Contemporary Accounting Case Studies

ANALYSIS OF FACTORS THAT INFLUENCE THE ADOPTION OF DATA ANALYTICS TECHNOLOGY

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Abstract

The big data era has driven industry to adopt data analytics technology, particularly in the field of internal audit. This study systematically investigates into factors that influence the adoption of data analytics technology for internal audit by a private company. Technology, Organization, and Environment (TOE) framework is used to explain the antecedents of the adoption of data analytics technology. Using a case study design and in-depth interviews for primary data collection, the findings reveal that technological and organizational contexts are the major drivers of technology adoption in data analytics. In practice, the use of data analytics at PT. XXX is to identify the presence of anomalies in the audit population, implement continuous auditing and analyze audit data by using more than 1 million data. The use of data analytics for audit activities is still found limited, therefore regulators are advised to set reformed audit standards and provide training to enhance the use of data analytics. In addition, the role of academics to develop hands-on curriculum for students to develop their skills in data analytics is deemed crucial in promoting the advancement of data analytics technology for internal audit work.
Keywords: Internal audit; data analytics; adopt data analytics; Technology, Organization, and Environment framework

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1.   Introduction

The world is entering a digital era where technology is developing so fast. This phenomenon is proportional to the amount of data production that is abundant from time to time. The production of big data is increasingly encouraging companies to manage data for strategic decision-making (E.F. Ahmad & Aliyudin, 2019). Therefore, the use of big data analytics technology is needed to process large amounts of data in all company industries.

Big data analytics technology can be used to increase efficiency and effectiveness in obtaining audit evidence for financial statements. The trick is to analyze patterns, deviations, inconsistencies and extract useful information in client data. This activity is carried out with the aim of planning and implementing the audit (FRC, 2017).

In line with the development of big data technology, the digitization process provides a variety of data in large volumes and speeds (Tang & Karim, 2017). This condition offers opportunities for companies to innovate in their business processes, including in accounting and auditing activities (De Santis & D'Onza, 2020). The concept of big data itself is closely related to the 3Vs: volume, variety, and velocity. Volume relates to the capacity of data that allows it to be stored in the storage space; variety is the diversity of data related to the type and type of data processed; velocity is related to processing speed (Tunggal & Elliza, 2021). Therefore, Big data can be utilized by a group of auditors who understand and understand the steps to access big data and have the ability to use data analytics as a set of technology applications that function in analyzing big data (Salahudin, 2019).

Utilization of data analytics for internal audit, namely: (1) auditors can examine more transactions, (2) audit quality can be improved by providing greater insight into the client's audit process, (3) fraud will be easier to detect, and (4) auditors can provide services and find solutions to client problems (Earley, 2015). Although the potential use of data analytics is very important for auditors, its use in internal audits is still very low and many challenges still need to be overcome before implementing data analytics widely in audits. Some of the factors that cause the low use of data analytics are the auditor's technological competence, professional standards related to auditing, and top management support in facilitating the use of data analytics (Rakipi et al., 2021).

With the growing use of data analytics technology, academics and professionals state the importance of data analytics technology as a "game-changer" in creating innovative auditing practices while also improving auditing performance. However, the reality shows that the use of data analytics technology for auditing activities is still quite limited (Austin et al., 2020). Therefore, this study examines the use of data analytics technology in improving auditing performance.

PT. XXX is a dealer who has a lot of data and transactions in its business operations. To check and evaluate activities the company was formed an internal audit unit tasked with carrying out monitoring tasks and evaluation of the company's internal control as well as providing views, independent and objective assurance and consultation. In doing audits at PT. XXX, internal audit uses a conventional audit approach and continuous auditing. By not fully implementing data analytics at PT. XXX so the objective of this paper is to find out of factors that influence the adoption of data analytics in internal auditing at PT. XXX and to analyze the use of data analytics that have been adopted by PT. XXX in implementing internal audit and providing suggestions for improvement. Previous studies (Bedard et al, 2003, Curtis and Payne, 2008) related to technology acceptance factors in the field of auditing carried out in developed countries. The study emphasizes adoption factors such as auditor training and skills, costs and resources and attitudes towards technology use.

