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Determinants of the Relationship between the Use of Big Data Analytics and Audit Performance in the Public Sector

Adlina Mohammed*, Mohd Mohid Rahmat, Soliha Sanusi[1], Ainol Basirah Abdul Wahab[1], Dicky Wiwittan Toto Ngadiman[2]

*[1]Faculti Ekonomi dan Pengurusan, Universiti Kebangsaan Malaysia, [2]Politeknik Tawau, Malaysia

Email: adlinamohamad89@gmail.com

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Abstract

This study was conducted to determine whether performance expectations, effort expectations, and social influence in the use of Big Data Analytics can influence audit performance in the public sector. This study focuses on public sector auditors' perceptions of the impact of big data analytics on audit performance. This study will involve internal auditors and external auditors serving in federal government ministries and departments. This study was conducted through a survey of 267 government auditors in the public sector. Partial least squares structural equation modelling (PLS-SEM) was used to analyse and test the research hypotheses. The findings of the study analysis showed that all three factors, namely performance expectations, effort expectations, and social influence, positively influence audit performance to adopt big data analytics in audit practice. Therefore, this study explains that adopting big data analytics can optimize audit performance and support improvements in financial governance in the public sector. The results of this study will benefit several auditing stakeholders, such as audit firms, audit regulators, new financial auditors, and academic scholars.

Keywords: Big Data Analytics, Audit Performance, Performance Expectations, Effort Expectations, Social Influence

Introduction

In the era of public sector digitalisation, government organisations are faced with a very rapid increase in data as a result of the use of integrated financial systems, digital service platforms, administrative databases, and transaction records that are continuously generated. This development has changed the landscape of public governance as policy decisions, performance monitoring, and resource management are now increasingly dependent on the ability of organisations to extract meaningful information from large-scale data. In the context of public sector auditing, the use of big data analytics is no longer seen as an additional element, but as a strategic necessity to improve the accuracy of risk detection,

identify patterns of non-compliance, and strengthen accountability for the use of public funds. Therefore, the relationship between the use of big data analytics and audit performance should be understood in a broader framework, namely, the public need for transparency, integrity of public institutions, and more efficient and evidence-based service delivery. From a theoretical point of view, the relationship cannot be considered direct or automatic because the effectiveness of the use of big data analytics in improving audit performance is influenced by various determining factors involving technological, organisational, and human aspects. Even if an agency has access to big data, the benefits of analytics can only be realised when there is an appropriate technology infrastructure, sufficient auditor competence, management support, and an organisational culture that is open to innovation and the use of data-based evidence. This suggests that audit performance in the public sector needs to be viewed through a more holistic perspective, where technology functions within a complex social and institutional system. Thus, this study is important to fill the gap in understanding how these determinants shape the relationship between the use of big data analytics and audit performance, particularly in a public sector environment with high demands for accountability, compliance, and public interest.

This study was conducted to determine whether performance expectations, effort expectations, and social influence in the use of Big Data Analytics can influence audit performance in the public sector. This study focuses on public sector auditors' perceptions of the impact of big data analytics on audit performance. This study will involve internal auditors and external auditors serving in federal government ministries and departments. This study was conducted through a survey of 267 government auditors in the public sector. Partial least squares structural equation modelling (PLS-SEM) was used to analyse and test the research hypotheses. The findings of the study analysis showed that all three factors, namely performance expectations, effort expectations, and social influence, positively influence audit performance to adopt big data analytics in audit practice. Therefore, this study explains that adopting big data analytics can optimize audit performance and support improvements in financial governance in the public sector. The results of this study will benefit several auditing stakeholders, such as audit firms, audit regulators, new financial auditors, and academic scholars.

