to this study.

2 Literature Review

There is a wealth of literature concerning the adoption of accounting software either by the public sector or private sectors. However, the literature explaining the adoption and utilization of audit software is considered limited. However, some studies report the extent of the usage of GAS among external auditors. For instance, Kent and Ahmi (2013) found that audit firms in the United Kingdom use GAS at a shallow rate. Owing to the perceived restricted advantage of using GAS for auditing small clients, approximately 73% of external auditors do not use it. Although some respondents acknowledged the benefits of GAS, they were turned off by what they perceived to be high implementation costs, a lengthy learning curve, an adoption process, and a lack of ease of use. Thus, they preferred to use conventional manual auditing methods.

In another study, Van der Nest, Smidt, and Lubbe (2018) compare the current practices of internal audit functions regarding the use of GAS in the locally controlled South African banking industry to a benchmark developed from recognized data analytic maturity models. Findings from the study reveal that despite the accelerating adoption of information technology (IT) and the generation of big data within organizations, the use of GAS by internal audit functions is still at a relatively low level of maturity. Given that the world, particularly from a business perspective, is now fully immersed in a technological-driven economic outlook. This article's empirical results also confirm that the maturity of GAS use by internal auditors employed by locally controlled South African banks is still lower than predicted.

On the same ground, Smidt, Steenkamp, Ahmi, Van der Nest, and Lubbe (2021) examine the use of GAS as a data analytics tool by internal audit functions in Australia. From a total research population of 322 chief audit executives (CAE) of internal audit functions of organizations registered members of the IIA-Australia, 50 online questionnaires were returned. The study's findings can be used as a benchmark to determine if CAEs are up to date on current best practices in the field of technology-based tools and techniques for control tests.

Adamyk, Adamyk, and Khorunzhak (2018) investigate the auditing order and methodology for computer accounting software (CAS). The findings from the study reveal that software auditing should be conducted separately for each of its elements. The database management system (DBMS) and the application software enabling accountancy automation are the CAS software's functional portions. Techniques like general evaluation and subject check of the embedded algorithms of information processing are used for auditing as the first component section. However, if the enterprise accounting strategy changes, this would prevent mistakes.

In a recent study by Bradford, Henderson, Baxter, and Navarro (2020), they examine auditors' perceptions of the relationship between audit benefits and GAS use. The partial least squares approach analyzes survey data from 188 existing GAS consumers who are financial and IT auditors. The study's findings uncover that the only significant predictor of GAS's information quality for financial auditors in detecting material misstatements antecedent. Meanwhile, detecting monitoring deficiencies and fraud has a considerable effect on information quality for IT auditors. Information quality affects both financial and non-financial auditors' use. Only IT auditors are affected by system quality, and neither form of the auditor is affected by GAS use. The use of GAS by financial auditors is affected by service quality, but not by IT auditors. Service quality has no impact on GAS satisfaction for either party, and GAS usage and satisfaction increase audit benefits expectations.

However, as far as the researcher is concerned, the study concerning the adoption of GAS among the SAR in the IBs is limited due to the nature of the study's field. However, the issue is vital because

SAR plays its roles and responsibilities as the third line of defense that ultimately requires the effective tools, techniques, and mechanisms to identify the misstatement, fraud, errors, and SNC in the IBs.

3 Methodology

3.1 The Process of Developing the Research Instrument

This main objective of this paper is to ascertain the adoption of GAS by SAR in Islamic banks based on practitioners' views and experiences. However, before data could be collected, the study has developed the research instrument based on few stages as presented in the Figure 1 below:

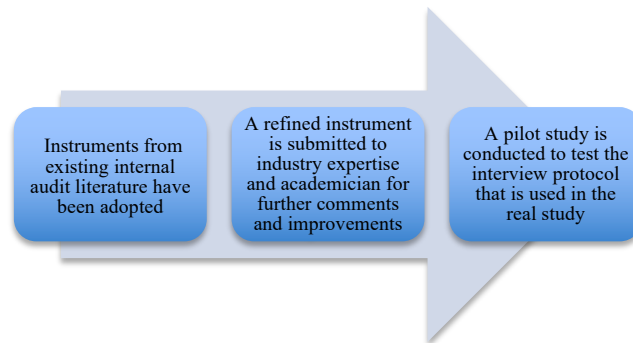


Fig. 1. The Process of Developing the Research Instrument

As illustrated in Figure 1 above, in the first stage of the process, a few instruments from the internal audit literature have been adapted and fulfilled this study's objectives. Second, the developed interview questions have been submitted to expertise scholar and industry's practitioner in the Shariah audit area as a subject matter expert. Finally, to validate the final set of interview protocol, the researcher conducts a pilot study with one of the Head of Shariah audit in IB. This pilot study is conducted before pursuing a real study to test and construct the effectiveness of the research tool (Marican, 2005).