Rakipi et al., (2021) emphasizes that the digitalization process creates both opportunities and threats and requires organizations to strengthen their ability to identify, assess and prevent risks in a timely manner. These factors have prompted a paradigm shift in audit practice as internal audit has a key role in evaluating an entity's internal control and risk management system. Based on the description above, internal audit requires data analytics software that can assist auditors in improving assurance and consulting services. Therefore, this study uses a TOE framework that focuses on three contexts: Technology, Organization and Environment where the TOE framework identifies key factors in the adoption and utilization of a new technology so that it is considered relevant enough to explain the phenomenon of data analytics at PT. XXX who has used data analytics in the audit process to achieve effectiveness and efficiency in audit assignments.

2. Literature Review

2.1. Technology, organization, environment (TOE) framework

The TOE framework was developed by Tornatzky and Fleischer (1990). The TOE framework describes the overall process of innovation starting from the innovation development process by engineers and entrepreneurs to the stage of adoption and implementation of innovations by users in the context of the company (Baker, 2011). The TOE framework is consistent with innovation theory which emphasizes technological and organizational aspects (Roger, 1995). Tornatzky and Fleischer (1990) include environmental aspects that are so important in organizational adoption that companies need to consider government regulations, competitors, and audit firm clients in adopting technology. TOE theory is used in predicting the goals of an organization adopting technology. The TOE framework represents a segment of the process through which the enterprise context can influence the adoption and implementation of innovations.

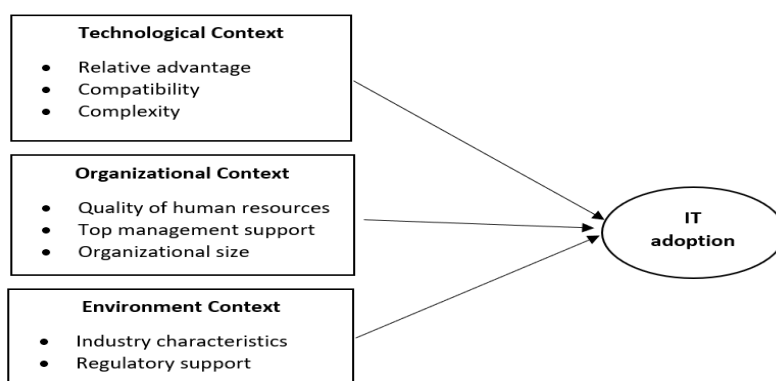The relationship between the various components in the TOE is illustrated in Figure 2.1

Figure 2.1 Technology, Organization, Environment (TOE) Framework

Source: Chong & Olesen (2017)

The explanation of the technology, organization, environment (TOE) framework is as follows:

a. Technology Context

The technology context consists of internal technology and external technology relevant to the organization (Oliveira & Martins, 2010). The internal technology in question is the technology adopted by the company

while the external technology refers to the availability of the technology on offer. Relative advantage refers to the adoption of technology in terms of the benefits felt by the organization such as increasing economic profits and organizational performance (Chong & Olesen, 2017).

Compatibility is the extent to which technology is aligned and consistent with socio-cultural values and beliefs and past experiences (Roger, 2010). Complexity is the level of technical difficulty for auditors to learn and use (Roger, 2010). According to Chong & Olesen (2017), Compatibility and complexity are the company's considerations in adopting data analytics for audit assignments. Previous research has suggested that technological complexity is a prerequisite for the adoption of innovative technologies (Li et al., 2018)

b. Organizational Context

The organizational context consists of the quality of human resources, top management support, and company size (Chong & Olesen, 2017). According to Tornatzky and Fleischer (1990), the adoption of technology when viewed from the organizational context includes the complexity of the managerial structure, scope, quality of human resources, centralization, IT capital budget, and the number of internal audit staff within the company. Krieger et al., (2021) stated that IT adoption is influenced by the size, structure, and context of the company, the relationship between auditors and clients, and how technology skills are acquired.

