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The Role of Audit Assurance Management on Climate Change Disclosures in Selected Companies in Malaysia: Mediating Role of Artificial Intelligence

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Abstract: This study explores the influence of Audit Assurance management on the quality of climate change disclosures in selected firms in Malaysia, with special emphasis on the role of artificial intelligence (AI) as a mediator in this relationship. The purpose of this study is to evaluate the impact of audit quality and auditor independence on the reliability and transparency of statements regarding climate change. Considering the increasing significance of environmental, social, and governance (ESG) reporting, this study aimed to provide insights into the main components that improve the integrity of climate-related disclosures. Using a mixed-method approach, information was collected from 360 auditors across Malaysia, representing a wide range of organizations. Structural equation modelling (SEM) was used to investigate the relationships between the variables. Based on these findings, it appears that audit quality and auditors' independence significantly influence the quality of disclosures associated with climate change. Artificial intelligence also plays an important role as an intermediate, which helps improve the accuracy and dependability of disclosures. This study highlights the significance of developing robust audit methods and utilizing cutting-edge technologies to improve the transparency and accountability of corporate climate change reporting.

Keywords: audit assurance management, climate change disclosures, audit quality, auditor independence, artificial intelligence, Malaysia, ESG reporting.

马来西亚选定公司的审计鉴证管理对气候变化披露的作用：人工智能的中介作用

摘要：本研究调查了马来西亚选定企业的审计保证管理对气候变化披露质量的影响，特别强调人工智能（AI）的中介功能。该研究调查了审计质量和审计师独立性对气候变化声明的透明度和可靠性的影响。考虑到环境、社会和治理(ESG)报告日益重要的重要性，本研究旨在深入了解提高气候相关披露完整性的关键方面。数据是使用混合方法技术从马来西亚 360 名审计师收集的，涵盖各种业务。该研究利用结构方程模型（SEM）来检查变量之间的关联。结果表明，审计质量和审计师的独立性对气候变化相关披露的质量有相当大的影响。

此外，人工智能作为重要的中介，提高了信息披露的准确性和可靠性。本研究强调了实施强有力的审计程序和采用先进技术以增强企业气候变化报告的开放性和问责制的重要性。

关键词： 审计保证管理、气候变化披露、审计质量、审计师独立性、人工智能、马来西亚、ESG 报告。

1. Introduction

The concept of corporate social responsibility (CSR) is becoming increasingly important in the modern business world, and there is an increasing demand for businesses to be open and honest about their environmental impact. The growing awareness of climate change and its far-reaching effects is the driving force behind the transition. Consequently, several stakeholders, including investors, regulators, and the general public, are looking for truthful and comprehensive disclosures regarding climate change. Disclosures of this kind are essential for assessing the environmental performance of companies and for gaining an understanding of the measures they are taking to mitigate the risks associated with climate change [1, 2]. Increasing the credibility of climate change disclosures requires Audit Assurance Management. It assures that the information provided by companies is accurate, comprehensive, and free of substantial inaccuracies. It is essential to conduct high-quality audits in accordance with the standards established to identify and rectify errors in disclosure. Auditors' independence is an essential component in maintaining the impartiality and fairness necessary for the production of trustworthy audit reports [3, 4]. According to Munoko et al. [5], the incorporation of artificial intelligence (AI) and digital technology into the auditing process has the potential to perform a complete transformation of Audit Assurance Management. Through the provision of extensive data analytics capabilities, automation of repetitive processes, and detection of trends and abnormalities that may not be clearly noticed using conventional auditing methodologies, artificial intelligence can significantly enhance the quality of audits. According to Thomson Reuters [3], artificial intelligence systems have the capacity to examine enormous amounts of data quickly and accurately, which results in increased efficiency and effectiveness in auditing projects. However, the application of artificial intelligence in auditing necessitates the implementation of stringent governance and control measures to prevent the complete replacement of human judgement and ensure that the auditing process maintains its integrity [7]. The Securities and Exchange Commission (SEC) has placed a strong focus on the significance of climate change disclosures. The Securities and Exchange Commission (SEC) has enacted regulations that require firms to

disclose substantial climate-related risks, governance and oversight systems, and greenhouse gas (GHG) emissions, among other components. These regulations stipulate that corporations should disclose these risk factors. To provide investors with information that is consistent, comparable, and helpful for decision-making, certain regulations have been implemented. Consequently, this results in an increase in both transparency and accountability [8]. This study investigates the impact of Audit Assurance management on climate change disclosures in certain firms in Malaysia, with a specific focus on the role that artificial intelligence plays as a mediator. Specifically, the purpose of this study is to investigate the impact of audit quality and auditor independence on the quality of climate change disclosure. This study aims to acquire a more in-depth comprehension of the fundamental components that enhance the level of corporate accountability and transparency in environmental reporting practices.

