



ADVANCED INTERNATIONAL JOURNAL OF
BANKING, ACCOUNTING AND FINANCE
(AIJBAF)
www.aijbaf.com



ADOPTING DATA ANALYTICS IN AUDITING: A STUDY OF INTERNAL AUDITORS AT MALAYSIA'S FINANCIAL INSTITUTION

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Article Info:

Article history:

Received date: 29.01.2025

Revised date: 12.02.2025

Accepted date: 24.03.2025

Published date: 30.03.2025

To cite this document:

Mat Saat, R., Hamdi, H. Z., & Danila, R. (2025). Adopting Data Analytics In Auditing: A Study Of Internal Auditors At Malaysia's Financial Institution. *Advanced International Journal of Banking, Accounting, and Finance*, 7 (21), 35-53.

DOI: 10.35631/AIJBAF.721003.

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Abstract:

The rapid advancement of technology has significantly impacted the auditing profession, highlighting the need for IT-savvy auditors who can leverage tools such as data analytics to enhance audit procedures. This study examines the factors influencing the adoption of data analytics among internal auditors at a financial institution in Malaysia. Utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) and IT Competency theory, this research explores the relationship between performance expectancy, effort expectancy, social influence, facilitating conditions, and IT skills with the intention to use data analytics. Additionally, it investigates facilitating conditions, IT skills, and intention to use influence the actual usage of data analytics. Data were collected through an online survey of 72 internal auditors from the financial institution's internal audit department and analysed using SmartPLS. The results indicate that performance expectancy, social influence, and facilitating conditions positively and significantly influence the intention to use data analytics, while effort expectancy does not. Moreover, both IT skills and intention to use significantly impact the actual usage of data analytics. This study provides valuable theoretical and practical insights, validating the applicability of UTAUT and IT Competency theory in this context and offering a deeper understanding of internal auditors' perceptions of data analytics in audit procedures.

Keywords:

Adoption, Analytics, Auditors, Technology, UTAUT

Introduction

In today's digital era, the proliferation of Information Technology (IT) has transformed numerous sectors, including business and finance. The rapid advancement of Artificial Intelligence (AI) has been a game-changer as part of technological evolution also has significantly influenced business operations, with many companies migrating to online platforms, thus expanding their market reach globally (Asniarti & Muda, 2019). Financial sector with the complex transactions including digital payment and currency exchange challenges the audit practice. The COVID-19 pandemic accelerated this shift towards digital transactions, as movement restrictions leading to a surge in digital auditing (Singh & Sharma, 2022).

This increases the necessity to shift towards more technologically advanced auditing methods specifically using data analytics in the auditing process. The benefit of data analytics in auditing allows for the examination of entire data sets, enhancing the scope and quality of audit evidence, and enabling more comprehensive audits (Al-Hiyari, Al Said, & Hattab, 2019; Ahmi et al., 2016). For example, Public Accountants Professional Standards highlight the importance of employing data analytics in auditing, especially when traditional manual testing methods are inadequate for assessing complex computerized systems (Asniarti & Muda, 2019). The utilization of data analytics offers numerous benefits to audit firms, such as reduced audit costs, enhanced audit quality, improved efficiency, and increased effectiveness in audit processes (Meiryani, Oktaviane, & Teresa, 2022; Daoud et al., 2021).

However, the adoption of data analytics in the banking and financial auditing industry has not been without its challenges. Concerns around data privacy, security, and the need for specialized skills and technologies have posed significant barriers to widespread implementation (Balios et al., 2020). Increases in volume, velocity, and variety of data and rapidly evolving technologies raise the question of the relevance and applicability of the traditional audit model (Appelbaum et al, 2016). The evolving role of internal auditors in the face of these technological advancements is noteworthy. Traditionally focused on compliance and risk assessment, internal auditors are now increasingly required to navigate a landscape dominated by digital data and potential cyber risks. This shift necessitates a continuous and dynamic auditing approach, leveraging data analytics for effective monitoring and fraud detection (Lois et al., 2020). This is aligned with Institute of Internal Auditors (IIA) that revisit the scope of internal auditing as an independent activity designed to add value and improve an organization's operations. In the current digital age, internal auditors are tasked with a range of responsibilities, including ensuring data integrity, assessing internal controls, and investigating potential digital fraud. As the auditing landscape becomes increasingly digitalized, auditors must adapt by acquiring the necessary skills and knowledge to effectively utilize data analytics in their audit processes (Bradford et al., 2020).

To better understand the factors influencing the adoption of data analytics in banking financial auditing, researchers have turned to the Unified Theory of Acceptance and Use of Technology framework. This paper aims to examine the factors that influence data analytics' adoption in the group of internal auditors, particularly in the context of the financial institutions. This study investigates the relationship between IT skills among auditors and actual use of data analytic in audit process. The following section discusses on past studies of data analytics in auditing and theory embedded with the study. Follows by methodology, analysis and discussion section. Limitation and future studies conclude this paper.

