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# The Role of External Auditors in Improving Cybersecurity of the Companies through Internal Control in Financial Reporting

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**Abstract.** Cyber security has been seen as very crucial to protect and improve corporate information security, where auditors have an important role in developing internal controls in technology-based operations through analysis of audit findings. However, research models that integrate cybersecurity with audit have yet to be widely developed. Therefore, this research adopts mixed methods that are aimed at the auditors working in the public accounting firm of the Greater Jakarta area. Data collection was carried out through the distribution of questionnaires and interviews, which were then analyzed by using the Structured Equation Model with SmartPLS Ver 4.8.4. The findings of this research are the growth of innovative technology affects the auditor's ability to assist in reviewing audit risk findings and measurements. However, the auditor's ability to apply technology to audit performance has an insignificant impact. This research contributes by developing an understanding model related to cybersecurity audit processes in industries and academics based on professional standards to improve audit performance with advanced technology.

**Keywords:** Cybersecurity, Auditors, Innovative technology, Audit Performance

# 1. Introduction

Advances in the era of the industrial revolution 4.0 have influenced one of the big 4 audit firms to invest in the application of technology that is predicted to increase global productivity in the business world by $6.6 trillion by 2030 (Munoko et al., 2020). According to Razzaq et al., (2020) changes in business strategy are caused by top management, where 70% believe in transforming the company by adopting technology that can accelerate the company's performance. Top management aims to prevent the company from experiencing disruption (Kumaraswamy et al., 2018), so the impact of the transformation has created a megatrend that turns operational activities in the presentation of financial statements into automated (Gray et al., 2014; Sirois et al., 2016). The presence of technology is due to the rapid pace of digital innovation as an alternative solution to develop industrial capabilities (Karajovic et al., 2019; Oliveira et al., 2021).

According to Stankovic et al., (2021) the occurrence of digital innovation has led to technological growth in Europe, which has increased digital competitiveness, stimulating GDP (Gross Domestic Product) and accelerating industrial operations by synergizing people with technology. The high level of digital competitiveness is due to the rampant use of Information and Communication Technology (ICT) to connect humans with communities, thereby shaping the operation of new business systems (Chatterjee et al., 2021). However, Zadorozhnyi et al., (2021) explain that the competitive level of technology applications also has the potential to experience high vulnerabilities, such as cyber-breaches resulting from a lack of IT security levels in the business.

However, according to Kolbjørnsrud et al., (2017) 44% of leaders feel threatened by technology, resulting in a lack of facilities provided to the workforce. Then, more than 50% of the younger generation is worried that the existence of technology will eliminate jobs (ACCA, 2021), which is also in line with research Frey & Osborne, (2017) accountants are classified as 30% of the 700 professions that experience vulnerability in the digitalization era. Then, there has not been much research found that adapts elements of digital innovation focused on digital competitiveness and ICT Usage to the audit sector (Slapničar et al., 2022). Previous studies (Calderon & Gao, 2021; Raguseo, 2018) revealed the importance of auditors collaborating with technology to improve data accuracy and audit performance, which regulators can also support in formulating policies on auditor performance.

In research Alles, (2015) AICPA encourages the transformation of auditors in transition from traditional to modern approaches, whereas in research (Bizarro et al., 2019; Rosati et al., 2019) based on PCAOB Auditing Standard No.12 and ISACA direct auditors to be able to understand the impact of using technology on clients when carrying out professional audit services. According to Munoko et al., (2020) the International Auditing and Assurance Standards Board (IAASB) has established

a technology-working group to facilitate the acquisition of data sources from stakeholders. Then based on Kroon et al., (2021) it has analyzed 157 articles and found that in practical implications, there needs to be changes in standards to assist accountants in adjusting their role to the use of technology.

Khin & Ho, (2019) explained the presence of big data, the internet of things, the cloud, and AI is categorized as IT, which is widely used to increase the power of innovation that brings updates in business processes. Research Chen et al., (2019) predicts that the internet network will be connected to 50 billion devices by the 2020s. The development of virtual networks has led to massive data growth of 35 – 50% (Bhimani & Willcocks, 2014). Therefore, it requires adequate technological roles to help solve problems effectively, such as cybersecurity, fraud detection, and data-driven strategy (Al-Matari et al., 2021). The presence of big data can enrich auditors in tracing and obtaining hidden findings, which can improve auditor performance (Moffitt et al., 2018). However, it is important to measure the proficiency of auditors when applying technology to increase accountability in presenting information free from fraud or conflict of interest (Rosati et al., 2019).

Human capabilities are needed to apply the technology effectively, which is known as digital capability (Li & Chan, 2019). Starting from dynamic capabilities terms developed by Teece et al., (1997) combine various theories such as resource-based view theory and game theory which leads some researchers to resource competencies to be able to keep up with dynamic changes that can thus support the development of the industry. Munoko et al., (2020) projected how the advancement of the auditor profession needs to integrate with technology to help improve the quality of audit performance that is more advanced, accurate, and reliable. Similarly, Kokina & Davenport, (2017), the presence of AI and robotics has brought major changes in the provision of audit services, where 30% of corporate audits will present audit reports in real-time with the help of AI by 2025.

However, Khin & Ho, (2019) found that 77% of respondents cited the skills gap as an obstacle to digital transformation. A skills gap exists due to the inequality between human capabilities and the rapid growth of technology, causing a gap that reduces employment (Autor, 2015; Kolbjørnsrud et al., 2017). Although the study of digital capability toward digital innovation is still frightening for practitioners and academics, the relationship between capability and innovation has proven to have a positive effect (Khin & Ho, 2019; Li & Chan, 2019). Several aspects of analyzing auditors' acceptance and skills lead to digital skills and digital competencies to prevent cyber risks (Slapničar et al., 2022; Widuri et al., 2016).

