Do Cyber security, Digitalisation and Data Visualisation Affect the Quality of Internal Environmental Audits?

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Abstract

Introduction/Main Objectives: This research was conducted to provide empirical evidence regarding the analysis of the influence of cyber security, digitalisation, and data visualisation on the quality of internal environmental audits.

Background Problems: Some data finds that many hotel industries are still polluting and not managing waste properly according to applicable regulations. So, it is necessary to carry out an internal environmental audit as a reference material for making management decisions. Novelty: Researchers raised variables based on technological sophistication that were not previously considered in audit research. Another novelty is that the research was conducted in the context of service companies in developing countries.

Research Methods: Research was conducted at 300 star hotels in Bali. The data collection technique uses a survey mechanism with the help of a questionnaire as a research instrument. Findings/Results: The results of this research show that cyber security, digitalisation, and data visualisation have a significant positive effect on the quality of hotels' internal environmental audits.

Conclusion: Based on empirical findings, it can be concluded that cyber security, digitalisation and data visualisation have a significant positive effect on the quality of internal environmental audits. Therefore, the increasing use of cyber security, managerial digitalisation, and adoption of data visualisation models will improve the quality of internal environmental audits, which can be used by management as a guide in decision making and communication with stakeholders. [3]

Keywords: Cybersecurity, Digitalisation, Data visualisation, Internal environmental audit

JEL: M42; Q56   **SDG:** SDG8, Target 8.2

INTRODUCTION

Internal environmental audits are needed in the tourism industry, especially in hotels. Indonesia, which has become a tourist destination because it has the island of Bali as a world tourist attraction. This causes the growth of hotels every year (Saputra et al., 2021). Currently, Indonesia is experiencing massive growth in the hotel business and an increase in the number of tourists every year (Saputra et al., 2023). This paradigm offers many golden opportunities for the hospitality industry (Shi & Tsai, 2020). For example, Nusa Dua and the surrounding area generates an income of USD 400 million per year as a result of the many domestic and international events held (Saputra et al., 2022). However, despite the many benefits to be had and the glamorous atmosphere on offer, hotels in Indonesia, especially in Bali, which is popular with tourists and where start-up companies are starting to emerge, are being urged to join the wastewater treatment movement with the necessary licenses and facilities. This is because one of the biggest concerns in hotel development is wastewater management. Regulation at the local level is still insufficient. (Eaton et al., 2019).

In Indonesia, the lack of adequate wastewater facilities and inadequate regulations governing wastewater management endanger the sustainable development of hotels and cities (Saputra et al., 2023). According to the Asian Development Bank, there are currently no specific and comprehensive wastewater management regulations in Indonesia (Fitriasari et al., 2021). An example is a law similar to European Council Directive 91/271/EEC of 21 May 1991 concerning wastewater treatment in urban areas. The only legal information relating to wastewater that can be found is: Minister of Environment Decree No. 112/2003 concerning domestic wastewater quality standards; Minister of Environment Regulation No. 3/2010 concerning industrial zone sewer quality standards; and the Minister of Environment's decision on domestic wastewater effluent standards (Sara et al., 2023). In addition, there are several ministerial decisions and regulations in Indonesia for certain industrial sectors (Ismanidar et al., 2022). With the lack of environmental regulations in the hotel industry, it is necessary to have a quality internal environmental audit process for this industry on a regular basis to further increase the awareness of the hotel industry regarding the use of water and the environment in its operations (Lohapan, 2021). The factors causing hotel non-compliance in environmental management are (Chang & Luo, 2021): 1) some hotels try to minimise commitment costs because monthly rates are a big obstacle in wastewater treatment; 2) lack of use of cyber security by the government and hotel management in environmental management; 3) there is still minimal digitalisation in energy use; 4) requires competent data visualisation for waste handling; and 5) strict effluent standards are applied in some areas.