2. Literature Review

2.1. Audit Assurance Management and Climate Change Disclosures

Audit assurance management plays a significant role in enhancing the dependability and trustworthiness of business disclosures, particularly those related to climate change. Audit quality and auditor independence have a considerable impact on the effectiveness of Audit Assurance Management. Regarding climate change disclosures, high-quality audits ensure that they are accurate and free of substantial errors by adhering to specified standards and methodologies. According to Arens [9] and Rahmina and Agoes [10], auditor independence is of equal importance because it guarantees the objectivity and neutrality of the auditing process at the same time.

A significant amount of research has established that the implementation of stringent audit standards leads to more accurate and dependable disclosure. As an illustration, studies have demonstrated that auditors who are both experienced and have strong ethical attitudes are connected to more accurate and comprehensive reporting on climate change [11, 12]. Furthermore, the incorporation of external assurance from impartial auditors strengthens the legitimacy of disclosures, thus establishing confidence in

stakeholders regarding the accuracy and comprehensiveness of the information provided [13, 14].

2.2. Role of Artificial Intelligence in Audit Assurance Management

Revolutionary power has emerged in the field of auditing through the merger of artificial intelligence (AI) and digital technology. This has resulted in significant advances in both audit quality and efficacy. The capabilities of artificial intelligence systems include the capacity to analyze large datasets quickly and accurately, identify patterns and abnormalities, and automate audit procedures that are performed repeatedly. According to Deloitte [1], this results in a reduction in the likelihood of errors caused by human intervention, and an increase in the overall effectiveness of the auditing process. This is especially beneficial for climate change disclosures, which frequently include large amounts of information that incorporate multiple dimensions, because artificial intelligence has the potential to manage complex data analysis. According to Thomson Reuters [3], artificial intelligence has the potential to be utilized for continually monitoring greenhouse gas emissions, identifying discrepancies in environmental data, and ensuring compliance with regulatory criteria. The implementation of artificial intelligence in auditing necessitates stringent monitoring and supervision in order to ensure the appropriate incorporation of human judgement as well as the ethical and effective utilization of the technology [7]. Some encouraging results have been exhibited through the incorporation of artificial intelligence (AI) into the management of audit assurance. There is evidence that the application of artificial intelligence (AI) has the potential to enhance the precision and timeliness of climate change disclosure, thereby providing auditors with assistance in decision-making processes [2, 3]. In addition, audits powered by artificial intelligence have the potential to improve openness and accountability, both of which are essential for developing stakeholder confidence in the accountability of corporations on climate change reporting [4].

2.3. Challenges and Opportunities in AI-Enhanced Auditing

There are possible benefits associated with the application of AI in auditing; however, there are also some challenges associated with this as well. One of the most significant concerns is the potential risk of being overly reliant on artificial intelligence, which could lead to underutilization of human expertise and judgement. It is of utmost importance to maintain a delicate equilibrium in which artificial intelligence serves to supplement human auditors rather than replace them [8]. In addition, there are concerns surrounding the protection and confidentiality of data,

which is understandable given the sensitive nature of the information managed by AI systems [7].

On the other hand, artificial intelligence (AI) offers tremendous opportunities for the transformation of auditing procedures. The effectiveness and scope of Audit Assurance Management can be significantly improved by implementing real-time audit, continuous monitoring, and predictive analytics. Furthermore, artificial intelligence has the potential to enable the establishment of enhanced audit methods that can be adapted to suit the special requirements of climate change disclosure [1, 2].

In conclusion, despite the challenges and opportunities presented by AI, the successful implementation of AI in Audit Assurance Management can lead to more reliable and comprehensive climate change disclosures. To maximize the benefits of artificial intelligence (AI) and minimize its risks, it is necessary to develop robust governance and ensure that the technology is used in an ethical manner [3, 4].