Literature Review

Data Analytics in Auditing

Previously many studies focused on computer-assisted audit tools and techniques (CAATTs) to complete audit tasks. It has also been referred to a variety of technologies, software, and tools. These technology tools have been used by the auditors for the purpose of conducting tests, control the information provided in financial statement, as well as controlling the auditing activities (Lutfi & Alqudah, 2023). According to Handoko et al., (2020), CAATTs could improve auditor's effectiveness and efficiency in doing their audit work as they will utilize all the capabilities that a computer is able to do. CAATTs is helpful in the sense of checking the transactions in the database by using the software, instead of manually inspecting the data and transactions. The advantage of CAATTs for testing the transactions and balances detail of the client's company, ease auditor in doing test data for the purpose of data control as well as during the procedures of analytical review (Asniarti et al., 2019). Moreover, if the auditor conducts their audit work by using CAATTs, it will also improve the operational review that is done in auditing technology audit (Handoko et al., 2021). Another huge benefit is that CAATTs enable auditor to save a lot of time during the audit process. This is because an auditor will be able to access the data that is available in the client's computer system independently, without having to physically meet and be dependent on the client (Shamsuddin et al., 2015).

However, with the rapid development of the new generation of information technology, the digital economy, as an economic revolution driven by digital technology and extended to traditional industries, the expansion of CAATTs is needed. Auditing requires innovation, and the use of information technology can effectively overcome the weaknesses associated with traditional auditing. The application of digital auditing technologies and the emergence of digital audit objects subvert the cognitive process of auditing activity and should develop digital auditing as a new field of scientific knowledge (Balios et al., 2020). It is crucial for auditors to adopt more appropriate auditing approaches as the business world increasingly replaces paper-based processes with electronic ones. Audits should start concentrating more on technology-based detection and prevention in this regard (Daoud, 2023). It is aligned with by Handoko et al. (2021) and Daoud et al. (2021) where they mentioned about technology embraced in audit for example, artificial intelligence, machine learning, big data and many more. These technology tools help the auditors to carry out the audit process and facilitate it simply by using the computers for the purpose of predicting any failures or breachers in the financial statements. It means that failure to assess IT risk properly may cause a lot of damage to the organization and stakeholders (Nuijten, Keil, & Zwiers, 2023).

This study focusses on data analytics, that has become a significant trend in the auditing field, offering various benefits to audit practices. The integration of data analytics in auditing has resulted in enhanced audit efficiency, digital transformation, and a shift in audit methodologies (Balios et al., 2020). Auditors are now utilizing data analytics to prevent and detect fraud by analyzing patterns in actual data, thereby improving audit quality and providing more analytical reports (Ovami & Muda, 2023). This transition to data analytics signifies a substantial improvement in efficiency and has the potential to significantly enhance audit quality (Salijeni et al., 2018). Moreover, the use of data analytics in auditing not only enhances audit efficiency but also influences auditor judgment, assisting in determining audit risk and reducing the likelihood of drawing incorrect conclusions (Balios et al., 2020). Auditors now have access to extensive datasets and granular data, enabling them to conduct advanced data analytics and

gain deeper insights into their clients' businesses. The adoption of predictive analytics in auditing is projected to rise, enabling auditors to predict risks and issues proactively (Antwi, 2024).

Furthermore, the integration of emerging technologies such as big data analytics, blockchain, and smart contracts into audit practices is reshaping the audit profession. These technologies empower auditors to conduct digital audits involving complete data analysis, marking a shift from traditional audits based on samples (Joshi & Marthandan, 2020). Internal auditors are increasingly acknowledging the significance of big data analytics and its role in transforming the internal audit function (Lois et al., 2020). To sum up, data analytics is revolutionizing the auditing field by enhancing audit efficiency, improving audit quality, aiding in fraud detection, and transforming audit methodologies. The adoption of data analytics and emerging technologies is expected to continue shaping the future of auditing practices, enabling auditors to offer more insightful and reliable audit services. As know, banking institution is dealing with complex transaction every day. Therefore, the auditors need to be more capable in using the latest technology to produce quality audit. Next section discussed integrating UTAUT in auditing as part of research model.

UTAUT and Information Technology Competency Theory

This study adopted Unified Theory of Acceptance and Use of Technology (UTAUT) to analyses the factors influencing internal auditors use data analytics in their audit work. The framework was refined by Venkatesh et al. (2003) that combine several IT acceptances models. It is used to measure the level of acceptance of users on the technology and helps to explain what's the reason behind individuals adopting the new information technology (Mohamed et al., 2019). The dependent variable for this framework is the intention and actual behaviour of the auditor to use data analytics in the audit procedures. This framework usually comprises of four variables which are performance expectancy, effort expectancy, facilitating conditions, and social influence (refer Figure 1). The study added Information Technology Competency theory to the framework. The general idea of competency is where a person has the sufficient skills, knowledge, abilities, and any other aspects that is deemed needed for the person to perform an efficient and effective performance of their own duties (Mei, Feng, & Cavallaro, 2023). In the context of auditors, it is regarding the adequacy of knowledge and skills required by them to adopt the usage of technology like data analytics in their daily audit work or audit procedures. Information technology competency is part of the digital competencies Mei et al. (2023) mentioned that some of the employees are required to improve their technology competencies gradually for the purpose of adapting with the current business requirements that are rapidly changing every single day. Moreover, auditors with IT competence also will be able to provide any solutions on the sudden surface of new situations involving technology where they will be able to do evaluation and look at situation critically before giving any suggestions. (Gallardo et al., 2015).