However, a lack of openness in implementing technology leads to a decrease in the quality of auditors in auditing clients who have transformed with IT (Rezaee & Wang, 2019). The report of ECIIA, (2019) states that the biggest risk faced by auditors in the 2020s is data security and cybersecurity, which is supported by

research ACFE, (2022) which exposes the level of fraud caused by internet and cloud deployments still have vulnerabilities to cyber theft, where there are 28% of financial statement manipulations occurring using systems and 25% committing e-document data forgery. Based on Rosati et al. (2019), cyberattacks resulting from weak internal control impacted the presentation of financial statements, especially on company assets, the use of fees, manipulation, and misstatement of financial reports. It decreases the transparency and reliability of the information produced (Al-Matari et al., 2021).

Over time, the level of losses due to cyberattacks continues to develop. Islam et al., (2018) revealed that the rapid number of cyberattacks in 2014 reached 3x greater than in 2010, whereas in the 2016 Breach Level Index report Sabillon et al., (2018) stated there were 1,378,509,261 cybercrimes found. Islam et al., (2018) developed a cybersecurity framework to improve internal auditor's performance to be more open to risks over the technology operation. Discussing further one of the interviews results Slapničar et al., (2022) stated that cyber breaches had become a major risk for companies. Although they do not conduct a full review of cybersecurity, the company structures have an element of control over cyber as part of internal audit activities. However, based on research Sabillon et al., (2018) the level of cybersecurity audits in North America is 70%, Europe is 58%, Latin America is 56%, Oceania is 53%, the Middle East is 50%, Africa is 49%, and Asia is 35%, which shows a lack of cyber awareness in Asia.

Cyber breaches that impact the company's financial condition have become a risk for auditors in detecting audit findings on internal controls (Calderon & Gao, 2021). Based on research Rosati et al., (2019) used a sample of 168 cybersecurity incidents from 2005 – 2014 and found a 12% increase in audit fees due to the rapid rise of cyber-breaches, thus adopting audit risk as a variable proxy to measure audit fees. Several studies have adapted to the acceptability and impact of using technology for auditors (Gepp et al., 2018; Raguseo, 2018) the analysis is needed to identify auditors' agility and agility in implementing increasingly vulnerable technologies to the lack of cybersecurity.

Auditors need the right strategic approach by starting with risk measurement to detect evidence that has the potential to be found. Adopting the NIST Cybersecurity framework as an element of risk audit (Ștefănescu et al., 2019), it assists auditors in assessing audit risk by using technology on clients who have adopted IT. Therefore, this study adopts agency and stewardship theory (Donaldson & Davis, 1991; Jensen & Meckling, 1976) which analyzes the integrity of the information presented by auditors to users of financial statements. Kyere & Ausloos, (2021) has combined the two theories to strengthen management governance factors that impact company performance, which is also the basis for adapting to the role of auditors who impact cybersecurity. In addition, (Islam et al., 2018; Sabillon et al., 2018), the evaluation of risk can be seen from the effectiveness of audits that affect the improvement of

cybersecurity so with adequate risk assessment and mitigation processes, it will lead to quality audit efforts.

Several previous studies (Rosati et al., 2019; Slapničar et al., 2022) audit efforts aimed to carry out assessment testing to obtain findings based on risk audit evaluations that lead to the security of asset information presented in financial statements. One standard reference for auditors is the COSO Internal Control-Integrated Framework (Klamm & Watson, 2009). Testing has been carried out by Klamm & Watson, (2009) it shows aspects of COSO Internal Control that are interconnected with each other, where if there is a weakness in operational supervision in one element of COSO, it will have an impact on other elements, thus becoming a risk that threatens the company.

Audit efforts will support each other with risk audits, especially after auditors integrate with technology that facilitates real-time data investigation and analysis to enrich insights that can find to improve audit quality (Sirois et al., 2016). According to Widuri et al., (2016), Indonesia, as a developing country, has also made auditors aware of starting transition to the use of technology, one of the interview results revealed that with the growing number of clients through the application of ERP Software in the form of Oracle, SAP, or Dynamic AS would make it more difficult to carry out audits process, resulting in a decrease in audit performance. Thus, this study will generate new performance for auditors in Indonesia by conducting audits that not only focus on examining transaction documents but also on how effective internal controls over the use of information have been monitored through the use of technology.

## 2. Literature Review and Hypothesis Development

The advance in the era of the industrial revolution 4.0 has created a digital transformation that has turned all business processes into full automation. The rapid development of technology affects business performance that requires changes in all operational activities can be an added value against competitors (Park, et al., 2016). The presence of innovative technology has also changed auditors so that they can integrate with the use of technology to ensure the information on the recording of financial reports through testing of internal controls in companies (Sirois et al., 2016). Auditors need to maintain audit quality by acting independently, skepticism, and critical thinking to prevent asymmetric information from occurring due to inaccurate reporting between company management and stakeholders (Nambisan et al., 2017). Through this role, auditors can help improve management governance in companies as an advantage that prevents fraud, especially by practicing technology in receiving transaction documents and recording reports (Kyere & Ausloos, 2021). Calderon & Gao, (2021) stated that cybersecurity has become crucial in the digital world that needs to increase information because it is confidentiality, integrity, and availability. Hence, auditors when conducting audit activities need to understand

how businesses operate, especially how leaders manage their operational activities at an adequate level of security.

Therefore, it is necessary to analyze the factors that influence the performance of auditors, especially amid technological advances that demand the role of auditors that can contribute to the field of IT, for which the research hypotheses are developed below.