Cyber security is really needed by the government and hotel managers in dealing with wasteful use of water and electricity or other energy because many cyber security incidents have occurred recently in the hotel industry, so unexpected things often happen, such as internet network theft, theft power lines, water theft, and other incidents that harm the company (Ehioghiren et al., 2021). The number of cyber security incidents increases every year as a result of the increasing use of the Internet, mobile applications, and technologies such as energy computing (Eltweri, 2021). Cybersecurity incidents can result in significant losses for the breached company in terms of remediation costs, fines, and reputation (Oyelami & Kassim, 2020). This condition is certainly related to good company management, which involves good cybersecurity concepts and conducting consistent audits (Ehioghiren et al., 2021). In the context of environmental management, cyber security is needed to detect excessive energy use, regulate energy efficiency, sort energy that can be recycled, and calculate the amount of energy used (Bao Ngo & Tick, 2021). So, by using cyber security, system security technology can be protected safely and make it easier to carry out internal environmental audits (Rosati et al., 2022).

The hotel industry is able to gain the full trust of the public or customers because it follows the latest technological developments in its business operations (Rosati et al., 2019). For example, hotel websites and applications should be secured to avoid cyber crime incidents (Singh et al., 2021). According to a recent report on cybersecurity, more than 20 percent of hospitality companies worldwide that experienced security breaches reported a substantial loss of revenue, reduced customer base, and lost business opportunities, with a total loss of approximately USD 17 million per company. Based on this incident, hotels in Indonesia were directed to use digital-based business governance. The digitalisation of management is very necessary to reduce dangerous risks for businesses (Rosati et al., 2019). In the context of hotel management, digitalisation becomes linear with environmental governance (Rosati et al., 2022). For example, the use of digital-based water and electricity management mechanisms for each hotel room. Other management is also important, including hotel room reservations. So, this will have an impact on the internal environmental audit that will be carried out (Kuypers et al., 2016; Rosati et al., 2022).

Very tight competition for hotel companies requires competent electronic data security to safeguard important data, including environmental data and environmental protection strategies (Betti & Sarens, 2021). Cyber security is the practice of protecting technological systems and devices such as computers, mobile phones, servers, electronic systems and data of a hotel company (Rosati et al., 2019). Cybersecurity practices are carried out not only by individuals, but also by companies and agencies (Kuypers et al., 2016). This step will help protect data centres and other computerised systems from unauthorised access. A competent cybersecurity strategy can provide good security protection against attacks designed to access, alter, delete or extort sensitive systems and data from users (Betti & Sarens, 2021; Gungor & Adiloglu, 2019). Cyber security also plays a role in preventing attacks that aim to disrupt or even stop the operation of systems or devices (Calderon & Gao, 2021).

The Cyber Security Law mandates that every company should have a security strategy to protect company data (Gungor & Adiloglu, 2019). Cyber security is also closely related to environmental management, namely that environmental protection data is one of the competitive advantage strategy data that needs to be secured and protected (Calderon & Gao, 2021). In the hotel business, data related to environmental strategy is not confidential, but it is still on one company server and is a single piece of data that needs to be protected (Eaton et al., 2019; Ehioghiren et al., 2021). The environmental management strategy must be properly archived and recorded because it will be related to the fulfilment of data for environmental audit purposes (Betti & Sarens, 2021).

Research by Bao Ngo and Tick (2021) states that cyber security incidents have an impact on the implementation of internal environmental audits. The same results were conveyed by Rosati et al. (2022), namely that cyber security has a positive effect on audit mechanisms for energy and the environment and can have an impact on the company's competitive advantage strategy. However, Rosati et al. (2019) and Slapničar et al. (2022) said that cybersecurity incidents did not significantly impact the implementation of environmental audits. Antunes et al. (2021) also conveyed relatively the same results as research by Rosati et al. (2019), namely that hotels still do not fully use cyber security mechanisms, so they do not have an impact on internal environmental audits. Several research results state that, in general, cyber security is important for company sustainability and ease of management, so it has an impact on the ease of audits in general and internal environmental audits (Tiberius & Hirth, 2019). Rosati et al. (2022) state that an environmental audit is an auditing concept intended for energy use in companies and analysing environmental damage due to the impact of production waste. Ren et al. (2020) also said that cyber security is very necessary in the internal environmental audit process. However,