Recent studies have applied the UTAUT framework to examine the adoption of data analytics in various industries. Data analytics in the auditing field in Malaysia has been a subject of recent studies. Suppiah & Arumugam (2023) focused on the impact of data analytics on the reporting quality of forensic audits specifically within Malaysian auditors. Additionally, Mohamed et al., (2019) discussed the implications of data analytics on auditing, emphasizing its role in preventing and detecting fraud through the analysis of patterns in actual data. In line with this previous study, this paper aimed to examine the factor of adoption data analytics in

order it will influences the quality of audit. Thus, provides insights into the application of data analytics in the Malaysian auditing context. The use of data analytics will be reshaping auditing practices in Malaysia, particularly in terms of fraud detection and prevention strategies. However, the cost of implementing data analytics, including the investment in software, hardware, and specialized training for audit staff, can also hinder adoption, especially for smaller audit firms with limited resources. This can potentially widen the gap between larger firms with greater financial capacity and smaller firms that struggle to allocate sufficient resources for these upgrades (Meiryani et al.2022; Mohamed et al. 2019). Finally, the availability of skilled personnel with the necessary expertise in data analytics and information technology remains a significant challenge. Auditors may lack the technical skills required to effectively leverage data analytics tools and techniques, limiting their ability to derive meaningful insights from the data. Therefore, this study has integrated UTAUT model and IT competency theory as a theoretical framework to look further of the actual use of data analytic in audit process. The next section will be discussed on each variable of the study.

Performance Expectancy

Performance expectancy is the degree or level there an individual believes that by using the technology or tools will help them to have improvement in their performance (Venkatesh et al., 2003). As for data analytics, it is belief that data analytic provides a lot of benefits, and it is useful for them to use. For example, data analytic enables them to analyze the whole population that consists of large volume of data. The ability to test the whole population will result in an increase in the audit quality (Pratama & Komariyah, 2023). It is a useful tool for the auditor in reducing the audit time needed in preparing the working paper and at the same time it increases the efficiency in doing the relevant audit testing. Data analytics also able to increase productivity and improve the quality of auditors' audit work (Al-Hiyari et al., 2019). Study from Iguma and Riccio (2020) investigates the factors influencing Brazilian internal auditors' intention to adopt data analytics. Their research found that, in contrast to effort expectancy and facilitating conditions, which had no significant impact on the behavioral intention to use, performance expectancy and social influence were the two main factors that increased the chance of big data analytics adoption. Studies in Malaysia showed that performance expectancy had significant influence on auditors' behavioral intention to adopt the usage of technology in audit (Mahzan & Leymar, 2014; Mohamed et al., 2019). Their finding is in line with results from earlier research, that stated computer assisted technology increase job efficiency and complete individual audit tasks to receive more substantial incentives. (Mansour, 2016). This study examines internal auditors using data analytics as part of their audit process work. Thus, hypothesis H1 was purposed.

H1: Performance expectancy has a positive significant influence to the intention of use data analytics by internal auditor in the audit department.

Effort Expectancy

Effort expectancy relates to the easiness level when using the technology and the individuals will think that using it will be effortless (Venkatesh et al., 2003). The nature of audit work has changed from the manual approach to an automated approach and the changes cause the complexity of auditor's work. This is because that auditor will need to find the right audit application to be use and the data that has been extracted from the information system need to be checked for its integrity (Al-Hiyari et al., 2019). Through learning, it can help them to increase the level of effort expectancy in using audit software. The easiness level of auditors to use data analytics in audit procedure will increase once they feel that the platform is easy for

them to use, which leads them to continuously using data analytics in their daily audit work. If the auditor feels like the analytics tool is difficult for them, or it will take a lot of their time to use the technology.

Based on previous studies, a study by Pedrosa, Costa, & Aparicio (2020) shows effort expectancy does not have any influence on the intention to use audit software by the European's auditors. However, in the context of Malaysia, the result from the study by Shamsudin et al. (2015) shows that effort expectancy has the strongest relationship with the intention to use audit software by internal auditors. This study examines internal auditors' intention to use data analytics in audit work. These contradicted results allow for further investigation. Therefore, H2 was proposed.

H2: Effort expectancy has a positive significant influence to the intention of use data analytics by internal auditor in the audit department.

Social Influence

Social influence refers to the extent an individual view that the superiors or relatives think that they should utilize the system (Venkatesh et al., 2003). As in this study social influence means that the auditors' intention to adopt and use data analytic influenced from the people that can affect the decision of the auditors during the audit process. Social influence in this study aspect could be audit committee, head of internal audit department, top management and colleagues or other auditors in different firms. Sujarminto and Putri (2023) also found that the social influence had a strong effect on the intention of auditors, which shows that the likelihood for the auditor to adopt technology really depends on the support they received from the superiors. Additionally, the intention of auditor to adopt data analytics also depends on the number of other auditors that have adequate knowledge on the tools that are being used. If the internal auditors found it easy to find colleagues that know how to use data analytics, they will be influenced by them and able to learn from their colleagues (Pratama et al., 2023). As this study examines internal auditor's use of data analytics, hence H3 was proposed.

H3: Social influence has a positive significant influence to the intention of use data analytics by internal auditor in the audit department.