## 2.1. The Relationship Between Digital Innovation in Auditing and The Digital Capability of Auditors

The rotation of technological growth has been growing rapidly in the industrial world, where Stankovic et al., (2021) innovation has produced digital competitiveness that increases resource capabilities, mainly due to ICT Development in enterprises. Based on several studies Zadorozhnyi et al., (2021) and Khin & Ho, (2019) reveal that digital innovation has increased economic acceleration by transforming non-IT aspects to integrate into IT applications that provide new experiences. According to Permana et al., (2019), developing strategies for digital innovation has improved the skills of resources in practicing technology as a competitive advantage that affects the performance of SMEs in Indonesia. However, the growth of innovative technologies impacts audit size and risk, which thus encourages auditors to be able to synergize with technology, as also stated in the study (Sirois et al., 2016).

Hypothesis 1: Digital Innovation in auditing positively affects the digital capability of auditors

## 2.2. The Relationship Between Digital Capability of Auditors and Risk Audit Amid IT Growth

Along with the development of time, the accountant and audit profession has transitioned to a digital-based (Friday & Japhet, 2020). Strong competence is needed to improve resource capabilities in achieving goals so that with the development of digital innovation it has an impact on digital capability Khin & Ho, (2019) which thus becomes a forum for auditors to evaluate risks efficiently (Gepp et al., 2018; Widuri et al., 2016). The digital capability has been widely adopted by several researchers leading to the growth of business performance and new consumer experiences, which are positively influenced by digital capability (Li & Chan, 2019; Malchenko et al., 2020). Raguseo, (2018) explained that a reliable ability to apply technology in audits will help the success of audit strategies in predicting and analyzing risks that can be findings to be followed up. According to Mahzan & Lymer, (2014), adopting the UTAUT Model, the acceptance of auditors to practice software auditing will increase the auditing capacity, thereby improving the quality of auditor performance. However, Stankovic et al., (2021) found that digital skills have less impact on improving business performance.

Hypothesis 2: Digital Capability Auditors positively affect Audit Risk

## 2.3. The Relationship Between Digital Capability of Auditors and Audit Effort

According to Sirois et al., (2016) the implementation of audits formed with the help of technology will improve the quality of audit performance through strategies that continue to be adapted agilely. Nevertheless, Rezaee & Wang, (2019) suggests improving the competence of auditors to keep up with the times, which will thus help the investigation process to the evaluation of data that becomes information in real-time. The previous statement is supported by the results of interviews Widuri et al., (2016), mentioning the difficulty Indonesia auditors face if they cannot synergize with technology. In addition, Widuri et al., (2016) revealed that various aspects can be further improved based on the interview results, in the form of IT Skills auditors, standard requirements, and others. However, Kolbjørnsrud et al., (2017) inform some leaders are hindering workforce capacity building with IT. Several previous studies (Al-Matari et al., 2021; Calderon & Gao, 2021) have analyzed the performance of auditors by practicing technology to prevent increasingly large cybersecurity risks from occurring in the industrial world.

Hypothesis 3: Digital Capability Auditor positively affects Audit Effort

## 2.4. The Relationship between Digital Capability of Auditors and Audit Performance

Auditors must invest time in renewing capacity in competitiveness so as not to experience disruption (Kumaraswamy et al., 2018) and (Autor, 2015). Several previous studies (Rosati et al., 2019; Sirois et al., 2016; Slapničar et al., 2022) explained the impact that applying technology would improve auditors' competence to invest broader hidden data in presenting to report users. According to Alles, (2015) auditors have faced 6x faster data growth, thus encouraging auditors to implement the provision of technology-based audit professional services without losing the value of audits.

Hypotesis 4: Digital Capability Auditors positively affect Audit Performance

## 2.5. The Relationship between Audit Risk Amid IT Growth and Audit Effort

Technology advancements provide excellence for industry and professionals to build a fast-growing economy Sorescu, (2017). The application of technology is very helpful for auditors in identifying fraud, finding hidden information, and expanding insights that can produce useful audit performance for information users (Kokina & Davenport, 2017). According to Raguseo, (2018) auditors can present information effectively when understanding the impact of IT. Technology will assist auditors in mitigating risks more flexibly and accurately so that it can be the basis for further detection through tests of internal controls in the company (Munoko et

al., 2020). However, according to Zadorozhnyi et al., (2021) reveal that the higher growth of technology tends to be a potential risk that impacts cyber breaches. Thus, the auditor's role needed to add a testing process to the risks of the control of the implementation of the system (Rosati et al., 2019).

Hypothesis 5: Audit risk positively affects audit effort

## 2.6. The Relationship between Audit Risk Amid IT Growth and Audit Performance

The development of IT has transformed job prospects in audits to run automatically, where utilizing technology will help process data quickly and accurately that streamlining time (Moffitt et al., 2018). In the study Salijeni et al., (2019) presence of big data has brought about a positive change that transitions the performance of auditors using technology. According to Rosati et al., (2019) and Calderon & Gao, (2021) analyzed that auditors' expertise in mitigating risk is also based on the size of public audit firms that support auditors to present better performance so by applying technology present audit risk that has a positive effect on measuring audit performance.

Based on Mahzan & Lymer, (2014) explained that the use of audit and computerization software will improve the auditor's strategy, which is constantly updated agilely to produce innovative solutions to solving problems. In addition, Gepp et al., (2018) show that the application of technology will Raguseo, (2018) improve information projection with the help of technology visualization that is easy for users to understand to make decisions so that the results of audit testing of the findings obtained will form a competent audit performance for various parties. Technology investment in public audit firms will improve auditors' performance in completing working papers (Munoko et al., 2020).