3.2 Data Collection Method and Group of Respondents

Six (6) semi-structured interviews have been conducted with interviewees from four (4) types of IBs, namely full-fledged Islamic banks (FFIB), Islamic banking subsidiaries (IBS), development financial institutions (DFI), and Islamic window (IW). FFIB refers to either local or international banks that only offer Islamic banking products or services. Their operation is ruled by the Islamic Financial Services Act (IFSA 2013). Besides, IBS is a conventional bank with Islamic banking subsidiaries whereby they are governed by IFSA 2013 and the Financial Services Act 2013 (FSA 2013). Meanwhile, DFIs refer to specialized financial institutions established by Malaysia's government to establish and stimulate important sectors to achieve the objectives of the country's socioeconomics by offering Islamic products and services. Lastly, IW is a commercial bank given Bank Negara Malaysia's license to provide Islamic banking products and services. Like IBS, IW's operation is also administrated by the IFSA 2013 and FSA 2013 in their business operation (Bank Negara Malaysia, 2015).

3.3 Sampling Procedures

The selection of interviewee is based on purposive sampling. Even though respondents' sample size is relatively small, it is considered normal in a qualitative study because they are selected based on the criteria to provide valuable information on the phenomenon under investigation. (Creswell & Poth, 2018). The Shariah auditors' and Head of Shariah auditors' mix provides fruitful details about GAS use in Shariah audit practice (Mohd Ali, Mohamed, Shahimi, & Shafii, 2015). On top of that, perceptions from other relevant interviewees other than SAR, such as from Chief Shariah officer, are also pertinent to produce a robust and unbiased result.

3.4 Establishing Reliability and Validity

In developing the attributes of reliability and validity while at the same time minimizing risky in committing mistakes in this study, the researcher has employed few strategies as proposed by Creswell (2014) and Lietz, Langer, & Furman, (2006). These strategies are field notes, respondents' confirmation, and pilot interviews.

According to Bogdan and Biklen (2007), the high level of reliability in qualitative studies can also be accomplished by having rigorous data accumulation or systematic collection in the field. Effort and initiative that involves fieldwork such as appointments, official interviews, unofficial interviews, observations, and accumulation of documents will also enhance the reliability. For the purpose of this study, the researcher uses a small notebook to write down all activities that occur in the field. This note is transferred into the computer and saved accordingly for reference.

In addition, verification from respondents regarding the interview's data or sometimes known as member's checking, is a transferring procedure of validity from the researcher to the respondents (Mulhall, 2003). However, the current study does not receive verification satisfactorily due to low responses or inadequate feedback from the interviewees. Ironically, only two out of nine interviewees have verified the interview text and provide some suggestions for improvement. Most probably, all of them are busy with their working tasks, and they feel that they have contributed already by spending much time with the researcher during the previous interview sessions.

Finally, a pilot study is essential to emphasize the research instrument's development, the feasibility of the actual research, the suitability of the research design, sampling technique, data analysis technique, and the research questions' suitability (Neuman, 2014; Gay, Mills, & Airasian, 2012). This method, in turn, will increase the reliability of the data. The purpose of this pilot study is also to identify the plausible problems that might be faced by the researcher during the actual interviews soon.

3.5 Data Analysis and the Application of CAQDAS

Before the analysis can be performed, the verbatim transcription was accomplished for all interview sessions by employing the Computer Assisted Qualitative Design Analysis Software (CAQDAS), namely Atlas.ti version 8.0. This software is used to facilitate the process of transcribing the interview and data coding. To keep the data's confidentiality, the respondents were coded based on group and position types. For instance, HSA-FFIB will be referring to the Head of Shariah Audit from full-fledged Islamic Bank, without explicitly mentioning the institution's name. Finally, the study comes out with the list of the interviewees as presented in Table 1 below:

Table 1. Interviewee for the Study

Types of Group	Position	Respondent Code
Full-fledged Islamic Banks (FFIB)	Chief Shariah Officer	CSO-FFIB
	Head of Shariah Audit	HSA-FFIB
Islamic Banking Subsidiaries (IBS)	Head of Islamic Banking Audit	HIBA-IBS
	Senior Director of Islamic Business Unit	SDIBU-IBS
Development Financial Institutions (DFI)	Head of Shariah Audit	HSA-DFI
Islamic Windows (IW)	Head of Shariah Audit	HSA-IW

4 Findings and Discussions

4.1 The adoption of GAS by SAR

The series of interviews have provided fruitful information on the adoption of GAS by the SAR in the IBs. Some interviewees argued that the Shariah audit is technology savvy because they claim that SAR employs the latest software or IS while executing the auditing tasks. One of the interviewees from IBSs claims that:

"..., For Shariah audit, we do have IIA guideline. Based on this IIA, they encourage us to use T-mate and ACL. We use that as part of our technology to do sampling and to find exceptions on Shariah..." (HIBA-IBS).