Big data can be very useful in accounting practice; tasks related to financial and management accounting functions will be automatically loaded into information systems in the future. The role of accountants is changing as they are not only responsible for accounting functions, but also take on a more proactive and strategic role (Gamage, 2016). The integration of finance, technology, and information in big data presents opportunities and challenges for the accounting profession. Big data is revolutionizing accounting and auditing, providing deep insights but also introducing challenges such as data privacy and security (Mohamad et al., 2022; Hamzah, 2024; Sun et al., 2024). Therefore, many parties may have negative perceptions or concerns about its effectiveness, the difficulty of its use, and the extent to which they will receive social support, which can affect the acceptance of this new technology. In addition, the use of big data analytics in audits can be a major challenge if auditors are not convinced of the benefits or if they think it requires a lot of effort. However, social influence among colleagues, managers, and management can have a significant impact on the acceptance of this technology. If auditors do not receive sufficient support or encouragement from individuals around them, they may hesitate to fully adopt this

technology, which in turn can affect the quality and performance of audits. If we look at the study by Susanto et al. (2025), the results of a study in Indonesia show that big data analytics does not have an impact on audit quality, which explains that the benefits of big data analytics are still low, and auditors still believe that traditional methods are still better. Thus, the question arises, to what extent are auditors in Malaysia's perceptions of the effectiveness of big data analytics on audit performance? Based on this scenario, the objective of this study is to determine whether performance expectations, effort expectations, and social influences in the use of big data analytics can affect audit performance in the public sector in Malaysia. This is because big data, as well as big data analytics, is a complex phenomenon, and understanding the technical, organizational, and human factors that contribute to its effective use is key to providing guidance to audit organizations for better results (Surbakti et al., 2020). The study findings will also provide insight into the interactions between factors that influence its use, thus providing insights to organizations seeking to establish a sound data governance framework that supports successful big data analytics initiatives.

The selection of this topic is important because the use of big data analytics (BDA) is increasingly relevant in the public sector, in line with the digital transformation agenda, greater accountability, and the need for more data-driven decision-making. A systematic literature review by Huda and Jatmiko (2025) shows that BDA in the public sector is closely related to improved governance, transparency, innovation, and public trust. In the audit context, Saud et al. (2025) found that performance expectations, effort expectations, and social influence influence auditors' intentions to adopt BDA, and the actual use of BDA subsequently improves auditor performance. This finding indicates that this topic is indeed significant and appropriate to choose, as BDA is no longer a future issue but a current need for strengthening the public sector audit function. However, the current literature still reveals clear research gaps, further strengthening the justification for selecting this topic. Huda and Jatmiko (2025) emphasise that BDA studies in the public sector remain poorly synthesised, particularly regarding institutional challenges, governance issues, and public-sector-specific implications. In a closer context, Ismail, Mokhtar, and Ahmad (2024) show that digital audit readiness in the Malaysian public sector is influenced by factors such as change valence, task knowledge, and task availability, while Sofyani et al. (2025) assert that the quality of the BDA-based audit system influences audit performance through the role of audit judgment, and they themselves state that there are still inconsistent findings on the relationship between audit technology and performance in the public sector. Therefore, this study is important to fill this gap by examining more specifically the determinants of the relationship between BDA use and audit performance in the public sector. In addition, Genaro-Moya et al. (2025) assert that public sector audit institutions need to adapt their human resources, technology, and audit strategies to cope with the increasing use of AI and data in public administration, thus indicating that research related to analytical technology in public audit is increasingly important and relevant

Literature Review

The Concept of Big Data and Big Data Analytics in Auditing

Big data and big data analytics are now terms that are increasingly commonly used, and influence various aspects of human daily life (Chomiak-Orsa et al., 2017; Mikalef & Krogstie, 2018; Shi, 2022), such as in the medical field (Batko & Ślęzak, 2022; Hassan et al., 2022), the manufacturing industry (Wang et al., 2022), in decision-making in an organization (Li et al.,

2022), modern business strategy (Ballos et al., 2020) or in the field of auditing (Hezam et al., 2023; Sun et al., 2024; Abdelwahed et al., 2025). The invention of computers in the 1940s gradually provided tools for humans to collect massive amounts of data, while the term "big data" became a popular slogan to represent the collection, processing, and analysis of various data (Tuitt, 2012). In addition, big data initiatives are important for transforming traditional organizational decision-making into data-driven decision-making. In detail, big data analytics refers to the use of statistical methods, processing, and analytics of big data for business development and advancement. Big data analytics has become very important in addressing specific customer needs that are important for the development of competitive advantage and sustainability (Amankwah-Amoah & Adomako, 2019; Aldossari et al., 2023). Empirical studies show that the use of big data analytics has a positive impact on the quality of decision-making and that data analytics capabilities play a mediating role in the relationship between the use of big data analytics and the quality of decision-making (Li et al., 2022). Why is big data analytics needed in the auditing field? According to the law, auditing includes the examination and review of various books of accounts by auditors as an independent economic activity to examine important projects and the financial income and expenditure of an organization (Zhu & Huang, 2019). Several studies have shown that there are positive effects of using big data and big data analytics in the field of auditing. For example, a study by Dagilienė & Klovienė (2019) found that the use of big data and big data analytics in external auditing leads to the desired results of audit firms, meets regulatory requirements, and provides more value to business clients.