Facilitating Condition

Facilitating conditions which is regarding the belief of an individual enough resources are available and technical infrastructure available in supporting the utilization of the system (Venkatesh et al., 2003). Since skills are needed by the auditors to use data analytics, therefore management can take incentives to invest more resources on the IT-related audit training to facilitate and teach the auditors about the tools. Software providers also play an essential role in providing the support to encourage auditors to adopt the technology (Mahzan & Leymar, 2014; Al-Hiyari et al, 2019). Moreover, adequate support in terms of computer infrastructure like high specifications' computers, data analytics laboratory, and so on should be prioritized as well in order to increase the intention and the usage of data analytics by internal auditors (Pratama et al., 2023). The researcher further added that it is important for the organization to include at least one technical assistance as well to facilitate the internal auditors if they encounter any problems during the usage of the tools.

Result from previous studies indicate that facilitating condition has the significant influence on the intention to adopt technology in audit work due to the great amount of support, resources as well as adequate knowledge on the tools (Pedrosa et al., 2020; Al Hiyari et al., 2019;

Shamsuddin et al., 2015). The presence of resources and technical infrastructure are an important element that will increase the intention for the internal auditors to adopt data analytics in their work. However, intention alone is not enough, the internal auditors need to have assurance that they will be able to use data analytics for a long time. Therefore, in addition to adequate resources and infrastructure, the presence of experts is also important because using data analytics may be hard for the auditors that does not have adequate knowledge on the technology itself (Iguma & Riccio, 2020). This shows that a good facilitating condition (adequate resources; technical infrastructure; experts) will ensure the usage of data analytics for a long time. The results have driven the next hypothesis;

H4: Facilitating conditions has a positive significant influence on the intention of use data analytics by internal auditor in the audit department.

H5: Facilitating conditions has a positive significant influence on the actual of use data analytics by internal auditor in the audit department.

Information Technology Skills

IT skills are part of IT competency where the skill will be used to expedite relevant daily task or business activities that will eventually give advantage to the individual and the business in achieving their objectives (Alsabahi et al. 2021). In performing audits by using data analytics or any other technology, having adequate knowledge on IT and have relevant IT skills is deemed important for an auditor. Alsabahi et al. (2021) compiled several previous studies about the level of IT skills or IT competency for the auditors. One of the previous studies by Al-Ansi (2015) addressed the concern on the low-level auditor's IT competency that eventually give unfavorable effect towards the audit reports for the organization, the auditors' also unable to accurately interpret and analysis the client's information system due to their lack of IT skills and IT knowledge. Therefore, this shows that IT skills can influence the usage of data analytics in audit procedures by internal auditors.

Data analytics' usage by internal auditors can also be determined by their IT skills. This is because having adequate knowledge and skills regarding the technology may give more confidence to the internal auditor to analyse their data related to audit by using data analytics. This means that, if the internal auditor has the relevant IT skills on the software or technology used in performing the audit procedure, it might increase their level of data analytics' usage both daily and weekly.

The result of study by Li et al. (2018) indicates that the IT skills or the competency level of using technology has a positive influence in the usage of data analytics by the auditors. The study mentioned that the higher the technology competency level, the likelihood for the auditors to adopt data analytics in audit process or audit procedures increases. In other words, they will use it more often as compared to the auditors that have less competency or lesser skills. Therefore, as this study's purpose is to analyse whether IT skills influence the usage of data analytics, H6 and H7 were constructed.

H6: IT skills have a positive significant influence on the intention of use data analytics by internal auditor in the audit department.

H7: IT skills have a positive significant influence on the use behaviour of data analytics by internal auditor in the audit department.

Behavioural Intention and Actual Use

Behavioural intention is a factor that provides motivations or helps to influence the people in performing certain behaviour. The likelihood that an activity will be carried out increases with the strength of the intention to do so. In the context of data analytics, it is important to monitor the behavioural intention of the internal auditors especially after the organization decided to adopt the technology for the audit work. In other words, the intention to use after IT adoption should be focused on by the organization to make sure that it is more likely for the auditors to have intention in using the technology (Almagrashi et al., 2023).

The next factor is regarding the use behaviour or the actual usage of data analytics in audit procedures by the auditors. Both objective and subjective methods can be used to gauge how a technology is really being used. The software typically generates usage logs from which objective measures are derived. Subjective usage measurements rely on each subject's subjective assessment, which is often obtained through a completed questionnaire (Turner et al., 2010). It is notable that using data analytics has a lot of benefits to the auditors as compared to traditional ways of auditing. Some examples are it does not only allow auditors to test the whole population, but also reduce the time in testing the whole data in an organization. Other than that, the tools are also able to detect any fraud or errors within the huge number of transactions (Al-Hiyari et al., 2019). Despite that, several studies indicate that the level of actual usage of data analytics are still low, or the level is still deemed unsatisfactory (KPMG, 2015). KPMG (2015) further explained that the data analytics are being used by the auditors for ad-hoc tasks only, but they are unable to use the tools in an effective way for them to accomplish their daily tasks.

However, since their study focuses on external auditor, but this study focuses on internal auditor's use behaviour of data analytics, thus H8 posited;

H8: Behavioural intention has a positive significant influence on the use behaviour of data analytics by internal auditor in the audit department.