The above argument is also supported by the Head of Shariah audit from DFI. He disputes that the employment of technology and software will ease and expedite the ISA work and eventually will enhance the ISA effectiveness as he opines:

"...There must be an efficient system since this audit system is vital. The most commonly used by the internal auditors is ACL Solution (Audit Management and Analytics). By employing this software, it is easy for us to get a sample. We can check what we want since its features help a lot. Our work will also be fast, effective, and efficient..." (HSA-DFI).

On the same ground, another interviewee supports this view by contending that the GAS assists them in finding the proper sample-based needs of users as she remarks:

"...There should be a proper system because the system is essential. The most common use in the audit field is ACL Solution (Audit Management and Analytics). Because it is easy for us to get a sample based on its features, we can check what we want...(HSA-FFIB).

Similarly, HSA-IW expresses his satisfaction with the adoption of GAS because of its functions in assisting the SAR's work. He disputes that:

"...GAS helps auditors a lot. Even audit work would be smoothly executed. Our work is effective and efficient..." (HSA-IW).

However, the above findings are contradict with the study conducted by Debrecey, Lee, Neo, and Shuling (2015), whereby they found that internal auditors in their study perceive GAS primarily as a tool for special investigations rather than as a foundation for their regular audit work. The most plausible reason behind this argument is that the development and application of GAS is significantly increase across the banking sector and it has been widely used by financial institutions including IBs.

In a nutshell, the adoption of GAS in the Shariah audit procedure and execution helps SAR in obtaining the needed audit sample as they expected. The adoption of GAS significantly ease and expedite the ISA work and ultimately will enhance the ISA's effectiveness.

4.2 The Application of Digital Analytics

Another exciting issue discussed by the interviewee relates to the significance of digital analytics in the Shariah audit procedure. SDIBU-IBS highlighting the implementation of digital analytics has an impact most on their working papers, and audit works have been changed from manual-based to automated-based as she mentions:

"...Previously, all our working papers are manual-based. Now, approximately 70% of our jobs are all automated. However, we still have to use human judgment when it comes to assessing control..." (SDIBU-IBS).

In line with the above argument, De Santis & D'Onza (2021) contend that big data and data analytics (BDA) is used to complement traditional audit procedures. In fact, HSA-FFIB supports this notion by arguing that after the application of the digital analytics, the audit judgment is more accurate since the SAR could increase the sample volume as she remarks:

"...Frankly, digital analytics solves many things. We try to explore as much as possible where we can AI (artificial intelligence) everything. The cover is much more in-depth because previously, the sample that we took maybe like 25 or up to 30 samples, but now the sample that we took is more than that..." (HSA-FFIB).

On a similar vein, HSA-IW contends that there is no sample in the digital analytics case because all of the data are considered as their samples as he asserts:

"...Sometimes, we run half a million of data. Now, there is no sample; instead, all of them are our samples..." (HSA-IW).

Interestingly, through digital analytics, the SAR can detect fraud and mismanagement much better as compared to manual audit exercise as he signifies:

"...Using digital analytics, we manage to discover very wrongly allocated funds, participants raise funds, and participant investment funds involving half of a million. Of course, we get the data through data analytics. So, we cannot depend on the manual. If we go by manual checking, we will not get much. Thus, we appreciate technology (digital analytics) very much to assist us in our audit work..." (HIBA-IBS).

However, a finding from Eilifsen, Kinserdal, Messier, & McKee (2019) shows that ADA (Audit Data Analytics) is relatively minimal, and it is uncommon for organizations to use more 'complex' ADA. More ADA is used for clients with integrated ERP / IT systems and newly issued audit assignments.

On the contrary, CSO-FFIB argues that even though software application for audit is paramount, the SAR still needs to visit and examine the locality of the auditees themselves as he affirms:

“...I am not very picky on this software element as auditing still requires a physical visit. Maybe this software is more important to finance for a consolidated report or risk management so that the process of escalation of risk is happening faster and based on real-time...” (CSO-FFIB).