The quality of human resources is related to the skills and competencies of the internal audit team in using data analytics. Li et al., (2018) state that management should dedicate resources to purchasing analytical software and training auditors in the successful application of audit analytics. The greater the capacity of human resources, the greater the chances of successful adoption of new technologies within the organization. Shukla & Mattar (2019) explains that adequate staff and skills are factors that need to be considered in adopting data analytics.

Chong & Olesen (2017) explains that firm size hurts the adoption of new technologies. Company size includes large companies, medium companies, and small-scale companies. According to Li et al., (2018) descriptive measure of the organization consists of the size and attitude of management. While research by Rakipi et al., (2021) shows that company size has a positive significant relationship with data analytics adoption.

c. Environmental Context

In the environmental context, Chong & Olesen (2017) explains the technology adoption factors consisting of industry characteristics and

regulations as the dominant factors of companies adopting technology. Industry characteristics are the domain in which a company carries out its operations, for example, a company runs its operations, the company's operating environment consists of competitors, business industry, access to resources, and government-related to the business operation (Tornatzky and Fleischer, 1990). Schull & Maslan (2018) explained that among environmental factors, competitive pressures have a stronger impact on data analytics adoption.

Government regulations can encourage companies or prevent organizations from adopting new technologies (Chong & Olesen, 2017). This research is in line with Widuri et al., (2016) stated that the requirements of regulators or professional bodies were the dominant factor in technology adoption.

2.2 Audit Internal

Based on the IIA's International Professional Practices Framework (IPPF) (2017:2), defines Internal Audit, as follows:

> *Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluating and improving the effectiveness of risk management, control, and governance processes.*

According to the free translation of Theodorus M. Tuanakotta (2016:11) definition of Internal Audit, as follows:

Internal audit is an independent and objective assurance activity and consulting activity designed to add value and improve the organization's operations. Internal audit supports the organization in achieving its objectives through a systematic and disciplined approach to evaluating and improving the effectiveness of risk management processes, control processes, and organizational governance processes. The purpose of internal audit activity is to increase organizational value to achieve organizational goals through three processes, namely risk management as an effort to manage organizational risk, control, and organizational governance so that the targeted organizational goals can be realized which will then add value to the company.

Internal audit carries out assignments with two approaches, first, approach that is mostly applied by internal auditors is the periodic-based

approach and the second approach is the continuous auditing approach. To implement continuous auditing, internal auditors are aware of the need for data analytics software that can assist the auditor's work in conducting a continuous audit approach. The Institute of Internal Auditors (IIA) even issued guidelines for the use of data analytics software, namely the Global Technology Audit Guide (GTAG) Number 3, entitled Continuous Auditing: Implication for Assurance, Monitoring, and Risk Assessment.

Table 2.1 Differences in Audit Approach

No	Periodic Based Audit	Continuous Auditing
1.	Manual system / direct observation	Using the role of information technology
2.	Periodic evaluation	Rating every time
3.	Retrospective	Recurring
4.	Reporting time is relatively long	Shorter reporting time
5.	There is a sample limit	Can be done on the population

Source :(Hiererra & Sarayar, 2014)

The periodic-based audit approach is considered less optimal than continuous auditing. Continuous auditing is considered the right solution for processing electronic data effectively and efficiently. The results of continuous auditing are more real-time than periodically based audits to assist management in making strategic decisions.

2.3 Data Analytics

Analytics is the use of computer-based data, machine learning, and statistical analysis to gain better insights and make better decisions. definitively, *analytics is* defined as a process of transforming data into action through analysis and insight in the context of organizational decision-making and problem-solving (EDUCBA, 2018). There are four types of data analytics models in the application, namely descriptive analytics, diagnostics analytics, predictive analytics, and prescriptive analytics. Data analytics is a tool used to quickly extract, validate and analyze large amounts of data (Jaffar et al., 2022). Data analytics affects business processes positively. The use of data analytics has been automated to make it easier for humans to process data because data analytics uses algorithms so that they can produce the required information. Data analytics tools that are often used in audit assignments include arbutus, audit command language (ACL), interactive data extraction and analysis (IDEA), and other generalized audit software (GAS) tools. Febrian (2021)

explained that Microsoft Excel is also one of the tools that can be considered in conducting data analytics but it requires certain expertise from the auditor so that audit testing can be carried out.