given the integrated nature of a company's internal control system, cyber security incidents can also pose a threat to audit quality through their impact on operational control risks, or in particular, information technology (IT) controls (Al-Matari et al., 2021). Because operational and financial reporting activities depend on joint control, weaknesses in one area will likely have an impact on other areas. Based on the description of previous research results, the first hypothesis can be formulated, namely:

H₁: Cybersecurity has a positive effect on the quality of internal environmental audits

Digitalisation is a process of change that occurs from analog technology to digital technology (Mergel et al., 2019). The digitalisation process in hotels is influenced by technological developments. Recently, the hotel industry has become increasingly modern and relies on technology to continue supporting its operations (Alrawadieh et al., 2021; Jans et al., 2022). Digitalisation in the hotel business itself is carried out in order to increase the efficiency and effectiveness of the performance of each part of the industry so that time and other available resources can be processed as optimally as possible to obtain maximum profits (Al-Mohammedi, 2020; Kristoffersen et al., 2021).

Digital-based governance makes carrying out internal environmental audits easier and of better quality. The digitalisation of energy management and use will have an impact on internal environmental audits (Erişen & Erer, 2023). According to research results by Yoon (2020), digital-based management has a positive impact on the internal environmental audit process. Kaawaase et al. (2021) and Betti and Sarens (2021) state that digital methods in corporate governance have a positive and significant effect on the implementation of internal environmental audits. However, the research results of Ren et al. (2020) state something different, namely that digital mechanisms in operations have nothing to do with environmental audits. This means that it is useless to use digital methods in management if the internal environmental audit mechanism is not accompanied by a sophisticated digital mechanism (Erişen & Erer, 2023; Montewka et al., 2020). The differences in the results of this research lead to the potential for tracing back to the context of the service industry in developing countries, namely Indonesia (Saputra et al., 2021). Previous research was only carried out in the hotel industry in developed countries (Khasnabish et al., 2020). Based on the results of previous research, the hypothesis can be formulated as follows:

H₂: Digitalisation has a positive effect on the quality of internal environmental audits

Data visualisation is the process of using visual elements such as diagrams, graphs, or maps to represent data (Ardiansyah et al., 2023). Data visualisation translates complex, high-volume, or numerical data into visual representations that are easier to process (Chang & Luo, 2021). Data visualisation tools enhance and automate the visual communication process for accuracy and detail. You can use visual representations to extract actionable insights from raw data (Singh & Best, 2019). Hospitality businesses typically process large volumes of data from multiple data sources, such as internal and external websites, smart devices, internal data collection systems and social media (Khasnabish et al., 2020). Large volumes of data are usually related to business strategies, including environmental strategies. However, raw data can be difficult to understand and use. Therefore, data scientists prepare and present data in the right context (Ardiansyah et al., 2023; Chang & Luo, 2021). They present the data in a visual form so that environmental decision-makers can identify relationships between the data and detect hidden patterns and trends. Data visualisation creates history that advances business intelligence and supports data-driven decision-making and strategic planning (Chang & Luo, 2021; Singh & Best, 2019).