Hypothesis 6: Audit risk positively affects audit performance

## 2.7. The Relationship Between Audit Effort and Audit Performance

Technological advancement has increased the auditor's performance in presenting audit information. Auditors have an important role in ensuring internal control is carried out within the company, and by accessing technology, they will help improve auditor performance to produce more advanced performance (Gepp et al., 2018; Kokina & Davenport, 2017; Munoko et al., 2020). However, cybersecurity cases are the biggest risk that has the potential to bring down the industrial world, and auditors often still misinterpret that they have no cybersecurity competency (Rosati et al., 2019). Discussing further, auditors can collaborate with the IT team to improve data security and protect company information (Calderon & Gao, 2021; Sirois et al., 2016).

Hypothesis 7: Audit effort positively affects audit performance

## 2.8. Research Framework

According to Slapničar et al., (2022) internal audit performance assessments began to be adapted to analyze and evaluate internal controls on the use of the system, but were not often carried out. In research (Calderon & Gao, 2021; Rosati et al., 2019) auditors can synergize with technology to minimize the risk of cybercrime that adversely affects financial performance. Ștefănescu et al., (2019) along with technological advances result in vulnerabilities that tend to harm users, such as manipulation of financial statements that decrease the credibility of data, which thus (Friday & Japhet, 2020) directs the growth of accountants who are warier of cybersecurity to prevent theft or manipulation of transaction data using systems.

Based on Rezaee & Wang, (2019), with the crime rate following the changes, it requires the role of accountants and auditors to adapt by synergizing with the use of technology.

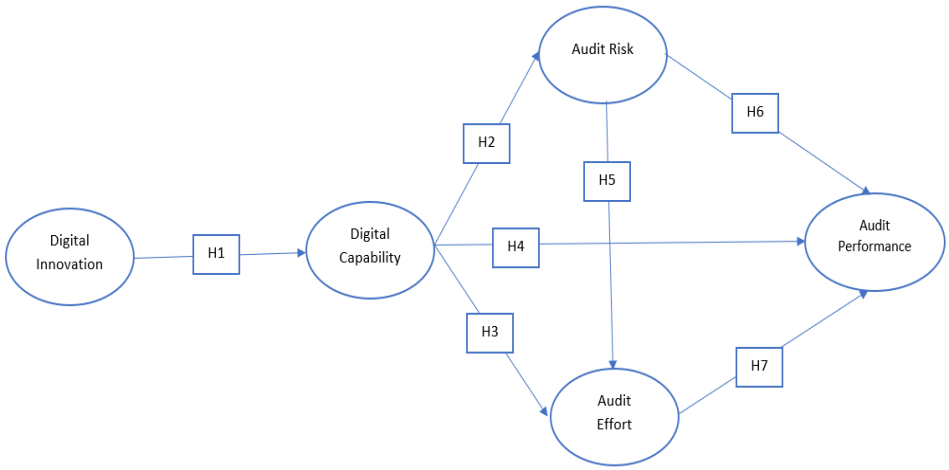


Fig. 1: Theoretical Framework

# 3. Research Methodology

This research uses a mix-methods concurrent model approach that focuses on auditors in Public Accounting Firms in the Greater Jakarta area. According to Marvasti, (2018) mixed-methods research can present very supportive information to project a combination of relevant information by explaining the situation in real terms on the phenomenon that occurs. Several previous studies Peter et al., (2020) and Dayour et al., (2019) adopted mixed methods to obtain a scope of information explaining the impact of risks from applying technology and developing organizational strategies.

In quantitative studies, researchers distributed a questionnaire consisting of several questions representing 5 research variables by adopting a 4-point Likert scale, which starts from strongly disagree (1) to strongly agree (4) on each question

given to respondents (Joshi et al., 2015). The types of questions given are closed questions, where the distribution process is carried out through Google Forms, Linkedin, and other social media in a snowballed manner starting from October 12, 2022, until October 20, 2022. Because the number of auditor populations is still being determined due to the high turnover of employees, the sampling technique carried out by researchers is to adopt the Roscoe criteria developed in 1975 (Yusoff et al., 2015). It is following Al-Okaily et al., (2020) that the sample calculation using SmartPLS is a minimum of 30 samples, which if it is less than 30 will result in an error calculation.

This research technique performs data analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM), which is processed using SmartPLS ver 4.8.4. The first process is to test the validity and reliability of each construct's indicator. Validity test using convergent validity, Average Variance Extracted (AVE), and discriminant validity (Al-Okaily et al., 2020). Then, the reliability test uses Cronbach's Alpha and composite reliability which is then continued with hypothesis testing by bootstrapping test (Hair et al., 2019).

Meanwhile, qualitative conducted an interview on November 03, 2022, with several question studies obtained based on previous studies (Slapničar et al., 2022 and Widuri et al., 2016), which are developed and adjusted to the performance of auditors. The questions given are semi-structured questions that will be conducted a thematic analysis to determine the points of the findings of the interview information (Braun & Clarke, 2019). In contrast, for the secondary data, this study used a Systematic Literature Review (SLR) to gain wider insight and knowledge (Bowen, 2009).

## 4. Results and Discussion

Respondents in this questionnaire obtained 30 respondents with zero missing values by following Roscoe rules and SmartPLS processing (Al-Okaily et al., 2020; Yusoff et al., 2015) obtained from auditors with a minimum position of Assistant Manager at a Public Accounting Firm in the Greater Jakarta Area area. The respondent data obtained consists of several aspects, which are found in Table 1.