The Influence of Performance Expectations of using Big Data Analytics on Audit Performance
Performance expectations refer to the user's belief that using big data analytics will improve their audit performance, such as producing more accurate and faster reports. However, performance expectations can be an issue and play a role in influencing the user's decision to accept or reject the use of big data analytics. Many studies present positive findings about the benefits of big data analytics (Ananda et al., 2024; Hilabi et al., 2025). There is an audit phase, namely risk assessment, also known as the audit planning and development phase, that is most likely to benefit from the use of big data analytics (Rezaee et al., 2018). The procedures in risk assessment are carried out to drive auditors towards a better understanding of the business and its environment. Operational risks, such as fraud and cybersecurity threats, can be mitigated using big data analytics (Eastman et al., 2015; Rassam et al., 2017). Big data analytics has the ability to help identify and assess the risk of bankruptcy or management fraud at a higher level. In addition, it helps in assessing the risk of material misstatement in financial statements. This analytics allows for the detection of emerging threats more quickly, can detect small changes in market sentiment on social media, or identify differences in real-time trading data, which could potentially indicate fraud. By detecting these threats early, financial institutions can take immediate action to address them. However, there are also studies that show the opposite, where several studies on the Unified Theory of Acceptance and Use of Technology (UTAUT) model in the field of audit and big data show that variables such as perceived usefulness or perceived ease of use do not necessarily have a significant influence on audit results (Al-Ateeq et al., 2022; Susanto et al., 2025).

The Influence of Effort Expectations of Using Big Data Analytics on Audit Performance

Big data analytics is widely used in Industry 4.0, where technology is becoming more advanced and powerful, but it also helps auditors in conducting audit activities. This means that auditors must better understand how to use big data analytics and become proficient (Meitasari & Manurung, 2023). In the context of public sector audits, effort expectations refer to the extent to which this analytical technology is easy for auditors to use in carrying out their audit tasks. According to Gusni et al. (2020), the first factor, namely perceived ease of use, is a condition that refers to the extent to which a person believes that using a particular system does not require any effort. In other words, if the use of an information system is easy, then the person will use it. Several studies have found that perceived usefulness and perceived ease of use of big data analytics have a direct impact on audit quality (Al-Ateeq et al., 2022). Big Data is usually an expanded form of traditional data generated by machines and new data sources that are not formatted for ease of use. It may not be practical at one point, but on the other hand, it is useful when it comes to structured data in ERP (Enterprise Resource Planning System) (Isa & Subramanian, 2024). However, the study by Meitasari and Manurung (2023) shows that the use of big data in the audit process is not easy. Based on the data obtained from respondents, this is generally due to older respondents or those working as senior auditors who need to learn more, supported by insignificant statistical results. Big Data influences companies' decision-making for their internal and external stakeholders, and auditors need to expand the scope of existing data analytics (Cao et al., 2015).

Social Influence of the Use of Big Data Analytics on Audit Performance

Social support refers to the quantity of resources, encouragement, and validation available to individuals through their social relationships (House 1983). In the context of auditing, social influence, such as support or encouragement from management or colleagues, can motivate auditors in the public sector to use big data analytics in their work (Saud et al., 2025). Social influence describes how the views of others affect a user's decision to use a new technology (Venkatesh et al., 2003). Social influence is considered a determining factor in a person's intention to use technology, assuming that the person is influenced by the positive perceptions of others towards the technology (Baabdullah et al., 2019; Manrai et al., 2021). In the context of this study, social influence is defined as the views or perceptions of others, such as colleagues or practitioners, that influence the auditor's decision to use big data analytics technology in the audit process. The studies conducted by Villarejo-Ramos et al. (2021) and Moraes et al. (2022) revealed that social influence is a factor that has a positive influence on the intention to use technology. Meanwhile, Bogdani et al. (2025) documented that peer social support developed through joint participation in company training accelerates the use of data analytics in various internal audit tasks, including continuous auditing, communication, risk and control alignment, and alignment of data analytics with business control objectives. This explains that social support is positively associated with all measures of data analytics use, including the use of data analytics in continuous auditing. However, there are also study findings that show the opposite. For example, there is a study using the UTAUT model to look at factors that influence the acceptance of big data analytics technology by auditors. The results of the study show that social influence does not significantly influence the acceptance of big data analytics technology (Saputra, 2023; Pratama & Komariyah, 2023).