As we know, the internal environmental audit process and company decision-making must be based on data. Quality digital-based data will produce quality audit results too. Data visualisation is used to make it easier to understand and explore. According to Ardiansyah et al. (2023), data visualisation is a graphic or visual display of information and data. In other words, data visualisation converts a data set into something simpler to display (Khasnabish et al., 2020). By using these visual elements, auditors and readers will more easily understand trends, outliers and patterns in data (Rosati et al., 2019). In internal environmental audits, data visualisation allows decision-making auditors to see analytics presented visually. That way, they can understand difficult concepts or identify new patterns (Singh & Best, 2019). This will make audit decision-making easier, more precise and of higher quality. Research by Gungor and Adiloglu (2019) and (Ren et al., 2020) states that data visualisation is closely related to audit quality. This means that visualising data will make it easier to carry out audits so that they are of higher quality (Manita et al., 2020). Al-Matari et al. (2021) also stated that data visualisation has a positive effect on the quality of internal environmental audits. Data visualisation produces ease in communication and places auditors at a high level of independence (Betti & Sarens, 2021). However, Calderon and Gao (2021) found that data visualisation was only in the managerial setting internally. What this means is that visualisation is only for the company's internal purposes, so it does not have a significant influence on the quality of internal environmental audits (Jans et al., 2022). The importance of data visualisation will lead to the accuracy of management decision-making and audit quality. Apart from that, when data and information are easily digested by more people, it will also be easier for them to get ideas to share their respective perspectives (Troisi et al., 2023). Based on the description of the results of previous research, the following hypothesis can be formulated:

H₃: data visualisation has a positive effect on the quality of internal environmental audits

From the results of several previous studies, the author found differences in the results of tests that had been carried out, so the author was motivated to research the influence of cyber security, digitalisation, and data visualisation on the quality of internal environmental audits.

RESEARCH METHOD

In this research, researchers used a quantitative assessment method based on the philosophy of positivism. The implications of positivism include that the analysed data can be tested to see whether it supports the hypothesis (testability) and preferring simple solutions in research rather than complex ones with many factors (parsimony). The aim of this paradigm is to achieve generalisation. This research is *explanatory research,* which aims to explain the position of the variables studied and the influence of one variable on another (Saputra et al., 2023). The main reason this researcher used the explanatory method was to test the proposed hypothesis (Sara et al., 2023). The research was conducted in natural settings (at each hotel as the research location), where the researcher's involvement was at a minimal level, namely when explaining research procedures to respondents (Sujana et al., 2020).

This research was conducted in Indonesia because of the massive and significant development of the hotel business there (Saputra et al., 2022). Every year, the number of hotels and tourist visits increases. Based on tourism regulations in Indonesia, every hotel is required to have an environmental management program and strategy and will be audited by an authorised professional (Saputra et al., 2023). For this reason, it is interesting to explore environmental management in hotels. The massive development of hotels is, of course, followed by increasingly fierce competition, so hoteliers need to adopt cyber security systems, digitalisation

and data visualisation to protect environmental data and display it in visual form to make it more attractive and energy efficient as a form of commitment to conservation energy in Indonesia (Saputra et al., 2023).

The population of this research is the internal auditor committee of 4 and 5 star hotels in Bali, which is in charge of internal environmental audits. In this study, this is represented by the head of the internal environmental audit committee with the consideration that 4 and 5 star hotels provide complete services, facilities and organisational structures in accordance with Ministerial Regulations Tourism and Creative Economy of the Republic of Indonesia Number PM.53/HM.001/MPEK/2013 concerning hotel business standards. Research was conducted on 300 internal environmental auditors of four and five star hotels in Bali. This research considers several things in determining the sample, namely the large diversity of the population, the level of confidence required, the acceptable level of error tolerance, the research objectives, and the limitations of the researcher (Saputra et al., 2022). Therefore, this study uses the Krejcie-Morgan table because it does not require estimates of population proportion values (Saputra et al., 2023). The Krejcie-Morgan table is used to obtain the number of samples in a survey with the aim of estimating proportions, and it is unknown to estimate the proportion of the population as a basis for calculating variance (Krejcie & Morgan, 1970). Krejcie and Morgan can create a table with the following calculations:

$$n = \frac{\chi^2.N.P(1-P)}{(N-1).d^2 + \chi^2.P(1-P)}$$

$$n = \frac{3,841 \times N(0,5 \times 0,5)}{(N-1)0,05^2 + 3,841(0,5 \times 0,5)}$$