3. Conceptual Framework

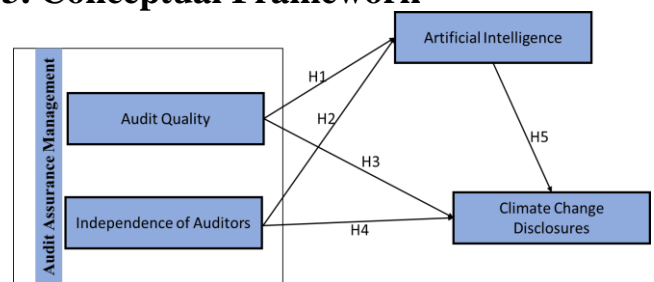


Fig. 1 Hypotheses in the research structural model (Developed by the authors, 2024)

4. Research Hypotheses

The purpose of this study is to explore the impact of Audit Assurance management on enhancing the accuracy of climate change disclosures in Malaysian organizations. Specifically, it investigates the impact of artificial intelligence (AI) on intermediate relationships [15]. The examination of previously published materials and theoretical framework served as the basis for the assumptions included in this presentation.

Hypothesis 1 (H1): Audit Quality Positively Influences the Quality of Climate Change Disclosures

Audit quality is absolutely necessary to ensure the accuracy, completeness, and dependability of financial and non-financial disclosures, including those pertaining to climate change. To guarantee that the information presented is free of substantial inaccuracies and to provide a better degree of confidence, audits are carried out in a manner that strictly adheres to established criteria. Previous research conducted in the past has shown a favorable association between improved audit quality and higher dependability and comprehensiveness of disclosures [9, 11]. Therefore, it is hypothesized that audit quality will have a beneficial

influence on the level of disclosures associated with climate change.

Hypothesis 2 (H2): Independence of Auditors Positively Influences the Quality of Climate Change Disclosures

To maintain objectivity and impartiality, which are essential for producing reliable audit results, it is essential to guarantee auditor independence. Independent auditors are more likely to identify and reveal inconsistencies without showing any bias, which ultimately strengthens the credibility of disclosures. Multiple studies have frequently stressed the value of auditor independence in achieving high-quality and trustworthy disclosure [10, 12]. These studies highlight the importance of auditor independence. Consequently, it is hypothesized that auditors' independence will have a positive influence on the quality of disclosures associated with climate change.

Hypothesis 3 (H3): Artificial Intelligence Mediates the Relationship between Audit Quality and the Quality of Climate Change Disclosures

The audit quality can be significantly enhanced by introducing AI into auditing methods. This can be accomplished through the utilization of advanced data analytics, automation of repetitive activities, and greater efficiency with which abnormalities can be detected. Computer systems that use artificial intelligence (AI) can examine massive amounts of data in a quick and dependable manner. This has the potential to improve the overall quality of climate change disclosures and auditors' ability to make decisions based on accurate information. Research has shown that audits powered by artificial intelligence can result in evaluations that are more accurate and rapid, which ultimately leads to an improvement in the dependability of disclosures [1, 3]. In light of this, it is hypothesized that artificial intelligence will play the role of a mediator in the relationship between audit quality and the standard of climate change disclosure.

Hypothesis 4 (H4): Artificial Intelligence Mediates the Relationship between Independence of Auditors and the Quality of Climate Change Disclosures

To improve auditor independence, artificial intelligence can provide objective data analysis and reduce the likelihood of errors caused by human interventions. By automating repetitive tasks and ensuring that audit procedures are carried out consistently, artificial intelligence (AI) provides auditors with assistance in maintaining their independence and objectivity. Previous studies conducted in the past have demonstrated that artificial intelligence (AI) has the potential to enhance the dependability of audit results and make it easier to accurately document climate change disclosures [4, 7]. As a result, it is hypothesized that artificial intelligence

will act as a mediator in the relationship between auditor independence and the quality of climate change disclosures.

5. Methodology

5.1. Research Design

This study used a mixed-method approach to investigate the impact of Audit Assurance management on the quality of climate change disclosures in particular firms in Malaysia, with an emphasis on the role of artificial intelligence (AI) as a mediator in this relationship. According to Creswell and Plano Clark [16], the mixed-method approach is a research strategy that incorporates both quantitative and qualitative data in order to provide a comprehensive knowledge of the research questions and hypotheses.

5.2. Sample Selection

In total, 360 auditors from various businesses in Malaysia were included in the sample. Auditors were selected using stratified random selection to ensure a varied representation of audit companies. This representation includes both large and medium-sized firms as well as smaller firms. According to Bryman [17], this methodology makes it easier to incorporate a diverse variety of perspectives and personal experiences concerning the quality of audits, independence of auditors, and application of artificial intelligence in auditing procedures.