2.4 Conceptual Framework

Data analytics is a form of data analysis that involves processing and examining a data set and is used for concluding. Data analytics can be valuable to the auditing profession, particularly when rigorous analytical procedures are combined with audit techniques and expert judgment (Gepp et al., 2017). Data analytics can improve audit quality by increasing the adequacy of audit evidence. Currently, auditors apply risk-based models and sample transactions to determine that account balances are fairly stated. Data analytics will allow auditors to automate transaction testing (Earley, 2015). The concept can be presented in the following figure 2.2
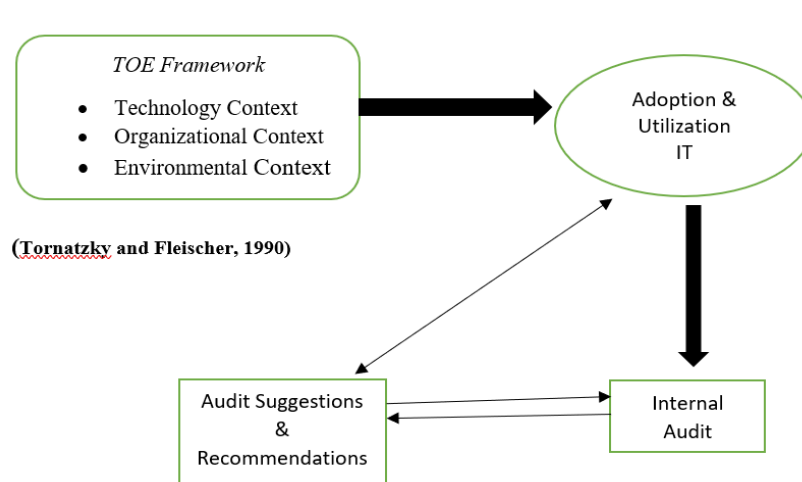

Figure 2.2 Conceptual Framework

2.5 Previous Studies

2.5.1 Data Analytics Utilization

The use of data analytics in the internal audit domain has been emphasized by both practitioners and academics (Li et al., 2018). Data analytics is a technology and framework developed to store, transfer, convert and analyze large volumes of data, varied, structured, and unstructured sthat auditors use in audit activities to process data and make important decisions more quickly (Sutandi, 2018). Ahmad & Aliyudin (2019) explained that there was a positive influence on the implementation of big data on the effectiveness of audits in government institutions, in this case, the majalengka regency inspectorate

office. This study uses quantitative data where the results of the study state that the implementation of big data is proven to bring resource efficiency in producing output (work results). In addition, this research also proves the effectiveness of the budget because all existing programs in government institutions that have been implemented can produce better services.

Previous studies have investigated the use of technology in the audit process such as Computer-Assisted Auditing Tools and Techniques (CAATTs). However, when compared to CAATT, audit analytics requires more specific auditor knowledge and skills and this is a new challenge for auditors because understanding data analytics requires statistical techniques and most auditors have limited knowledge. There are several inhibiting factors in the use of data analytics in audits. Adrianto (2016) mentioned several inhibiting factors such as the shift in the auditor's paradigm, the nature of decision-making in auditing, the implications of datafaction, related to the security of client data, and messy data. Earley (2015) argues that the barriers to the use of data analytics are categorized into three broad categories, namely auditor training and expertise; availability, relevance, and integrity of data, and expectations of regulators and users of financial statements.

Research related to technology adoption in audit firms, especially in developing countries is a major concern because it relates to the transparency and quality of financial reporting so a high-quality audit using technology is very important (Widuri et al., 2016). Research by Widuri, O'Connell, and Yapa (2016) uses the technology, organization, and environment (TOE) framework in its analysis to examine the use of technology in the external auditor's environment using Generalized Audit Software (GAS) technology. The results of this study explain that environmental factors are very influential for external auditors who work in public accounting firms when compared to organizational and technological factors.