Methodology

This study focuses on public sector auditors' perceptions of the impact of using big data analytics on audit performance. The study will involve internal auditors and external auditors serving in federal government ministries and departments. The involvement of both internal and external auditors enables a comprehensive analysis of auditors' perceptions across their different roles in the public sector. Internal auditors are typically involved in ongoing assessments within government entities. External auditors, on the other hand, conduct periodic assessments of government agency records and operations. These differences will influence different views and experiences regarding the use of big data analytics. This diversity is important to understand the broader implications of using big data analytics tools in improving audit effectiveness and efficiency.

This study does not include auditors from statutory bodies as part of the study sample due to (1) different functions and scope of responsibilities: ministries have a broader and more comprehensive scope of responsibilities, while statutory bodies are more focused on specific aspects with more specific jurisdictions. Therefore, the activities of the organization that are carried out are more limited, causing the data collected to not be categorized as big data (2) different sources of allocation: statutory bodies are given autonomy in terms of finance and administration to ensure smooth operations without being completely dependent on the annual government budget. Statutory bodies have the power to manage their own financial resources through the proceeds obtained from their activities. Therefore, the ability and decisions of statutory bodies to use technology tools are different from those of ministries and departments. Both of these differences will affect the type and method of technology use by auditors when conducting audits. Auditors serving in government organizations at the state and local government levels were also not taken into account as part of the study sample due to the small and limited size of the organization's activities. This causes the data collected to not be categorized as big data.

This study uses a quantitative approach and uses a questionnaire as the study instrument. Exogenous and endogenous constructs are measured using a 5-point Likert scale as a preventive measure for common method bias (MacKenzie & Podsakoff, 2012). Purposive sampling was used in selecting the study sample. A total of 267 individuals were involved in this study. The sample size was determined by referring to the Krejcie & Morgan Table (1970). Inferential statistics were used to test the study hypotheses using Partial Least Squares Structural Equation Modeling (PLS-SEM) (Hair et al., 2017). The study data analysis was based on reflective measurement models and structural equation models.

Results

Respondent Profile

Table 1

Respondents' backgrounds

Item		n	%
Gender	Male	87	32.6
	Female	180	67.4
Education	Diploma	95	35.6
	Degree	2	0.7
	Master	167	62.5
	Certificate	1	0.4
	SPM	1	0.4
	STPM	1	0.4
Experience	10 years and under	13	5.86
	11 to 20 years	120	54.05
	21 years and above	56	40.09
Age	26 to 35 years old	45	16.98
	36 to 45 years old	131	49.43
	46 years and above	84	31.7
Gred	F10	3	1.1
	JUSA	1	0.4
	W10 (W44	42	15.7
	W12 (W48	21	7.9
	W13 (W52	10	3.7
	W14 (W54	7	2.6
	W5 (W29)	42	15.7
	W6 (W32)	90	33.7
	W6(TBK)	1	0.4
	W7 (W36)	30	11.2
	W9 (W41)	20	7.5

The respondents of this study were from among auditors working in the public sector. Based on Table 1, a total of 267 auditors participated in this study, consisting of 32.6 percent men and 67.4 percent women. This shows that women are more interested in an audit career than men. According to a study by Susilawati et al. (2022), women, in general, can organize information more systematically to obtain more accurate assessments and can analyse information systematically. In terms of education, the majority of respondents have a master's degree (62.5 percent), followed by a diploma (35.6 percent). In terms of work experience, the majority have worked for more than 10 years, and most respondents are between 36 and 45 years old. Meanwhile, in terms of grade, the percentages are different, but the majority are in grade W6 (29).