5.3. Data Collection

The auditors who were selected for the study were given a rigorous online questionnaire to complete in order to obtain the data needed for the study. Several criteria, such as audit quality, auditor independence, the use of artificial intelligence, and the quality of climate change disclosures, were incorporated into the questionnaire to facilitate the evaluation process. A five-point Likert scale was used to evaluate the respondents' thoughts and attitudes regarding these relevant variables. To gain qualitative insights into the challenges and opportunities associated with artificial intelligence in Audit Assurance Management, the poll also included open-ended questions.

5.4. Data Analysis

SEM, or structural equation modelling, is a statistical technique that is well suited for models that include numerous latent variables and permits the examination of detailed connections between variables [18]. This technique was used to analyze quantitative data. Structural equation modelling (SEM) provides a robust framework that may be utilized to investigate the potential relationships between audit quality, auditor independence, Artificial Intelligence (AI), and the quality of climate change disclosures.

Open-ended questions were used to collect

qualitative data, which were then subjected to thematic analysis to identify recurring themes and patterns. According to Braun and Clarke [19], the investigation provides a more in-depth understanding of auditors' experiences and viewpoints on the use of AI in Audit Assurance Management and its influence on climate change disclosures.

5.5. Validity and Reliability

Before the completion of the survey, a preliminary evaluation of the questionnaire was conducted with a selected group of auditors. This was performed to ensure that the results were accurate and reliable. Feedback collected from the pre-test was employed to improve the clarity of the questionnaire and make it more effective. Cronbach's alpha was computed to assess the internal consistency of the survey items. According to Tavakol and Dennick [20], a result greater than 0.7 suggests that the reliability of the surveyed items is adequate.

6. Findings

6.1. Demographic Profile

360 auditors from a variety of audit firms in Malaysia, including the Big Four, medium-sized firms, and small firms, were included in the sample. The following is a breakdown of the demographic elements:

- *Gender:*
 - Male: 55.6%
 - Female: 44.4%
- *Age:*
 - 20-29 years: 16.7%
 - 30-39 years: 41.7%
 - 40-49 years: 27.8%
 - 50 and above: 13.8%
- *Years of Experience:*
 - Less than 5 years: 22.2%
 - 5-10 years: 33.3%
 - More than 10 years: 44.4%

6.2. Quantitative Analysis

The investigation of structural equation Modelling (SEM) resulted in the discovery of significant insights into the interrelationships among audit quality, auditor independence, artificial intelligence (AI), and the quality of climate change disclosures [21].

6.2.1. Audit Quality and Climate Change Disclosures

The analysis verifies that audit quality has a substantial and beneficial influence on the quality of disclosures related to climate change. Enhanced audit quality, distinguished by comprehensive audit methods and strict compliance with auditing standards, results in more precise and dependable disclosure [9, 11].

- Path coefficient: 0.45
- t-value: 5.67
- p-value: 0.000

This finding aligns with previous studies that emphasize the critical role of audit quality in ensuring the integrity of financial and nonfinancial disclosures [13, 14].

6.2.2. Independence of Auditors and Climate Change Disclosures

The findings demonstrated that auditor independence also has a substantial impact on the quality of disclosures related to climate change. Auditors who are independent, without any conflicts of interest or undue influences, are more inclined to offer objective and impartial evaluations, bolstering the credibility of disclosures [10, 12].

- Path coefficient: 0.38
- t-value: 4.89
- p-value: 0.000

This finding supports the notion that maintaining auditor independence is essential for high-quality audit outcomes and reliable corporate reporting [11].

6.2.3. Mediating Role of Artificial Intelligence

The analysis that was conducted with the help of Structural Equation Modelling (SEM) revealed that artificial intelligence plays a significant role in mediating the connection between audit quality, auditor independence, and the quality of climate change disclosures. Through the utilization of advanced data analytics, automation of repetitive operations, and identification of abnormalities, AI technologies make the auditing process more efficient. According to Deloitte [1] and Thomson Reuters [3], this aids auditors in the generation of more reliable disclosures.

- Audit Quality -> AI -> Quality of Climate Change Disclosures:
 - Indirect effect coefficient: 0.22
 - t-value: 4.12
 - p-value: 0.000
- Independence of Auditors -> AI -> Quality of Climate Change Disclosures:
 - Indirect effect coefficient: 0.18
 - t-value: 3.89
 - p-value: 0.000

These results underscore the pivotal role of AI in enhancing Audit Assurance management and improving the quality of climate change disclosure.