2.5.2 The implementation of internal audits in the private sector

The existence of an internal audit is considered important for the organization to examine the company's financial statements whether the accounting records are accurate and complete and prepared in accordance with the provisions of the statement of financial accounting standards (PSAK). Competent auditors are auditors who have technological capabilities, understand and carry out the correct audit procedures and use the right samples

(Jaffar et al., 2022) In addition, in carrying out audit activities, steps / procedures are needed so that the objectives of the audit are in accordance with the audit plan (Fachruddin et al., 2017). In auditing financial statements, auditors have very limited time, therefore auditors often only concentrate on testing the validity of a few samples rather than checking as a whole (Yolanda, 2016). Rustiarini (2013) states that the time pressure experienced by the auditor arises from limited resources or time constraints in carrying out audit assignments. Due to this time pressure, auditors need data analytics software tools that are useful in sampling anomalous data so as to facilitate the auditor's work to carry out further checks of abnormal transaction findings in accordance with audit objectives.

3. RESEARCH METHODS

This study uses a qualitative approach that allows researchers to investigate a particular subject in depth. This study is exploratory because research on data analytics is very rarely found in the previous literature. Several previous studies used the unified theory of acceptance and use of technology (UTAUT) theory developed by Venkatesh et al. (2003) and the technology acceptance model (TAM) developed by Davis (1989) to describe the acceptance of technology from the individual side. This study uses an interview approach using TOE theory because the lack of research based on a qualitative approach to the analysis of the use of data analytics in the implementation of internal audit provides researchers with the opportunity to contribute to the literature. This research study adopts the technology, organization, and environment (TOE) framework as the theoretical basis. The TOE framework was chosen because it provides an explanation of IT adoption and implementation that is well received by the organization and provides better explanatory power by including the environmental context so that it is considered relevant enough to explain the phenomenon of data analytics at PT. XXX has used data analytics in the audit process.

3.1 Data

This study uses primary data and secondary data. The primary data in this study were obtained by interview method to collect in-depth information from

the participants. The interview structure helps researchers to obtain comprehensive data from the respondents (Myers, 2009). Interviews were conducted with auditors at various levels who have used data analytics in conducting audit work. Before conducting the interview, the researcher first sent interview questions using an online google form. When the researcher had collected data via a google form, then the researcher contacted the respondent to ask for an interview schedule to get answers to more in-depth questions.

The interview questions were structured and designed with item groupings based on TOE theoretical framework, namely the technological context, organizational context and environmental context. Questions in the context of technology refer to the benefits / advantages of software in providing added value for the company. In addition, the interview questions also confirmed the level of ease of use of data analytics software which was one of the factors considered in the adoption and whether the software at PT. XXX is compatible with existing technologies and can read all types of data. Questions in the organizational context refer to the readiness and decision of the organization to adopt and measure the benefits felt by the company after adopting data analytics. Furthermore, The questions used for interviews should be able to explain the phenomenon under study related to how and why the phenomenon occurs. For this purpose, interview questions must be able to explore information in depth, focus, and be relevant to the research question and can be sourced from several literatures that are considered relevant to the research topic.(Roberts, 2020). The interview questions in this study were sourced from several journals (see Appendix 1). Study Prakoso & Yusuf Khudri (2022) also uses several research sources in formulating interview questions that are relevant to the research question. In this case, the researcher has verified the sources of interview questions.

The form of the interview is semi-structured interview. Semi-structured interviews were carried out by asking questions to informants referring to a list of questions that had been previously made by researchers that had been consistently and systematically identified which could be interrupted with follow-up spontaneous questions in order to get more detailed answers (Sekaran

& Bougie, 2016). Interviews were held in April 2022. The interviewees were selected using the snowballing method. Noy (2008) recommends this method because researchers can access informants through the contact information provided by other informants. Faugier and Sargeant (1997) assert that the snowballing method approach provides an advantage in obtaining information about phenomena that are difficult to observe that are sensitive, illegal, or distorted. It also provides an efficient way to identify research participants who may be difficult or impossible to find or contact, so the appropriate research method is exploratory, qualitative, and descriptive. The use of data analytics is relatively new in auditing practice in Indonesia and the researcher believes this research is a sensitive topic for most internal auditors. The researcher estimates that some audit firms (KAP) will be reluctant to participate in this study, which is one of the reasons the researcher chooses the object of internal audit.