$$n = \frac{3,841 \times N(0,25)}{(N-1)0,0025 + 3,841(0,25)}$$

Based on the calculations above, it shows information regarding the Krejcie-Morgan Table, namely the Krejcie-Morgan table can be used to determine sample size, only if the research aims to estimate population proportions. Assuming a reliability level of 95%, because it uses the value $X^2 = 3.841$, which means using $\alpha=0.05$ at 1 degree of freedom. The population diversity assumption included in the calculation is P(1-P), where P=0.5. We assumed an estimation error value of 5% (d=0.05).

Before the field survey was conducted, a pre-test questionnaire was distributed to teaching staff who were willing to participate at the economics and business faculties of state and private universities located in Bali, Indonesia (Saputra et al., 2023). Lecturers were chosen because they were considered capable of understanding and providing input regarding the instruments being developed, so that they could help us develop a questionnaire that was easy for respondents to understand. Based on the results of this review, the author made several revisions to the sentences in the instrument. Data was collected by hard and soft copy so that researchers could obtain answers to questions via email. Primary data collection was carried out using a survey method, namely a self-administered survey (Nguyen, 2018). The data collection technique in this research was a questionnaire sent by the researcher via hotel email using Google Form. When the specified deadline arrived, 75 responses had been collected via email. The research was conducted within six months. The response rate reached 25 percent. The data

in this study were analysed using a multiple linear regression analysis mechanism (Chairina & Tjahjadi, 2023). The equation of this research is:

$$ALI = a + \beta_1 CS + \beta_2 D + \beta_3 DV + e$$

Where:
ALI = Internal environmental audit quality
a = Constanta
CS = Cyber Security
D = Digitalization
DV = Data Visualization
β = Regression Coefficient.
e = Error term

RESULTS AND DISCUSSION

This research was carried out first by testing the validity and reliability of the instrument. The validity test uses the product moment Pearson correlation test by connecting each item score with the total score obtained in the research, while the instrument reliability test is measured based on the Cronbach's alpha value.

Table 2. Cyber Security Model Indicators and Measurements

Indicators/Items	Code	Pearson Correlation	Cronbach's Alpha
Risk Assessments	CS.1	0.799	
Follow Cyber Security Frameworks	CS.2	0.707	
Cyber security Training for Staff	CS.3	0.730	
Development of a Cybersecurity Culture	CS.4	0.544	
Continuous Monitoring	CS.5	0.774	
Updating Software and Hardware	CS.6	0.504	0.806
Threat Intelligence	CS.7	0.733	
Access Control	CS.8	0.672	
End-to-End Encryption for POS (Point of Sale) systems	CS.9	0.751	
Strong Passwords and data limitations	CS.10	0.688	
Cyber security Testing	CS.11	0.791	
Supply Chain Risk Assessment	CS.12	0.773	

Table 3. Digitalisation Indicators and Measurements

Indicators/Items	Code	Pearson Correlation	Cronbach's Alpha
Has an interconnected network	D.1	0.726	
There is an intelligent exchange of information	D.2	0.894	
Forming a new business model	D.3	0.689	
Creating innovation values	D.4	0.764	0.777
Process management	D.5	0.886	
Building a data and technology-based culture	D.6	0.679	

Table 4. Data Visualisation Indicators and Measurements

Indicators/Items	Code	Pearson Correlation	Cronbach's Alpha
Easily communicating	DV.1	0.696	
Speed up decision-making	DV.2	0.794	0.811
Enriches the team's perspective	DV.3	0.789	
Identify the problem	DV.4	0.864	

Table 5. Internal Environmental Audit Quality Indicators and Measurements

Indicators/Items	Code	Pearson Correlation	Cronbach's Alpha
Analysing environmental data	ALI.1	0.706	
Collecting data on operating conditions in field	ALI.2	0.894	
Understanding of company characteristics and interaction with the environment based on occupancy level and time operation	ALI.3	0.860	0.802
Evaluate energy use and recycling	ALI.4	0.767	
Carry out environmental management	ALI.5	0.789	
Identify environmental pollution	ALI.6	0.879	