Theoretical Framework

The framework that is being used as a base to collect the data is as the Figure 1 below. This framework is being adopted from the study by Meiryani et al. (2022), Handoko et al. (2021) as well as Al-Hiyari et al. (2019). All three studies used UTAUT as their theoretical framework in order to analyse the factors that influence the usage of IT adoption by the internal auditors at the individual level in their respective countries. The framework will visualize the details of variables used and the relationship between all the variables. The theoretical framework used by the previous studies have four variables which are a) Performance expectancy, b) Effort expectancy, c) Social influence, and d) Facilitating conditions. As for the current study, one variable was added which is IT skills to answer the research question and achieve the research objectives.

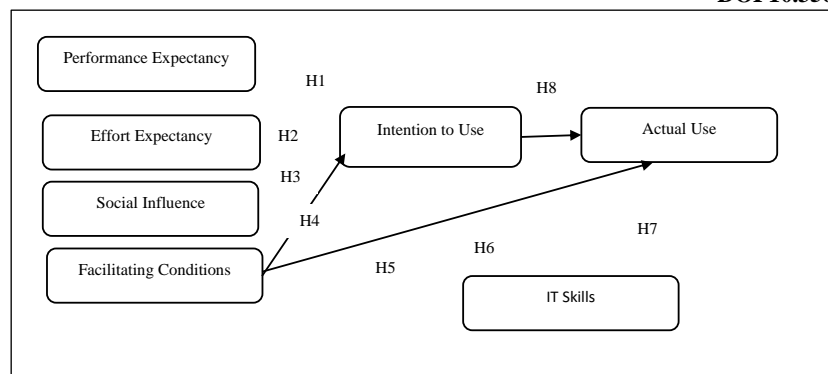


Figure 1: Theoretical Framework

Methodology

Quantitative method was used as part of the analysis process to collect data. Quantitative method is the experimental and statistical in nature as it deals with the data that involves numbers. The method able to analyse data that have clearer focus on the specific hypotheses or objectives (Mayoux, 2006). The unit of analysis for this study is the internal auditors as an individual in central bank of Malaysia in Kuala Lumpur. Since the job scope of internal auditors in the central bank related to data analytics, and they have been using data analytics to conduct internal audit, so the internal auditors were chosen as the analysis unit as they have adequate knowledge that enables them to identify the influence of factors on their usage of data analytics in audit procedures.

Population

The population in this research is internal audit department in the central bank where it has 72 internal auditors that are involved in doing internal audit inside the central bank. Internal auditors are the people that are part of the employee of the company and will ensure that the company's financial statement and internal control follows the rules and standards that are being proposed by relevant bodies before passing it to the external auditors. Because of the small number of the internal auditors in the department, the study decided to analyse the whole population of 72 internal auditors as the respondents.

Instruments And Data Collection

The sample groups consisting of internal auditors are being given a set of questionnaires that have two parts, part A and part B. This questionnaire was adopted and reformed from previous studies by Handoko et al. (2021), and Mansour, Ebrahim Mahmoud (2016). In Part A, it includes the basic questions of the respondents such as age, education background, years of experience. Part B, the questions are for each variable, and this part is in the form of Likert five-point scale where 1 being defined as "Strongly Disagree", and 5 being defined at "Strongly Agree". The items adopted from Handoko et al. (2021); Mansour, Ebrahim Mahmoud (2016) and Al Ansi et. al (2015).

This study used an online questionnaire method in collecting the data from the respondents. The link of online questionnaire is distributed through the email of each auditor. Online questionnaires are convenient as the respondents can answer the survey at their own free time and at any place by using their laptop or their phone. This is important as the respondents will not feel any limitations or pressure in completing the questionnaire. Another benefit is that

online questionnaires have the advantage of reducing the cost that will be used by the researcher to collect the data. Data collection started in 2022. It takes 2 months to complete.

Results and Discussion

Descriptive Analysis

Response rate of this study is 69.4 percent. From 72 population only 50 of them returned their questionnaire. There is no missing value. Each question was answered by respondents. Most of the respondents are female where it contributes to 60% of the survey, or 30 respondents in total. Meanwhile the percentage for male respondent is 40%, which equals to 20 respondents. As for age, majority of the respondents' age ranges from 26 to 30 years where it contributes 34%, which is 17 out of 50. The second in rank for age is 20 to 25 years that contributes 30% or 15 respondents, followed by range 31 to 35 years which is 24% or 12 respondents, and both age range of 36 to 40 years and 41 years and above contributes to the same amount of percentage which is 6%, which means there are 3 respondents respectively from both age group.

Most of the respondents' education level is at bachelor's degree where it contributes to 74% or 37 out of 50 respondents. There are 13 respondents that contribute to 26% that have master's degree. There are 27 respondents that have a professional qualification which contributes to 54% of the percentage. This means that 46% or 23 of the respondents does not have any professional qualification. Moreover, for the respondents that have a professional qualification, most of them have Association of Chartered Certified Accountants (ACCA) where it contributes to 39% or 12 out of 27 respondents. Certified Information Systems Auditor (CISA) comes in second at 29% together with "Others". In the survey collected, the other qualifications that the respondents have are a) Certified ISO27001, b) Chartered Islamic Finance Professional (CIFP), c) Microsoft Certified Power BI, and d) Azure Fundamentals. There is one respondent that has Certified Public Accountant (CPA) qualification which contributes to 3%.