Secondary data is data obtained by researchers from other parties such as scientific works, books, documents and is relevant to the data that researchers will use (Sekaran & Bougie, 2016). Secondary data sources are usually publicly available such as literature books, media publications, published journals (Greener, 2008). The secondary data used in this study are in the form of annual reports and information from electronic media that provide a comprehensive picture of the organizational structure, organizational characteristics, the role of internal auditors and the types of data analytics used by the company.

4. ORGANIZATIONAL PROFILE

The object chosen for this research is the company with its business activities engaged in the distribution of motorcycles, spare parts, and several subsidiary lines. The company's success is certainly supported by one of the organization's supporting organs is the internal audit unit which functions to monitor the organization's operational activities, evaluate the company's internal control system and provide independent and objective views, assurances, and consultations to increase the value and performance of the company's operations

The internal audit unit at PT. XXX is divided into two, namely the audit operational team that handles the company's day-to-day operational activities the checking of financial statements, and the IT audit team in charge of minimizing the risks of fraud related to the system used by the company. Both the audit operational team and the IT audit team work together to increase the company's value and performance. In carrying out an assignment/checking of internal control, the internal audit team uses data analytics to detect anomalous transactions that are not following company procedures. In this case, the company has implemented data analytics in the form of Microsoft Excel and IDEA software that has been used by PT. XXX to assist the audit process.

IDEA is a data analytics software used by companies to process data up to 50-60 million data records whose functions and objectives are to meet organizational needs in audit assignments. Directly, the benefits felt through the use of data analytics at PT. XXX is divided into benefits in financial data and non-financial data. Utilization of data analytics in financial data, namely IDEA software is used to make transaction data sampling in audit assignments. In addition, the IDEA system can perform a continuous audit that can detect an anomaly/fraud transaction data that is not following the company's operational system.

Data analytics used in both operational activities and internal audit activities. For operational activities, data analytics features are used in Microsoft Excel such as pivot table, sort, remove duplicates, data visualization, vlookup, IF function, while for internal audit, data analytics features are used such as summarize, sampling, descriptive statistics, gap detection, aging analysis, trend analysis, data visualization, and duplicate detection.

In carrying out operational activities, PT. XXX does not only use continuous audit continuous monitoring (CACM) to monitor activities at the head office but up to the CACM subsidiaries that can be integrated. The benefits of data analytics in non-financial data, such as monitoring CCTV in warehouses / spare parts warehouses of subsidiaries, which amount to 34 warehouses, and checking the stability of the condition of the subsidiary's website, if an error occurs, the system will provide reports to the holding faster and can be followed up immediately. The CACM system runs every day even if there are findings / no findings. If there is a finding, the internal audit will investigate first whether the error occurred due to a system error or anomaly finding.

5. RESULT AND DISCUSSION

This study uses the content analysis method, which is a research method that provides a systematic and objective way to make valid conclusions from verbal, visual, and written data. to explain a certain phenomenon (Wilkinson & Birmingham, 2003). The content analysis aims to objectively characterize the message conveyed with descriptive information on the information collected and help to identify patterns in the text.

Table 1 Interview Participants

Source person	Position	Qualification
Participant A	Manager	4 years working period with an introduction to data analytics between 5 – 10 years
Participant B	Supervisor	1 year working period with an introduction to data analytics < 5 years
Participant C	Head of Internal Audit	5 years of working experience with an introduction to data analytics > 10 years
Participant D	Former Head of Internal Audit	4 years 8 months working period with an introduction to data analytics < 5 years

The interview method used for this research is a mixed-method between structured interviews and unstructured interviews. Interviews were conducted with the company's internal audit team representing all the information needed to answer this research question. Content analysis can be used as a powerful research tool in revealing message content to determine good conclusions. Qualitative content analysis is a commonly used method to analyze a wide range of text data including interview transcripts and observation notes. This method

can be used because this analysis focuses on the content and contextual understanding of a text (Cahyadi & Prananto, 2015)

The results of the descriptive content analysis of the interview from the internal audit team at PT. XXX that the factors that influence the adoption of data analytics in the company's environment consist of technological factors, organizational factors, and environmental factors. These three factors need to be considered by the top management of PT. XXX in making decisions on the adoption of new technologies.