The results of testing the validity of the research instrument can be seen in the Pearson correlation value by comparing the r table at DF=N-2 and a probability of 0,05. The DF value in this test is 0,1914, so if the Pearson correlation value is above that value, then the question item is declared valid. Based on the results above, all question items are declared valid and can be used in a wider research sample. Based on the Ronbach's alpha coefficient value, this research instrument has a value of ≥ 0,6, so it is declared reliable or consistent, so the research instrument can be used for research and is consistent.

Hypothesis test

Multiple linear regression is an equation model that explains the relationship between one dependent variable/response and two independent variables/predictors. In this research, the independent variables are cyber security, digitalisation and data visualisation, while the dependent variable is the quality of internal environmental audits (Saputra, 2023). The purpose of the multiple linear regression test is to predict the value of the dependent variable/response if the values of the independent variable/predictor are known (Ikpor et al., 2022). Testing the research hypothesis obtained the following results.

Table 6. Hypothesis Test Results

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	4.126	4,038		1,039	0,302	-3,853	12,245		
CS	0,764	0,160	0,421	4,781	0,000	0,445	1,081	0,566	1,767
D	1,043	0,190	0,486	5,510	0,000	0,667	1,423	0,566	1,767
DV	0,631	0,152	0,465	4,619	0,001	0,534	1,271	0,566	1,767

a. Dependent Variable: A LI

Partial regression coefficient testing aims to determine whether the regression model equation that is partially formed by the independent variables has a significant effect on the dependent variable. Based on the results of hypothesis testing using multiple linear regression, it was found that the significance value in the regression model for cyber security was 0.000, digitalisation 0.000, and data visualisation was 0.000, at a significant level with an alpha of 0.05 and a constant value of 4.126. So, the regression equation is:

$$ALI = 4.126 + 0.764CS + 1.043D + 0.631CV.$$

Decision-making is done by looking at the significance value in the Coefficients table. Usually, the basis for testing regression results is carried out with a confidence level of 95% or with a significance level of 5% ($\alpha = 0,05$), meaning that the hypothesis can be accepted if the significance value is below 0.05. The results of the first hypothesis test (H1) state that cyber security has a significant positive effect on the quality of internal environmental audits, as indicated by the sig value. 0,000. The second hypothesis (H2) can be answered by looking at the significance value of the digitalisation variable, namely 0,000, meaning that digitalisation has a significant positive influence on the quality of internal environmental audits. Also, the third hypothesis (H3) states that data visualisation has a significant positive effect on the quality of internal environmental audits with a sig. 0,001. So, the first (H1), second (H2), and third (H3) hypotheses can be accepted with the statement that cyber security, digitalisation and data visualisation have a significant positive effect on the quality of internal environmental audits of hotel companies.

Discussion

The first hypothesis states that cyber security has a positive effect on the quality of internal environmental audits. Based on empirical evidence, the hypothesis can be accepted. These results provide support for research by Bao Ngo and Tick (2021) and Montewka et al. (2020), which state that cyber security in companies has an effect on audit quality. The research results Kuypers et al. (2016) found that cyber security influences the implementation of internal environmental audits by utilising culture-based cyber security management. Rosati et al. (2022) also found that cyber security in the form of Supply Chain Risk Assessment has a positive and significant effect on the quality of the company's internal environmental audit.

Based on the statement, Rosati et al. (2019) stated that cyber attacks have recently occurred in the hotel industry, including attacks on the InterContinental Hotel Group (IHG), which affected the Regent, Crown Plaza and Holiday Inn hotels in 2022. This cybercrime began with Starwood data compromised and spread to the IHG group, which consists of more than 6,000 hotels in more than 100 countries. The compromised data included customer names and addresses (Singh et al., 2021). Learning from this incident, hotels need cyber security because it impacts all operations and important company data (Gungor & Adiloglu, 2019).