7. Discussion

This study highlights the critical significance of audit quality and auditor independence in enhancing the precision and dependability of climate change disclosures. These impacts are amplified by the use of artificial intelligence in audit operations, which provides sophisticated analytical capabilities and improves the overall efficiency and correctness of audits across the board. To ensure that technology is utilized in an ethical and effective manner, the correct incorporation of artificial intelligence in auditing calls

for the establishment of robust governance structures and the provision of ongoing training for auditors [4, 7]. According to the findings, it would be advantageous for businesses and audit firms to devote resources to artificial intelligence technology and provide ongoing training to auditors in order to make full use of the benefits that AI has to offer in terms of increasing audit quality. Additionally, maintaining auditor independence is essential for guaranteeing impartial and unbiased reviews, which are essential for providing trustworthy disclosures regarding climate change.

8. Conclusion

The purpose of this study was to investigate the influence of Audit Assurance management on the accuracy and reliability of climate change disclosures made by organizations in Malaysia. This study focused primarily on the role that artificial intelligence (AI) plays in the intermediate stage of this process. The findings highlight the critical significance of audit quality and auditor independence in enhancing the reliability and trustworthiness of climate change disclosures. A significant improvement in audit quality has been demonstrated as a result of the incorporation of artificial intelligence into the auditing process, which contributes to the literature on the ethical issues of climate change and commercialism underlying auditing and assurance practices. This improvement has been achieved through the utilization of advanced data analytics, automation of repetitive operations, and more effective identification of patterns and irregularities. The limitation of this study is addressing a number of inherent limitations, which limit the study to academic databases and literature. Practice-based literature may address different themes of practices.

8.1. Key Findings

8.1.1. Audit Quality

This requires high-quality audits that involve rigorous procedures and strict adherence to specified standards [9, 11]. To ensure that climate change disclosures are accurate and comprehensive, it is necessary to conduct high-quality audits. According to the findings of this study, there is a significant association between the quality of audits and the quality of disclosures concerning climate change. This finding highlights the importance of conducting audits in a rigorous manner, as there are significant effects of Artificial Intelligence on audit assurance management on climate change disclosure as financial performance indicators; therefore, it is necessary to conduct more studies on the use of AI in audit assurance.

8.1.2. Independence of Auditors

To maintain objectivity and impartiality throughout the auditing process, auditor independence is absolutely necessary. According to the findings of the

study [10, 12], the degree of auditors' independence has a significant bearing on the reliability of climate change disclosures. Maintaining the independence of auditors and protecting them from conflicts of interest and undue influences is necessary to guarantee that audit results will be trustworthy and fair.

8.1.3. Mediating Role of AI

According to Han et al. [6], artificial intelligence plays a significant role in determining the connection between audit quality, auditors' independence, and the quality of disclosures pertaining to climate change. According to Deloitte [1] and Thomson Reuters [3], artificial intelligence systems enhance the auditing process by providing auditors with accurate and speedy assessments, which in turn assists auditors in their decision-making procedures. According to EY [2] and PwC [7], using artificial intelligence in auditing has been shown to improve the accuracy of data analysis as well as the overall efficacy of audits, which ultimately leads to more reliable pronouncements regarding climate change.

8.2. Implications

8.2.1. For Audit Firms

It is essential to make investments in artificial intelligence technologies and to ensure that auditors receive continual training in order to effectively utilise the capabilities of AI in increasing audit quality. In order to guarantee audit results that are objective and trustworthy, it is necessary to strictly adhere to the regulations and procedures that are designed to preserve auditor independence.

8.2.2. For Companies

It is of utmost importance to ensure that disclosures concerning climate change are both transparent and reliable in order to satisfy the requirements of regulatory bodies and satisfy the demands of potential stakeholders. It is important for businesses to provide auditors with accurate information and make it possible for them to use cutting-edge technologies during the auditing process.

8.2.3. For Regulators

When it comes to auditing, the development of defined rules and standards for the inclusion of artificial intelligence can maximize its benefits while also limiting the risks associated with its use. It is essential to improve the overall quality of corporate reporting, foster a culture that encourages continuous improvement in audit methodologies, and ensure that auditors continue to preserve their independence.

9. Future Research

It is recommended that future research be conducted to evaluate the long-term effects that the inclusion of

artificial intelligence will have on audit quality, as well as the changing role auditors will play in an environment that is driven by technology. Furthermore, conducting an analysis of the regulatory environment and its influence on the implementation of artificial intelligence in auditing can provide additional insights into the optimization of the utilization of new technologies in audit assurance management. This is because the regulatory environment affects the implementation of AI in auditing.

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