A similar view has been highlighted by SC-DFI whereby she asserts that the management should consider the cost-benefit analysis in implementing the audit system so that the benefits received should outweigh the cost incurred as she contemplates:

“...For this audit, more importantly, we try to implement the best practices. If the software is just used to assist in producing the report, it is not critical; that is my personal view. Thus, not everything should be automated, and even if automation will increase the cost than the benefit received, it is not worth...” (SC-DFI).

HSA-DFI has stressed a similar tone. He argues that the implementation and adoption of GAS and data analytics depend on the management's support. If SAR wants to employ this system, the management has to leverage the system and allocate the budget adequately to install and maintain it in the long run.

In a nutshell, the findings discovered that most of the interviewees acknowledge the benefits of adopting GAS and digital analytics. Even though there are few opinions against this adoption, their benefits outweigh its deficiencies. However, the IBs need to provide proper training for their staff. Hence, as Ayedh, Mahyudin, Abdul Samat, & Muhamad Isa (2019) suggest, IBs should provide their team with essential IT and IS knowledge, including responsibility for Shariah's functions (i.e., Shariah audit, Shariah review, and Shariah risk management). Management should also suggest regular training for IFI staff, covering the information system and Shariah compliance problems.

5 Conclusion

This paper attempts to identify the adoption of GAS by SAR in IBs. Our findings support the notion that most SARs adopt and use GAS in their audit execution. Interestingly, few of them use digital analytics in conducting their audit assignments. This digital analytics application will undoubtedly help SAR seek the Shariah non-compliance (SNC) cases effectively. The samples selected by GAS would be much bigger compared to manual audit exercise, which depends on few selected samples only. However, there is an argument that the audit software application is not enough since SAR must pay visit physically to their auditee's premises. Finally, this study suggests that there should be some training for the SARs, especially regarding the GAS application, to detect the SNCs thoroughly in IFIs operations. Eventually, GAS can assist SAR in mitigating SNC cases while strengthening the public confidence and achieving *Maqasid As Shariah*.

The results offered in this study have specific implications for other Islamic jurisdictions around the globe that have a similar setting as Malaysia. Thus, this study provides a significant contribution to issues of the adoption of GAS in IBs. Besides, even though there are limited respondents through interviews, this study explores and elaborates on the respective matters. It also apprehends thoughts and intentions that are difficult to be observed using other methods (Creswell & Poth, 2018).

Like other empirical research, this study also has its limitations. First, not all the essential vital persons in Islamic banks were eager to share their valuable experience with us due to time constraints. Second, interviewees consist of only six (6) members, namely Shariah auditors, Heads of Shariah audit, Shariah Committee member, and Chief Shariah officer. The small interviewees' size can disputably limit the depth of discussions on the relevant issues. Future research could be conducted to capture more data from other experts like regulators and external auditors.

References

- Abdul Wahab, N., & Abdul Rahman, A. R. (2011). A framework to analyse the efficiency and governance of zakat institutions. *Journal of Islamic Accounting and Business Research*, 2(1), 43–62. <https://doi.org/10.1108/17590811111129508>
- ACCA. (2016). Specific aspects of auditing in a computer-based environment.
- Adamyk, O., Adamyk, B., & Khorunzhak, N. (2018). Auditing of the software of computer accounting system. In *CEUR Workshop Proceedings* (Vol. 21, pp. 251–262).
- Ayedh, A. M., Mahyudin, W. A., Abdul Samat, M. S., & Muhamad Isa, H. H. (2019). The integration of Shariah compliance in information system of Islamic financial institutions: Qualitative evidence of Malaysia. *Qualitative Research in Financial Markets*. <https://doi.org/10.1108/QRFM-05-2017-0042>
- Bogdan, R., & Biklen, S. K. (2007). *Qualitative research for education : an introduction to theory and methods*. Boston: Pearson/Allyn and Bacon.