Table 1: Demographic Data of the Respondents

| Category | Total | % |
|---|---|---|
| | **Gender** | |
| Male | 22 | 73.33% |
| Female | 8 | 26.67% |
| **Total** | **30** | **100.00%** |
| | **Education** | |
| Bachelor (S1) | 21 | 70.00% |
| Master (S2) | 9 | 30.00% |
| Doctoral (S3) | 0 | 0.00% |
| **Total** | **30** | **100.00%** |

| | | |
|---|---|---|
| **Working Experience** | | |
| 6 - 10 years | 20 | 66.67% |
| 11 - 15 years | 3 | 10.00% |
| 16 - 20 years | 6 | 20.00% |
| > 20 years | 1 | 3.33% |
| **Total** | **30** | **100.00%** |
| **Position** | | |
| Partner | 6 | 20.00% |
| Director | 2 | 6.67% |
| Senior Manager | 1 | 3.33% |
| Manager | 7 | 23.33% |
| Assistant Manager | 14 | 46.67% |
| **Total** | **30** | **100.00%** |
| **Place of Work** | | |
| Big 4 | 16 | 53.33% |
| Big 10 (Exclude big 4) | 10 | 33.33% |
| Non big 4 and big 10 | 4 | 13.33% |
| **Total** | **30** | **100.00%** |
| **Client** | | |
| Financial Services | 15 | 100% |
| Manufacturing | 19 | |
| Telecommunications | 7 | |
| Consumer Goods | 8 | |
| Construction | 6 | |
| Trading | 10 | |
| Mining | 8 | |
| Property | 4 | |
| Transportation | 7 | |
| Business Agriculture | 6 | |
| **Professional Certifications** | | |
| No Certification | 17 | 100% |
| Chartered Accountant (CA) | 8 | |
| Certified Public Accountant (CPA) | 8 | |
| Chartered Practicing Accountant Australia (CPA Australia) | 2 | |
| Certified Information Systems Auditor (CISA) | 2 | |

The data obtained from the questionnaire distribution were processed with the help of SmartPLS ver 4 to form a calculation pattern representing the test results of this research hypothesis. The purpose of using SmartPLS 4 to support this research analysis approach refers to SEM (Structured Equation Model), starting from convergent validity, discriminant validity, Fornell-lacker test, and hypothesis testing (Ghozali & Latan, 2015). The figure below projects a structural model of the study.

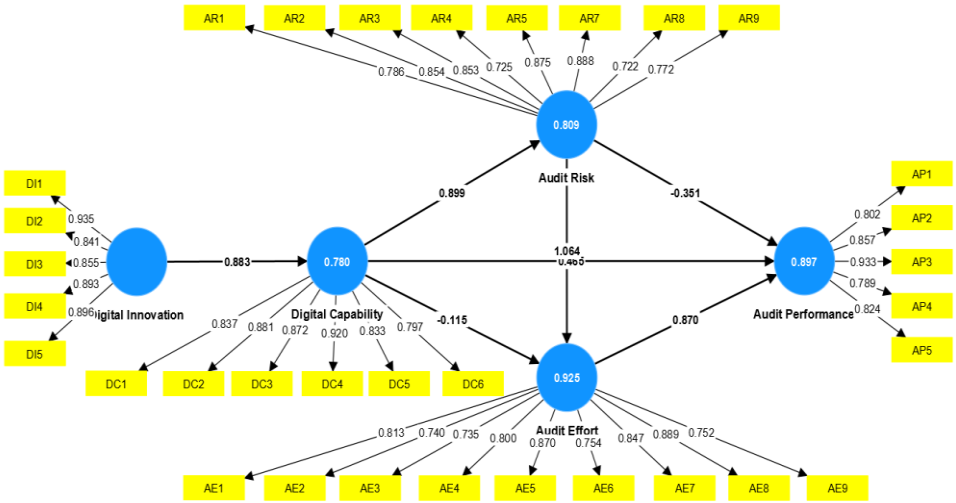


Fig. 2: Structural Model

Based on figure 2 represented above, presents the structural model of the study by eliminating the AR6 indicator of the Audit Risk variable and the AE10 indicator of Audit Effort since the values of the loading factors obtained are <0.70. According to Hair et al., (2019) it is recommended that the measurement indicators of a construct reach >0.70, which illustrates the high validity of the data obtained in the study, in order to increase the results of the data analysis in the relevant and appropriate information to support the investigation.

## 4.1. Validity Analysis

According to Hair et al., (2019) validity testing needs to be implemented to validate accurate and competent data for further use in the next testing stage. To find out valid data, convergent validity aims to test the readability of data, research indicators, and relationships between latent variables arranged in the research model, which can be seen in the table below.

Table 2: Convergent validity test

| Construct | Item | Outer loadings |
|---|---|---|
| Digital Innovation | DI1 | 0.935 |
| | DI2 | 0.841 |
| | DI3 | 0.855 |
| | DI4 | 0.893 |
| | DI5 | 0.896 |
| Digital Capability | DC1 | 0.837 |
| | DC2 | 0.881 |
| | DC3 | 0.872 |
| | DC4 | 0.92 |
| | DC5 | 0.833 |
| | DC6 | 0.797 |

| | | |
|---|---|---|
| Audit Risk | AR1 | 0.786 |
| | AR2 | 0.854 |
| | AR3 | 0.853 |
| | AR4 | 0.725 |
| | AR5 | 0.875 |
| | AR7 | 0.888 |
| | AR8 | 0.722 |
| | AR9 | 0.772 |
| Audit Effort | AE1 | 0.813 |
| | AE2 | 0.74 |
| | AE3 | 0.735 |
| | AE4 | 0.8 |
| | AE5 | 0.87 |
| | AE6 | 0.754 |
| | AE7 | 0.847 |
| | AE8 | 0.889 |
| | AE9 | 0.752 |
| Audit Performance | AP1 | 0.802 |
| | AP2 | 0.857 |
| | AP3 | 0.933 |
| | AP4 | 0.789 |
| | AP5 | 0.824 |

Based on the test results on outer loadings, 2 indicators such as AE6 and AR10 that are not eligible because they are below the specified validity value. Hair et al., (2010) and Cleff, (2019) revealed that the normal limit on convergent validity testing >0.70. Thus, both unqualified indicators will be eliminated.