Model Measurement Assessment

The analysis used in this study is Partial Least Squares (PLS). In PLS analysis, the first step is to assess the measurement model or external model. Measurement assessment is important

and very necessary because it tests the reliability and validity of the scale used to measure the latent constructs and variables (Loehlin, 1998).

Table 1
Evaluation of Measurement Model, Validity and Item Reliability

Dimensi	Item	Muatan Faktor	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Performance Expectations	JP1	0.874	0.955	0.961	0.965	0.82
	JP2	0.953				
	JP3	0.962				
	JP4	0.877				
	JP5	0.805				
	JP6	0.951				
Effort Expectations	JU1	0.879	0.922	0.925	0.939	0.72
	JU2	0.892				
	JU3	0.862				
	JU4	0.787				
	JU5	0.813				
	JU6	0.852				
Social Influence	PS1	0.919	0.97	0.971	0.978	0.919
	PS2	0.933				
	PS3	0.904				
	PS4	0.866				
	PS5	0.723				
	PS6	0.834				
Audit Performance	PA	0.955	0.932	0.937	0.947	0.75
	PAL	0.963				
	PAM	0.961				
	PAT	0.956				

In the model measurement assessment (Table 1), each dimension and item analyzed met the reliability and validity criteria to ensure that the model built was strong and reliable. The factor loadings and Cronbach Alpha values for each item exceeded 0.6, indicating that the items were suitable for further analysis. In addition, Average Variance Extracted (AVE) is an important statistical measure used to assess the convergent validity of constructs in various research contexts. Generally, the accepted AVE value should be more than 0.5. (Qin et al., 2024). While the Composite Reliability (CR) value of all constructs exceeded 0.7, indicating that the study constructs had sufficient internal consistency reliability because it exceeded the recommended minimum value of 0.70. Meanwhile, Table 2 is the result of the Fornell-Larker test. This test compares the AVE value (average variance explained) with the relationship between constructs. The AVE value obtained was higher than the relationship between constructs. Therefore, all constructs met the analysis requirements.

Table 2
Summary of Fornell-Larcker test results

	JP	JU	PS	PA
Performance Expectations	0.905			
Effort Expectations	0.686	0.848		
Social Influence	0.729	0.73	0.866	
Audit Performance	0.766	0.771	0.804	0.958

Structural Model Evaluation

The issue of collinearity needs to be assessed in studying the structural model. All internal VIF values for the independent variables, namely Performance Expectations 2.393, Effort Expectations 2.414, and Social Influence 2.715, are less than 5 and 3.3, respectively, indicating that there is no collinearity problem (Hair et al., 2017). The validity of the hypotheses and structural models in this study was determined by evaluating the path coefficient between one and two latent variables. Based on previous studies, the path coefficient value should be at a value of 0.01 to reflect the specific effect in the model (Hair et al., 2017). The path coefficient shows the relationship between the predictor variable and the dependent variable in the model. Based on Table 3, all the variables tested showed positive and significant ß values with t-values, as well as p-values less than 0.1. All hypotheses for a direct relationship between the variables are supported. The results show that Performance Expectations positively influence Audit Performance (β=0.283, p<0.05*). Similarly, Effort Expectations positively influence Audit Performance (β=0.119, p<0.05*). Furthermore, Social Influence also shows a positive influence on Audit Performance (β=0.053, p<0.05). In summary, from the results of this analysis, it can be concluded that all hypotheses are supported at a significant level of 0.05.

Table 3
Summary of path coefficient results

Laluan		β	S.P	nilai-*t*	nilai-*p*	Keputusan
H_1	Performance Expectations -> Audit Performance	0.283	0.058	4.918	0.000	Sig.
H_2	Effort Expectations -> Audit Performance	0.306	0.072	4.194	0.000	Sig.
H_3	Social Influence -> Audit Performance	0.375	0.06	6.282	0.000	Sig.