The hospitality industry can improve its cyber security by focusing on preventing cyber attacks and mitigating data breaches (Ren et al., 2020). As seen in the case of major hotels being punished by regulators and lawsuits for mishandling data breaches, it is more cost-effective and morally sound to invest in preventive security measures rather than relying on a response after an attack occurs (Guix et al., 2018). The findings of Jans et al. (2022) suggest that companies have different cybersecurity priorities based on size, location, cybersecurity maturity, and other factors. It is important to start by gathering information about the cyber threat landscape and corporate security to make accurate decisions in mitigating cyber risks and easing the internal audit process (Calderon & Gao, 2021).

The second hypothesis states that digitalisation has a positive effect on the quality of internal environmental audits. Based on empirical findings, the second hypothesis is accepted. These results support the results of previous research (Yoon, 2020). The research results of Tiberius and Hirth (2019) found that the digitalisation of management has a positive effect on audit quality. Kristoffersen et al. (2021) also stated that data and operational digitisation mechanisms have a positive influence on the quality of environmental audits. These results provide support for the legitimacy theory that the new digital-based company management model will attract full trust from the public and customers, so that legitimacy is provided (Mergel et al., 2019).

The general guidelines for implementing environmental audits in Indonesia state the functions and benefits of implementing environmental audits, whether carried out voluntarily or mandatory (Veronica et al., 2020). The first function is that an environmental audit can function as an effort to increase the income of a business or activity against environmental laws and regulations, for example, standards for air emissions, liquid waste, waste handling and other operating standards (Deegan, 2019; Sari et al., 2020). The second function is as documentation of a business or activity regarding the implementation of operating standards, management procedures and environmental monitoring, including emergency response plans, monitoring and reporting, as well as plans for changes to processes and regulations (Foster et al., 2022; Sun et al., 2021). The third function is to act as a guarantee to avoid damage or tendency to damage the environment. Based on the environmental audit function, and also adopted in the internal environmental audit mechanism, it requires convenience to analyse data (Antunes et al., 2021). Ease of providing data will occur if the digitalisation of management and data is carried out (Khasnabish et al., 2020; Ren et al., 2020).

Internal auditors are responsible for understanding internal controls. They must know about general controls and application controls, as well as the risks of using company information technology (Antunes et al., 2021; Ren et al., 2020). Knowledge of general risks and controls will enhance the internal auditor's ability to assess and rely on effective application controls to reduce control risk for the related audit objectives (Singh & Best, 2019). According to Troisi et al. (2023), the process of digitising company systems has had a positive impact on internal audit work related to the environment. Digitisation of environmental data makes it easier to carry out internal environmental audits so that it will have an even greater impact on their quality (Jans et al., 2022). Internal environmental auditors consider that digitalisation has an impact on work methods to achieve work effectiveness and efficiency (Manita et al., 2020; Troisi et al., 2023). Appropriate digitalisation mechanisms will really help maintain the quality of internal environmental audits (Castka et al., 2020).

The third hypothesis states that data visualisation has a positive effect on the quality of internal environmental audits. Based on empirical findings, the hypothesis can be accepted. The results of this study support previous results from Betti and Sarens (2021) and Chang and Luo (2021). The results of Singh and Best (2019) state that data visualisation will make it easier to understand the flow of data related to the internal audit of the company environment. Khasnabish et al. (2020) also state that data visualisation has a significant positive effect on the quality of internal environmental audits. Based on legitimacy theory, data visualisation is what is most expected by customers and potential customers because it makes it easier for customers to get information related to hotels and other destinations (Guix et al., 2018). Data visualisation is important so that policymakers can obtain audit opinions quickly and with quality (Pinto et al., 2020). Following the current era of technological sophistication, data presented monotonously creates boredom and does not have a good impact on audit quality. Visualised data is proven to have a positive impact on the quality of environmental audits (Khasnabish et al., 2020; Singh & Best, 2019).