Fifty six percent or 28 out of 50 respondents has an experience of 1 – 5 years in auditing, meanwhile there are 16 respondents which contribute to 32% that has 6 – 10 years in auditing, the next one is at 11 – 20 years where it contributes to 8% or 4 respondents, and the last two respondents that contribute to 4% have 21 – 30 years of experience in auditing.

Measurement Model

Research finding used SmartPLS 4 to perform partial least square structural equation modelling (PLS-SEM). The approach was in two stage which is measurement model assessment, then structural model assessment. For measurement model assessment, this study evaluates the model based on individual item reliability, convergent validity, internal consistency, and discriminant validity according to the suggestion by Hair et al. (2019) to measure the relationship between the variables in this study (refer Figure 2).

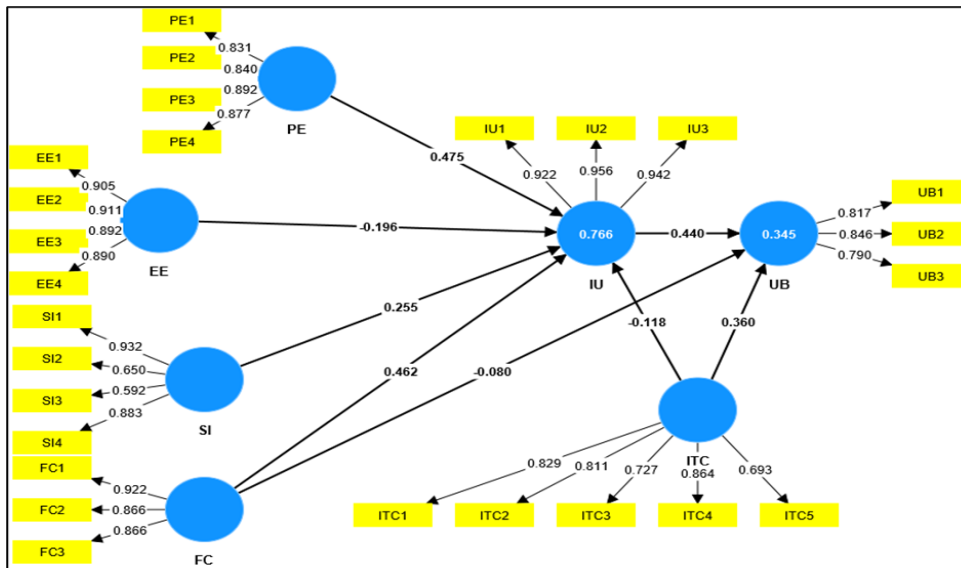


Figure 2: Measurement Model

Note: EE-Effort expectancy; FC-Facilitating conditions; ITC-IT competency; IU-Intention to use; PE-Performance expectancy; SI-Social influence; UB-Use behaviour.

Outer loading is being used for the purpose of evaluating the individual reliability of each item where the bivariate correlation among each indicator is taken separately and the concept equals the outer loading (Hair et al., 2020). The outer loading above 0.5 is considered as at significant level, meanwhile if the outer loading of the item is below 0.5, the scholar suggested that the researcher should remove the indicator or item, but the researcher can also retain them (refer Table 4.1). The decision whether to remove or retain the item shall be based on assessment made by researcher in terms of relevancy of the item (Hair et al., 2020). Construct reliability showed that each variable has more than 0.70 indicating the presence of internal consistency. Convergent validity or present by AVE in this study, shows above 0.50. Meaning that there is acceptable convergent validity as mentioned in Hair et al., (2011).

Table 1: Convergent Validity (Loadings, Composite Reliability and Average Variance Extracted)

	Items	Loadings	CR	AVE
Effort expectancy	EE1	0.905	0.932	0.809
	EE2	0.911		
	EE3	0.892		
	EE4	0.89		
Facilitating conditions	FC1	0.922	0.868	0.784
	FC2	0.866		
	FC3	0.866		
IT skills	ITC1	0.829	0.872	0.62
	ITC2	0.811		
	ITC3	0.727		
	ITC4	0.864		
	ITC5	0.693		
Intention to use	IU1	0.922	0.934	0.884
	IU2	0.956		
	IU3	0.942		
Performance expectancy	PE1	0.831	0.889	0.74
	PE2	0.84		
	PE3	0.892		
	PE4	0.877		
Social influence	SI1	0.932	0.877	0.605
	SI2	0.65		
	SI3	0.592		
	SI4	0.883		
Use behavior	UB1	0.817	0.755	0.669
	UB2	0.846		
	UB3	0.79		

Note: EE-Effort expectancy; FC-Facilitating conditions; ITC-IT competency; IU-Intention to use; PE-Performance expectancy; SI-Social influence; UB-Use behaviour.

Discriminant validity is the degree to which a concept in the structural model differs empirically from other constructs. In other words, discriminant validity measures the level of distinction of a construct (Hair et al., 2019; Hair et al., 2020). The scholar mentioned several tests that can be done to measure discriminant validity which includes cross-loading and Fornell-Locker (Hair et al., 2019). Henseler et al., (2015) in the other hand propose the HTMT approach to determine the discriminant validity. The threshold value suggested is less than 0.90. As in this study the value is within the acceptable range.