5.1 The factors that influence the adoption of data analytics for internal audit at PT. XXX

5.1.1 Technology Context

The organization will adopt new technology if the technology is useful and provides added value to the organization (Chong & Olesen, 2017). The success of the company's transformation from a motorcycle distributor company to a company that has a reputation as a smart mobility company is certainly supported by various strategies, one of which is the adoption of data analytics software. One of the benefits that organizations get in implementing data analytics is effectiveness and efficiency in audit assignments.

> "For a more efficient and effective audit process, if we use data analytics, we can analyze the entire population of data that we audit. For example, business transaction data in our company can be analyzed directly in its entirety so we can get better assurance. In addition, reducing the human error factor because it is assisted by software, there are already many built-in functions, such as Benford's law, it can also help the audit process." (Participant C, 2022)

This is in line with research E.F. Ahmad & Aliyudin (2019) which explains that the implementation of data analytics has a positive effect on the effectiveness of the audit process. The use of data analytics not only improves operational effectiveness and efficiency by reducing costs but also helps auditors quickly identify potential fraud and anomalies thereby providing a higher assurance of audit results (Li et al., 2018).

Compatibility is the degree to which adoption of technological innovation is considered consistent with existing socio-cultural values and beliefs, past experiences, and needs of potential adopters (Chong & Olesen,

2017). In adopting data analytics, companies need to consider the compatibility between the adoption of new data analytics and the technology that has been adopted by the company. Shukla & Mattar (2019) explained that the technology that has been adopted by the previous organization can slow down the process of adopting data analytics. According to participant C, the compatibility factor is not an obstacle in the adoption of data analytics at PT. XXX because data analytics software that has been used, such as IDEA can be adopted in companies without considering the compatibility factor.

Consistent complexity associated with technology adoption is the degree to which technological innovations are relatively difficult to understand and use (Chong & Olesen, 2017). The tendency of companies to adopt data analytics that is easy to use by auditors and by organizational needs to make audit assignments carried out by auditors easier and auditors comfortable with using the software (Darmaningtyas & Suardana, 2017). All auditors at PT. XXX can use data analytics in the form of Microsoft Excel and IDEA in carrying out audit assignments. Participant B explained that PT. XXX has never held training related to data analytics in the internal audit team division. The use of IDEA software is quite easy like using Microsoft Excel and can be learned independently through the guide module.

5.1.2 Organizational Context

In adopting data analytics at PT. XXX does not only consider the technological context but also the organizational context, such as the quality of human resources, top management support, and company size as important factors that must be considered in decision making.

The quality of human resources is the technical knowledge possessed by auditors in an organization (Chong & Olesen, 2017). Auditors are expected to have the competence to analyze the necessary data because, in the current era of the fourth industrial revolution, the credibility of the auditing profession can be increased if the auditor is equipped with these competencies. (Jaffar et al., 2022). Participant D explained that PT. XXX already has an internal audit team that has experience and ability in using data analytics software.

Management support or commitment from management is the extent to which top management invests in technological innovation. Li et al., (2018) explained that support from top management plays a key role in the successful adoption of technology. Participant C explained that management support is the main priority in the decision to adopt new software at PT. XXX. If the

management of PT. XXX sees that the use of data analytics software has a positive impact if it is invested in line with the company's goal of advancing digitalization, so management will decide to invest in data analytics software. The lack of top management commitment to adopting data analytics is also influenced by the amount of budget allocated (Shukla & Mattar, 2019). Management's ability to adopt software depends on the price of the software and the company's financial ability to buy the software. One of the reasons management decided to adopt IDEA software was a cost-benefit analysis. Management compares the budget provided with the perceived benefits of the company in the long term.