Then to support that each construct is valid and has a qualified discriminant value, through Fornell-Lacker testing can help identify the value of each variable. Table 3 below shows the projection of the Fornell-Lacker test on the questionnaire data and proves that the data is following the requirements on discriminant validity.

Table 3: Fornell-Lacker test

| Variable | Audit Effort | Audit Performance | Audit Risk | Digital Capability | Digital Innovation |
|---|---|---|---|---|---|
| Audit Effort | 0.802 | - | - | - | - |
| Audit Performance | 0.924 | 0.843 | - | - | - |
| Audit Risk | 0.96 | 0.903 | 0.812 | - | - |
| Digital Capability | 0.841 | 0.882 | 0.899 | 0.858 | - |
| Digital Innovation | 0.81 | 0.904 | 0.824 | 0.883 | 0.885 |

## 4.2. Reliability Test

Reliability testing aims to ensure that all data used can be trusted, thus increasing

the research's added value (Creswell, 2007). According to Al-Okaily et al., (2020), data reliability analysis using smartPLS provides flexible and effective data exposure to interpret item results and relationships between adequate variables. In data reliability testing, Cronbach alpha is used to measure the level of consistency in each item, whereas composite reliability testing is measured to determine the reliability of data with AVE values of >0.50 and CR >0.70. The model formed has been reliable (Yamin & Kurniawan, 2011).

Table 4: Construct validity and reliability data

| Variable | Cronbach's alpha | rho_a | Composite Reliability (CR) | Average Variance Extracted (AVE) |
|---|---|---|---|---|
| Audit Effort | 0.93 | 0.933 | 0.942 | 0.643 |
| Audit Performance | 0.897 | 0.903 | 0.924 | 0.71 |
| Audit Risk | 0.925 | 0.928 | 0.939 | 0.659 |
| Digital Capability | 0.928 | 0.928 | 0.943 | 0.736 |
| Digital Innovation | 0.93 | 0.933 | 0.947 | 0.783 |

## 4.3. Determinant Coefficient

Determinant coefficient testing aims to identify the degree of magnitude of existing dependent variables to be explained based on the relationships of other independent variables (Cleff, 2019), where the audit performance variable is the endogenous variable of the study. If the greater the value of R2, the higher the variable's value that can be explained by the intervening variable (Yamin & Kurniawan, 2011). The testing process uses SmartPLS Ver 4, which can be seen in the table below:

Table 5: R Square Test

| Variable | R-square | R-square adjusted |
|---|---|---|
| Audit Effort | 0.925 | 0.919 |
| Audit Performance | 0.897 | 0.886 |
| Audit Risk | 0.809 | 0.802 |
| Digital Capability | 0.78 | 0.773 |

The data in table 6 uses 1 dependent variable (Audit performance) and 3 intervening variables (Digital capability, audit risk, and audit effort) to determine how much the intervening variable can explain the dependent variable in the study. Based on the presentation from table 6, it shows how to audit performance has a value of 0.897, where intervening variables in the form of audit effort, audit risk, and digital capability can explain 89.7% of audit performance variables, with 10.3% explained by other variables or factors (Ghozali & Latan, 2015). In addition, other intervening variables also have a high value to better explain the study results.

## 4.4. Hypothesis Testing

After validating and reliability test, all data obtained are tested to present information describing the study results based on the preparation of a research hypothesis framework. Hypothesis testing uses two-tailed, which refers to a 95% confidence level and a degree of freedom value of 1.96 (Cleff, 2019). The results of hypothesis testing on each latent variable can be seen in table 6 as follows.

Table 6: Hypothesis testing (Bootstrapping)

| Construct | T-Statistic | P Values |
|---|---|---|
| Digital Innovation --> Digital Capability | 3.067 | 0.002 |
| Digital Capability --> Audit Risk | 6.83 | 0.000 |
| Digital Capability --> Audit Effort | 0.954 | 0.340 |
| Digital Capability --> Audit Performance | 0.539 | 0.590 |
| Audit Risk --> Audit Effort | 2.093 | 0.036 |
| Audit Risk --> Audit Performance | 9.802 | 0.000 |
| Audit Effort --> Audit Performance | 7.692 | 0.000 |

Based on the hypothesis testing results presented in table 7, there are several relationships between variables, such as the following:

- In hypothesis 1 testing, the influence of digital innovation on digital capability has a T-statistical value of 3,067 > 1.96 with a P-Value of 0.002 <0.05. According to (Cleff, 2019; Ghozali & Latan, 2015), if by applying the two-tailed concept and achieving more than the specified conditions, then the results of hypothesis testing have a significant positive impact.
- In hypothesis 2 testing, the influence of digital capability on risk audits has a T-Statistical value of 6.83 > 1.96 with P-Value of 0.000 <0.005. According to Ghozali & Latan, (2015) and Jogiyanto & Abdillah, (2016) if it meets the requirements in testing the relationship of the hypothesis, it can accept the hypothesis that has been prepared. The results of this test showed a significant positive impact.
- In hypothesis 3 testing, the effect of digital capability on audit effort has a T-Statistical value of 0.954 < 1.96 with P-Value of 0.340 > 0.05. Thus, the results on the testing of hypothesis 3 had an insignificant positive impact because they needed to meet the requirements on the tested value (Ghozali & Latan, 2015).
- In hypothesis 4 testing, the effect of digital capability on audit performance has a T-Statistical value of 0.539 < 1.96 with a P-Value of 0.590 > 0.05. Thus, the test results were declared to have an insignificant positive impact (Ghozali & Latan, 2015).
- In hypothesis 5 testing, the effect of audit risk on audit effort has a T-Statistical value of 2,093 > 1.96 with P Values of 0.036 < 0.05. The results

of testing the relationship of the hypothesis showed a significant positive impact (Ghozali & Latan, 2015).