Table 2: Discriminant Validity by Heterotrait-Monitrait Ratio (HTMT)

	EE	FC	ITC	IU	PE	SI	UB
EE							
FC	0.859						
ITC	0.431	0.603					
IU	0.678	0.88	0.345				
PE	0.811	0.869	0.292	0.89			
SI	0.785	0.782	0.667	0.706	0.707		
UB	0.468	0.579	0.552	0.588	0.438	0.604	

Note: EE-Effort expectancy; FC-Facilitating conditions; ITC-IT competency; IU-Intention to use; PE-Performance expectancy; SI-Social influence; UB-Use behaviour.

Hypothesis Results and Discussion

The first step to examine the hypothesis result is to conduct bootstrapping where it will help to examine not only size but also the significance of the path coefficient. Hair et al. (2017) suggested that for bootstrapping, the researcher will need to bootstrap 5,000 samples, and this is being conducted for this current study. The purpose of bootstrapping the huge number of samples is to obtain the standard error as well as calculating the t-value and p-value of the path coefficient. For the current study, considering that the study has a smaller sample size, and the hypothesis is one-tailed, the critical value is 1.65 with the significant level of 0.05 or 5%.

Table 3: Hypotheses Result

Hypothesis	Relation	Standard Deviation	t-value	p-value	Decision
H1	PE – IU	0.158	3.01	0.001	Accepted
H2	EE – IU	0.12	1.633	0.051	Rejected
H3	SI – IU	0.107	2.378	0.009	Accepted
H4	FC – IU	0.147	3.142	0.001	Accepted
H5	FC – UB	0.323	0.249	0.402	Rejected
H6	ITC – IU	0.094	1.254	0.105	Rejected
H7	ITC – UB	0.172	2.091	0.018	Accepted
H8	IU – UB	0.246	1.788	0.037	Accepted

Note: EE-Effort expectancy; FC-Facilitating conditions; ITC-IT competency; IU-Intention to use; PE-Performance expectancy; SI-Social influence; UB-Use behaviour.

The results of hypothesis testing conducted using SmartPLS is being shown in Table 4.3. For H1, the study predicted that performance expectancy positively influenced internal auditors' intention to use data analytics in audit procedure. The result shows that t-value $3.01 > 1.65$ and p-value $0.001 < 0.05$ which indicates that there is significant correlation between performance expectancy and intention to use, hence H1 is accepted. This shows that the internal auditors in the financial institution believe that if by using data analytics will improve their performance, then they will have more intention to use it in their daily work. The result in line with several previous studies, for example Damer et al. (2021) studies on the external auditors in Jordan, and performance expectancy also has the positive influence for the external auditors to use software and applications, Al-Hiyari et al. (2019) that shows significant result of the performance expectancy by the internal auditors in Jordan, as well as study from Shamsuddin et al. (2015) where the results from the study indicates that performance expectancy has the

strongest relationship with the intention to use. However, the result from this study contradicts with Handoko et al. (2021) that conducted research in predicting adoption by auditors in Indonesia where performance expectancy has no significant influence by external auditors in Indonesia as they do not feel any changes on their work performance after using new technology. The reason shows that

Next, H2, the study predicted that intention to use is positively influenced by effort expectancy. The result show that the $t\text{-value} = 1.633 < 1.65$ and $p\text{-value} 0.051 > 0.05$, which indicates that there are no correlations between internal auditor's expectations on effort expectancy with intention to use data analytics, hence H2 is rejected. This difference indicates that effort expectancy does not really influence the intention of internal auditors to use data analytics in their work. This may be influenced by the demographic of the internal auditors in regard to their experience in doing system auditing, most of them only have between 1 to 5 years of experience, hence they might not think using data analytics is easy for them. This result from the study is similar to Pedrosa et al. (2020) that study on CAATs acceptance of statutory auditors in Europe where it mentioned that effort expectancy has the negative influence on the intention to use. However, the result contradicts many studies by Damer et al. (2021), Al-Hiyari et al. (2019), and Shamsuddin et al. (2015).

H3 predicted that social influence positively influenced internal auditors' intention to use data analytics in audit procedure. The result shows that $t\text{-value} 2.378 > 1.65$ and $p\text{-value} 0.009 < 0.05$ which indicates there is significant correlation between social influence and intention to use, hence H3 is accepted. Handoko et al. (2021) also has the similar result as the auditors in Indonesia indicates that receiving the support from the managers and seniors that are in the same profession increases their intention to adopt the technology in auditing. Pedrosa et al. (2020) study shows that social influence has a positive impact as well, but the impact is only small if compared to other variables that are being used in the study.

Next, H4 predicted that facilitating condition positively influence the internal auditors' intention to use data analytics in audit procedure. The result show $t\text{-value} 3.142 > 1.65$ and $p\text{-value} 0.001 < 0.05$, which indicates the positive relationship between facilitating conditions and intention to use, hence H4 is accepted. As for H5, it predicts that facilitating condition positively influence the internal auditors' usage or use behaviour of data analytics in audit procedure. However, H5 is rejected because the $t\text{-value}$ is $0.249 < 1.65$ and $p\text{-value} 0.402 > 0.05$ which indicates that there are no correlations between facilitating condition and internal auditors' use behaviour of data analytics. This means that the financial institution's internal auditor has a high intention to use data analytics in audit procedure if they think that they have enough resources, technical infrastructure, and technology expertise to help them in using data analytics.