- Bradford, M., Henderson, D., Baxter, R. J., & Navarro, P. (2020). Using generalized audit software to detect material misstatements, control deficiencies and fraud: How financial and IT auditors perceive net audit benefits. *Managerial Auditing Journal*, 35(4), 521–547. <https://doi.org/10.1108/MAJ-05-2019-2277>
- Creswell, J. W. (2014). *Research Design Qualitative Quantitative and Mixed Methods Approaches* (Fourth). Thousand Oaks, Calif.: SAGE Publications Inc.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and research design choosing among five approaches* (Fourth Edi). Thousand Oaks, Calif.: SAGE Publications Inc. <https://doi.org/10.2307/1523157>
- De Santis, F. and D'Onza, G. (2021), "Big data and data analytics in auditing: in search of legitimacy", *Meditari Accountancy Research*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/MEDAR-03-2020-0838>
- Debreceny, R., Lee, S., Neo, W. and Shuling Toh, J. (2015), "Employing generalized audit software in the financial services sector: Challenges and opportunities", *Managerial Auditing Journal*, Vol. 20 No. 6, pp. 605-618. <https://doi.org/10.1108/02686900510606092>
- Dusuki, A. W. (2011). Introduction to Shariah audit framework. In *International Shariah Audit Conference 2011*. Kuala Lumpur: International Shariah Research Academy for Islamic Finance.
- Eilifsen, A., Kinserdal, F., Messier, W., & McKee, T. (2019). An exploratory study into the use of audit data analytics on audit engagements. *Accounting Horizons*, 1(1), 51.
- Gay, L. R., Mills, G. E., & Airasian, P. (2012). *Educational Research Competencies for Analysis and Applications* (10th Edition). Pearson.
- IFSA. Islamic Financial Services Act 2013, Laws of Malaysia (2013). Malaysia.
- Kent, S., & Ahmi, A. (2013). The utilisation of generalized audit software (GAS) by external auditors. *Managerial Auditing Journal*, 28(2), 88–113. <https://doi.org/10.1108/02686901311284522>
- Khalid, A. A., Haron, H., & Masron, T. A. (2018). Competency and effectiveness of internal Shariah audit in Islamic financial institutions. *Journal of Islamic Accounting and Business Research*, 9(2), 201–221. <https://doi.org/10.1108/JIABR-01-2016-0009>
- Lahsasna, A. (2014). *Shariah Non-compliance Risk Management and Legal Documentation in Islamic Finance*. Singapore: John Wiley & Sons Singapore Pte. Ltd.
- Lietz, C. A., Langer, C. L., & Furman, R. (2006). Establishing Trustworthiness in Qualitative Research in Social Work. *Qualitative Social Work: Research and Practice*, 5(4), 441–458. <https://doi.org/10.1177/1473325006070288>.
- Marican, S. (2005). *Kaedah penyelidikan sains sosial*. Selangor: Prentice Hall/Pearson Malaysia.
- Mohd Ali, N. A., Mohamed, Z. M., Shahimi, S., & Shafii, Z. (2015). Competency of Shariah auditors in Malaysia: issues and challenges. *Journal of Islamic Finance*, 4(1), 22–30. <https://doi.org/10.12816/0024798>
- Mulhall, A. (2003). In the field: Notes on observation in qualitative research. *Journal of Advanced Nursing*, 41(3), 306–313. <https://doi.org/10.1046/j.1365-2648.2003.02514.x>
- Neuman, W. L. (2014). *Social research methods: Qualitative and quantitative approaches* (Seventh Ed, Vol. 30). Essex: Pearson. <https://doi.org/10.2307/3211488>
- Shafii, Z., Salleh, S., & Shahwan, S. (2010). Management of Shariah non-compliance audit risk in the Islamic financial institutions via the development of Shariah compliance audit framework and Shariah audit programme. In *Kyoto Bulletin of Islamic Area Studies* (pp. 3–16).
- Singleton, T. (2006). Generalized audit software: Effective and efficient tool for today's IT audits. *ISACA Journal Online*, 1–3.
- Smidt, L., Steenkamp, L., Ahmi, A., Van der Nest, D. P., & Lubbe, D. S. (2021). Assessment of the Purpose of the Use of GAS: A Perspective of Internal Audit Functions in Australia. *International Journal of Information Systems in the Service Sector*, 13, 65–82. <https://doi.org/10.4018/IJISS.2021040105>
- van der Nest, D. P., Smidt, L., & Lubbe, D. (2018). The use of generalised audit software by internal audit functions in a developing country: A maturity level assessment. *Risk Governance and Control: Financial Markets and Institutions*, 7(4–2), 189–202. <https://doi.org/10.22495/rgc7i4c2art2>.
- Yaacob, H., & Donglah, N. K. (2012). Shariah audit in Islamic financial institutions: The postgraduates' perspective. *International Journal of Economics and Finance*, 4(12), 224–239. <https://doi.org/10.5539/ijef.v4n12p224>
- Wicaksono, A., & Lusianah, L. (2016). Impact analysis of generalized audit software (GAS) utilization to auditor performances. *Binus Business Review*, 7(2), 131–136. <https://doi.org/10.21512/bbr.v7i2.1582>