- In hypothesis testing 6, the effect of audit risk on audit performance has a T-Statistical value of 9,802 > 1.96 with P-Value of 0.000 < 0.05. It proves that the test results on the relationship of audit risk variables with audit performance have a significant positive impact (Ghozali & Latan, 2015).
- In hypothesis test 7, the effect of audit effort on audit performance has a T-Statistical value of 7,692 > 1.96 with P-Value of 0.000 <0.05. Thus, the results of testing hypothesis 7 had a significant positive impact.

## 4.5. Discussion

This research also conducted an interview study by obtaining information directly from practitioners, which can be seen in the table 7 below:

Table 7: Data interview

| Code | Position / Job Title | Long Time Working |
|---|---|---|
| R1 | Audit Partner | >20 years |
| R2 | IT Auditor | >10 years |

The interviews were adjusted to research variables consisting of digital innovation, digital capability, risk audit, effort audit, and performance audit, which were also developed based on several previous studies (Rosati et al., 2019; Slapničar et al., 2022; Widuri et al., 2016). Here is an analysis of the study:

- Hypothesis 1 shows that the relationship between digital innovation significantly affects digital capability. It explains that the level of digital competitiveness and ICT Usage among auditors in the Greater Jakarta Area is very high. In line with the research of Stankovic et al., (2021) that the rapid growth of technology in Europe results in a high level of competitiveness in applying technology, whereas Zadorozhnyi et al., (2021) state that it raises vulnerabilities that have the potential to occur cyber-breaches. The growth of technology in the industrial world also influences auditors to have a qualified capacity to adopt technology (Salijeni et al., 2019; Sirois et al., 2016).
- Based on the results of an interview with **R2** "I have led IT audits in banking, mining, and automotive. However, talking about cybersecurity when emphasized to the financial industry is greater than other industries, because the level of awareness in the financial sector is greater than the automotive and other sectors". This is also supported by **R1** "As R2 said, the majority currently use IT auditors because financial statements have implemented the system. Examples of banks and financial standards use their own applications, so it is impossible to conduct a manual audit. The audit

approach cooperates with IT even though not to all clients". The results of this hypothesis study follow research Khin & Ho, (2019) and Nambisan et al., (2017) on how the relationship between digital capability and digital innovation affects each other. However, Kolbjørnsrud et al., (2017) show that 44% of leaders see innovative technology as a threat, which thus impacts company performance.

- Hypothesis 2 shows that the relationship of digital capability significantly affects audit risk. Auditors are increasingly facilitated in analyzing risks to create audit strategies on an ongoing basis (Calderon & Gao, 2021; Rosati et al., 2019). Auditors can identify hidden information quickly by making optimal use of technology (Najafabadi et al., 2015). Based on the interview results, it is explained that auditors with IT are inseparable, where obtaining a professional certification like CISA can be an added value to the competence of auditors. Similar to the study of Rezaee & Wang, (2019) and Al-Matari et al., (2021) that auditors and forensic accountants need to update their capabilities by having education and the ability to adapt to change. That way, auditors can move into new domains in mitigating risk without losing the value of audits (Sirois et al., 2016).
- Hypothesis 3 shows the relationship of digital capability which has a positive but insignificant impact on audit effort. Technology implementation has affected the performance of auditors who have become faster and more agile (Deloitte, 2018). However, the thing that hinders auditors from practicing technology is regulations that have yet to adapt to changes (Alles, 2015). Based on an interview with **R2**, it is explained that often when developing an audit system, it competes with regulatory rules. Discussing further, **R2** posits, "... In practicing the audit system, it also requires specialization, such as in the audit standards, financial accounting standards, and so on, which then if there are findings in the system will be informed to the IT auditor". It also shows how the role of auditors today still requires awareness and readiness to adapt (Kokina & Davenport, 2017; Munoko et al., 2020). However, the slowly shifting approach to audit strategies requires motivation towards auditors, although it does not reduce the auditor profession, as stated by **R1**. Supporting the previous statement, Slapničar et al., (2022) showed that some companies have begun to direct the study of audit strategies to analyze control systems, which can improve cybersecurity in data.
- Hypothesis 4 shows that the relationship of digital capability has a positive but insignificant impact on audit performance. According to **R1** and **R2** collaboration between financial audit and IT from both sides will mutually improve each other's competence, so that it will update the quality of specialists such as taxation, accounting standards, and so on to integrate with

technology. **R2** also revealed that the development of technology, would give birth to the specialization needed, one of which is in Indonesia is the Cloud (Azure, AWS Amazone). Implementing the right control system, it will help improve the quality of audit performance (Calderon & Gao, 2021). Several studies have combined cybersecurity frameworks with internal audits as elements to support internal control in practicing systems (Al-Matari et al., 2021; Sabillon et al., 2018). Nevertheless, **R2** argues that "... if you say that the tools that exist now such as automated auditing cannot be 100% applied, because the standards (ISO, COBIT, COSO) change, increase, and the system is different, so the system called automated audit cannot be fully implemented." Therefore, in addition to the readiness and knowledge to constantly update strategies to keep abreast of developments (Sorescu, 2017). Lastly, **R2** argues "... the price when practicing technology is not yet economic, so it goes back to manual control (Microsoft excel)".