This result is in line with Pedrosa et al. (2020), Al-Hiyari et al. (2019), and Shamsuddin et al. (2015) that also reported that facilitating conditions has the significant influence on the intention to use. Meanwhile, the result was not supported by Handoko et al. (2021) as the study reported that facilitating conditions does not have significant influence on the intention mainly because the current situation in the firm in Indonesia still does not reach the stage where the company can fully facilitate the auditors with adequate resources. This is in line with Damer et al. (2021) where the study also reported that facilitating condition has positive impact on usage of CAATs, the researcher explained that the respondents found that by using the tools

will be helpful not only in reducing the time spent to do their work, but at the same time still maintaining the same service's quality provided to their clients.

As for H6, the study predicted that IT skills competency of internal auditors positively influences the intention to use data analytics in audit procedure. However, H6 is again rejected as the t-value $1.254 < 1.65$ and p-value $0.105 > 0.05$ which indicates that there are no correlations between IT skills and intention to use data analytics. This indicates that even with the adequate number of resources, or the relevant trainings to the internal auditors in the financial institution, it will not provide assurance that the auditors will use data analytics to perform their audit. Next, H7 predicted that internal auditors' IT skills positively influence their usage of data analytics in audit procedure. The result shows that t-value $2.091 > 1.65$ and p-value $0.018 < 0.05$ which indicates that there is positive correlation between IT skills and use behaviour, therefore H7 is accepted.

Lastly, H8 predicted that internal auditors' intention to use data analytics positively influence their use behaviour of data analytics in audit procedure. The result shows that t-value $1.788 > 1.65$ and p-value $0.037 < 0.05$, hence the last hypothesis, H8 is accepted as the intention to use has a positive correlation with use behaviour. This shows if the internal auditors have the intention to use data analytics, it will provide a significant influence or impact on the actual usage of data analytics in audit procedure. This result from the study also in line with Pedrosa (2020) that reported the intentions to use has a large impact on the use of CAATs which indicates that the auditors' intention to use and the actual usage is high.

Hair et al. (2020) defined coefficient of determination, usually refers as R^2 , as a measure of prediction of the endogenous constructs. In other words, R^2 is being used to assess the structural model for the purpose of determining its predictive power. The value of R^2 should be between 0 and 1, but the scholar mentioned that the value usually will not be as low as 0, and as high as 1. The higher the value of R^2 indicates that the independent variable in the structural model is very independent, which increases the accuracy level of the endogenous construct (Hair et al., 2020). Furthermore, the R^2 value of 0.75, 0.50, and 0.25 are described as strong, moderate, and weak respectively (Hair et al., 2019). Moreover, further analysis on both dependent variables was conducted, based on the results in Table 3, it can be seen that the R^2 value for intention to use (0.766) is stronger than use behaviour (0.345) according to the classification made by Hair et al. (2019). The results indicate that intention to use has more predictive power as compared to use behaviour.

Table 4: Variance Explained in the Dependent Variable (R^2)

Latent Variables	R^2	R^2 Adjusted
IU	0.766	0.738
UB	0.345	0.301

Note: IU – Intention to use; UB – Use behaviour

Table 3 shows the result for R^2 value for relevant constructs in the structural model. Based on the classification of R^2 by Hair et al. (2019), the value of R^2 for intention to use data analytics is strong with 0.766, and the value of R^2 for use behaviour of data analytics is weak with 0.345.

Conclusion

The purpose of this study is to find whether performance expectancy, effort expectancy, social influence, facilitating conditions, and IT skills have any impact to intention to use and use behaviour of data analytics. The sample of this study involves the internal auditors in the internal audit department of the financial institution in Malaysia which include 72 staffs, and 50 questionnaires were received in the Microsoft Form that is being distributed in online manner. The findings of this study reported that performance expectancy, social influence, facilitating conditions has the positive significant influence on intention to use. As for performance expectancy, this means that if the internal auditors believe that data analytics will benefit them in a way that it will increase their performance, and able to accomplish their task quicker than doing it in traditional way, then they will have more intention to use data analytics. Moreover, the internal auditors also believe that their intention to use data analytics will increase if the other colleagues and seniors believe that they are able to use it, as well as the colleagues and seniors are using it as well. Similarly, facilitating conditions where if there are adequate resources available for the internal auditors to use data analytics, then the intention to use will increase.

Next, IT skills and intention to use has a positive significant influence on use behaviour. Having IT skills will be an additional value to the auditors, therefore, if they have sufficient knowledge and skills on the technology, they will use data analytics more often and for a long time too. As for intention to use, it has significant impact on the use behaviour or actual usage of data analytics. This indicates that if the internal auditors in central bank have a strong intention to use data analytics, then they will be using it for a long time in their daily work. Meanwhile, contradict to some studies, in this study, effort expectancy is deemed to have no significant influence on intention to use.

In short, this study utilizes the UTAUT and IT competency theory in developing the research framework, as well as eight research hypotheses where five hypotheses were accepted, and three hypotheses were rejected. This study also used IBM SPSS and SmartPLS as a tool for statistical analysis to analyse the results and provide further details and explanation in the last chapter of this study.

Acknowledgements

This paper is one of the outputs of the author's Master of Accounting thesis at Universiti Utara Malaysia. The author acknowledges the support provided by Universiti Utara Malaysia in facilitating this research. Appreciation is also extended to all who contributed, directly or indirectly, to the completion of this study.

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