Next, the Coefficient of Determination R-squared (R^2). R2 can be used to predict the extent of the influence of the independent variable (X) on the dependent variable (Y) (Asseng, 2018). The value obtained in this analysis is 0.752. In many scientific disciplines, an R-squared value above 0.70 or 0.80 is considered good, indicating that a large part of the variance in the dependent variable is explained by the independent variables in the regression model. This study further examined the effect size using Cohen (f^2) (Cohen, 1988), with values of 0.35, 0.15, and 0.02 indicating large, medium, and small effect sizes respectively (Gignac & Szodorai, 2016). f^2 is used to measure the magnitude of the effect that one or more independent variables in the model have on the variation in the dependent variable. In explaining the use of big data analytics on audit performance, the performance expectation (0.137) indicates a small effect size. While effort expectations (0.137) and social influence (0.211) showed a moderate effect size. Finally, the predictive relevance (0.02, 0.15, and 0.35 for weak, moderate, and strong) was assessed using Stone-Geisser's Q^2 (Geisser, 1974; Stone, 1974). The main purpose of Q^2 is to measure the extent to which the model is able to predict

variations in the dependent variable based on data not used in model construction. The Q^2 value for audit performance is 0.647. This value indicates that the model used has good predictive ability.

Discussion

This finding is consistent with several studies that show that performance expectations, effort expectations, and social influence positively influence auditors' intentions to adopt big data analytics in audit practice (Hamdi & Saat, 2025; Saud et al., 2025). This is likely driven by positive experiences of using big data analytics in the auditing process. The findings of this study are also consistent with the findings of Abdelwahed et al. (2025), which show that big data analytics has a significant positive impact on the audit process and auditor efficiency. The consistent findings of the influence of big data analytics on audit performance are because big data analytics has speed, efficiency, and integration of various types of data. The great leap in technological advancements in the past decade has enabled audit work to process data more efficiently and quickly by utilizing specialized analytical systems and software to perform data processing. Audit departments can now collect information, conduct analytics, and make observations and conclusions in real-time or near-real-time, and from a combination of data sources, allowing auditors to make more accurate decisions and a better audit experience than when performing traditional audits, as data analytics typically involves several types of technologies used to process large amounts of information. The consistent findings with findings from other studies in the auditing field are likely due to the use of data analytics no longer being based on traditional samples, but rather being able to encompass the analysis of the entire population of audit-related data, thus improving the quality and coverage of audit evidence. There are existing analytics tools, such as IDEA and ACL, that can perform a variety of analyses, based on parameters designed by the auditor, and then provide a list of exceptions for the auditor to evaluate (Balasubramaniam & Sidhu, 2021). Currently, many audit firms have already provided audit analytics by extracting large amounts of client data and then analyzing the data on separate machines with specialized audit analytics software. While these analytics are often performed within the audit firm environment, the next big leap for data analytics in future audits, with the help of artificial intelligence and machine learning technologies, is for audit firms to be able to install intelligent audit analytics software that resides in their clients' data centres and stream analytics results to the audit team directly, facilitating continuous auditing. Data analytics is considered essential in improving auditor performance in the era of rapid technological advancements and big data (Bogdani et al., 2025). Through the use of data analytics, auditors can highlight not only financial reporting matters but also other value-added findings as part of the overall audit findings, which were previously not noticed by the client, such as the relationship between specific factors and business performance, important drivers affecting business performance, key business risks, and warning signs of fraudulent activity.

Conclusion

This study found that performance expectations, effort expectations, and social influence in the use of big data analytics have an influence on audit performance in the public sector. The study findings explain that the audit profession in the public sector has become accustomed to the international auditing environment in implementing technological advances, namely big data analytics, to manage large amounts of data and help detect errors, risks, and fraud. Therefore, the findings of this study contribute to the literature by showing the responses of

auditors in this study. In addition, the findings of this study make academic contributions in the context of the use of big data analytics and its impact on audit quality in the public sector. The sample size of 267 government auditors in the public sector in this study is seen as sufficient, and the validity of the findings and their generalizability. The current developments and conditions in the field of auditing have necessitated big data analytics. Big data analytics fosters and improves the integrity of audits and auditing procedures. This relationship has also been studied in previous research and is consistent with the findings of this study. Although there are advantages of big data analytics, it poses several challenges for external auditors. Companies face high costs due to the increasing complexity of big data, which requires the hiring of data scientists and investment in new technologies. Similarly, the lack of audit standards and scepticism from audit authorities prevents the full adoption of big data analytics in auditing. In addition, privacy and security threats in the digital ecosystem remain a major challenge. Therefore, further research is needed to understand the moderating factors that may influence the relationship between performance expectations, effort expectations, and social influence in the use of big data analytics on audit performance.

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