- Hypothesis 5 shows the relationship of audit risk which significantly affects audit effort. The presence of technology makes it easier for auditors to work flexibly to analyze and evaluate risks (Widuri et al., 2016). With effective risk management, it can determine the future actions of auditors to respond to clients in the face of problems, especially in helping to provide solutions related to cyber threats caused by lack of control and division of responsibilities, which will thus have an impact on better audit performance for clients and users of financial statements (Ștefănescu et al., 2019) and (Friday & Japhet, 2020).
- Hypothesis 6 shows the relationship of audit risk which significantly affects audit performance. Interviews with R1 and R2, show that the risks faced by auditors are also developing, so there is a need for collaboration with the IT team to help solve the problems faced. Several reports (ACFE, 2022; ECIIA, 2019) have predicted that data security and cybersecurity are the main risks auditors face, so Rezaee & Wang, (2019) state the need to update auditors' ability to mitigate risks. Increased audit detection with innovative solutions can improve audit performance that impacts users of financial statements (Sirois et al., 2016). In addition, R2 explained that control analysis by practicing IT requires support from appropriate standards, such as the management system (ISO 27,000:1) as a guiding standard in analyzing company risks. It will help auditors contribute to the improvement of cybersecurity by understanding the impact of system usability and how control processes run in the client (Alles, 2015).
- Hypothesis 7 shows the relationship of audit effort which significantly affects audit performance. The movement of the industrial world that is increasingly advanced Mikalef et al., (2021) has led to a shift in audit strategies that also examine internal control in the application of systems for

the presentation of financial statements (Slapničar et al., 2022). **R1** argues that the presentation of the audit report is accompanied by an audit of key matters that have been adjusted to the audit findings, where the presentation of the information is also obtained from the IT team. Supporting this, **R2** "Of course, not all weaknesses will be revealed there, because it will potentially invite cyberattacks such as hackers, viruses, and malware to attack the client". The implementation of technology in audit activities, especially in detecting risks and conducting substantive tests on the company's internal control, has changes that impact more qualified and reliable audit performance (Islam et al., 2018; Rosati et al., 2019).

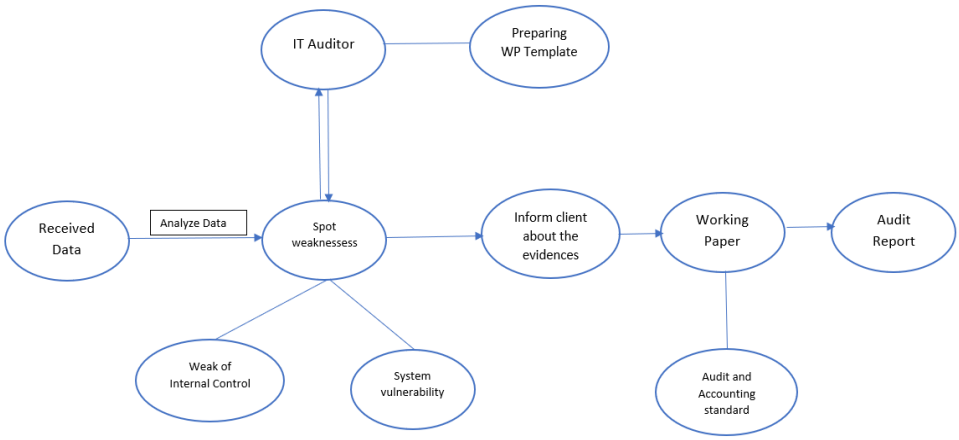


Fig. 2: The Flow of Audit Technology Based on the Interview

## 5. Conclusion

The audit sector continues to change over time, where in the midst of the 4.0 era began to transition the audit approach to be automated (Munoko et al., 2020). This study aims to examine how auditors can be aware of technological risks and play a role in improving cybersecurity as part of the resulting performance. By developing 7 hypotheses based on previous research, all the results have a positive impact, however, there are 2 hypotheses are insignificant (digital capability on audit effort and digital capability on audit performance). In addition, by carrying out mix-methods research showing the results of questionnaire data and interviews that support each other, by stating that auditors have transformed and are very closely related to the use of IT in order to open up new opportunities through the collaboration with the IT team to present more competent and reliable information through the application of the system. Based on the interview's result the auditors had presented significant findings and risk information on key audit matters, which impacted on the decision-making process for companies and businesses in the industrial world. Although the implementation of Key Audit Matter is still new in

Indonesia, it has been specially adapted by projecting risks from technology implementation that require additional management as the accountant and auditor must be able to adapt to changes (Friday & Japhet, 2020).

The limitation of this research is that the data collection process is targeted at auditors working in public accounting firms in the Greater Jakarta area because the diffusion of technology in Indonesia is not evenly distributed, it is targeted to the city's center. In addition, the amount of data obtained is limited because it is aimed at middle and senior managers as leaders who lead auditors to be prepared to face changing times in conducting audits. Then, not much previous research has been found on the contribution of auditors to enterprise cybersecurity (Slapničar et al., 2022), so this study also emphasizes digital innovation and the ability to provide information that current technological growth has transformed auditors with technology in auditing.

This research focuses on contributing to the world of education and professionals by presenting information on the awareness of the auditor, who has an important role in maintaining data security through increasing cybersecurity in business infrastructure. Auditors can better understand and stay abreast of the growth of technology at clients, thus increasing audit implementation by focusing on the company's internal controls that can yield hidden findings as information to users of financial statements. Lastly, academic researchers can review the research building the audit function on the growth of technology infrastructure to improve auditor performance sustainably.

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