When data and information are easily digested by more people, it will also be easier for them to get ideas to share their respective perspectives (Gungor & Adiloglu, 2019). Imagine if, in one team, there were only a few people who understood technical data presentation (Slapničar et al., 2022). They must have difficulty understanding it and feel unsure about what kind of opinion they should give (Tiberius & Hirth, 2019). In business, data visualisation allows decision-makers to view analytics presented visually. An environmental management system audit is a type of environmental audit that focuses on the entire management system and Company environment (Manita et al., 2020; Ren et al., 2020). This audit provides information and confidence to management regarding the effectiveness of systems, controls, and procedures for compliance with company environmental policy (Al-Matari et al., 2021; Salih et al., 2020). This type of audit process is carried out internally when the Environmental Audit process is mature, and the company is confident of compliance with a rule (Ehioghiren et al., 2021; Oyelami & Kassim, 2020). This audit method is mostly carried out in hotel businesses in Bali. This audit procedure requires data that is unambiguous and "clear" according to actual environmental conditions, so that the data can be visualised to make it easier for internal auditors to understand the environment (Al-Mohammedi, 2020; Boskou et al., 2019).

Based on the findings, Castka et al. (2020) provide the meaning of data visualisation, which is the process of using visual elements such as diagrams, graphs, or maps to represent data. Data visualisation translates complex, high-volume, or numerical data into visual representations that are easier to process (Chang & Luo, 2021; Lohapan, 2021). This condition affects the quality of internal environmental audits because it is able to shorten, clarify and simplify data presentation (Ismanidar et al., 2022). A data mechanism that can be visualised for environmental audit purposes is operational assessment data, which is used to identify opportunities to minimise waste and reduce pollution (Heidbreder et al., 2019). Pollution prevention covers various manufacturing facilities that may generate pollution in various media at various stages of operation (Yin et al., 2019).

CONCLUSION

Based on the empirical findings of this research, cyber security, digitalisation, and data visualisation influence the quality of hotel internal environmental audits. In accordance with the findings, environmental audits can be used by hotels as a management tool to assess corporate environmental risks for banks, agents, creditors, foundations and investors. Internal environmental audits determine whether soil contains toxic materials or waste. External parties need to understand the company's environmental risks. More broadly, environmental audits in the hotel business environment are understood as more detailed audits focusing on company operations. This type of audit includes verifying compliance with regulations. So, auditors need to trace the company's compliance process through their statements to ensure the company's compliance with regulations.

The existence of environmental management in hotels has implications for various things, namely management strategies, accounting systems, green-based technical operations and management control systems. Company data relating to management needs to be protected, digitised and translated into visual form so that the internal audit environment does not make things difficult for auditors and has its own charm in conveying data. Seeing the urgency of cyber security, serious efforts are needed from organisations to build a reliable data and information security infrastructure, and competent personnel, and develop standard operational procedures for managing data and information by referring to cyber security standards.
Making decisions or policies related to the environment and energy conservation is closely related to the availability of data, so visualisation and digitalisation are needed in presenting

data, so that its use is more optimal. Management of this data and information can provide optimal and non-confusing information. If this can be done simultaneously, then, of course, this data can be used by companies, communities, hotel associations and auditors. Currently, the hotel business has developed the integration of data in digital form from various central government data information systems and associations, in combination with data systems from international institutions. So that in the future, the presentation of data can be more transparent, and accessible to the public. It can be open to anyone in accordance with the directions of the Ministry of Tourism of the Republic of Indonesia.

AUTHORSHIP CONTRIBUTION STATEMENT

Conceptualisation and Research Design, Data Collection, Methodology, Supervision, Writing Entire Paper, Conceptualisation, Data Collection and Analysis, Editing and Layouting. All Authors have read the final version of the paper.

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