Li et al., (2018) explained that company size had no significant effect on technology adoption in the company because several small companies had used data analytics in audit assignments. Small companies have at least used Microsoft Excel in conducting audit assignments. Size is thought to have a positive impact on the use of data analytics for several reasons including that large companies have more resources to facilitate the adoption of data analytics (Li et al., 2018). Different from research Bremser et al., (2018) state that company size is determined to be a significant determinant in data analytics adoption. Participant C explained that company size was not an important factor in the adoption of data analytics at PT. XXX because since the initial establishment of PT. XXX has used data analytics in the form of Microsoft Excel for decision making, business strategy, and business development.

5.1.3 Environmental Context

Environmental factors are external factors from the organization that is important to be taken into consideration in the adoption of data analytics in the PT. XXX. The environmental context consists of the characteristics of the industry and support from the government.

Chong & Olesen (2017) explained that the characteristics of the industry consist of pressure from trading partners in which the organization conducts its business and competitive pressures. Competitive pressures are pressures that arise from the threat of losing or maintaining a competitive advantage that forces organizations to seek the adoption of new technologies as an alternative to their strategy in maintaining long-term viability. Participant C explained that competitive pressure was not a supporting factor in the adoption of data analytics at PT. XXX.

"No competitive pressure. Due to internal factors, there is a need for an audit to see the benefits felt by the company in an audit assignment to be more effective and efficient." (Participant C, 2022)

Another environmental factor that needs to be considered besides competitive pressure is the presence of professional assistance. Li et al., (2018) in their research explain that the support of professional assistance encourages organizations to use data analytics. Professional assistance refers to assistance provided by software vendors to explain to the auditor matters beyond the auditor's understanding of using the adopted data analytics.

Government regulatory support has been identified as a critical environmental factor influencing the adoption of data analytics within the TOE framework (Chong & Olesen, 2017). Government regulatory support can further encourage or hinder organizations from adopting data analytics. Participant A explained that government support was not a factor that encouraged the adoption of data analytics at PT. XXX. Without government support, PT. XXX has used data analytics as a necessity in running the company's operations.

5.2 Analysis of the use of data analytics for the implementation of internal audit

5.2.1 Technological Context

Internal auditors and external auditors need data analytics tools in carrying out audit assignments. For internal auditors, data analytics is not only useful for increasing operational effectiveness and efficiency, but data analytics also helps in detecting potential fraud and anomalous transactions (Li et al., 2018). This agrees with participant C the head of an internal audit who said that data analytics is useful for finding anomalies in the audit population. Furthermore, participant D said that the use of data analytics at PT. XXX is the implementation of continuous audit continuous monitoring (CACM), one of which is to monitor spare parts warehouses located in subsidiaries.

5.2.2 Organizational Context

Auditors are expected to have the competence to analyze the necessary data because, in the current era of the fourth industrial revolution, the credibility of the auditing profession can be increased if the auditor is equipped with these

competencies (Jaffar et al., 2022). Rakipi et al., (2021) in their research said that management support had an impact on the use of data analytics. This research is in line with research by Li et al., (2018) who agree that top management support is an important factor in data analytics adoption. The results of interviews with participant C stated that management will adopt software that provides benefits and added value for the company.

> "Continuous audit is that we can automate the audit process without human intervention. It can be said that robotic process automation (RPA) reduces errors and reduces errors because the system works automatically and the timely results can be done at any time, for example weekly, monthly, daily, or hourly. That can happen because of the help of data analytics software." (Participant C, 2022)

Data analytics can shorten the time of audit assignments. The data analytics software accelerates management in making decisions for the organization. In addition, because it is robotic process automation (RPA), the company does not require a large number of internal auditors because the auditor's work can be done with the system. This of course further saves the company's financial resources.

5.2.3 Environmental Context

More organizations processing data have become a consideration for organizations to adopt data analytics technology so that organizations remain ahead and can compete competitively (Chong & Olesen, 2017). Competitive pressure leads to pressure from external factors in the form of suppliers, customers, and competitors. Participant C explained that the use of data analytics is not related to the company's clients or competitors, but rather to improve relationships with auditees because internal controls are running well and provide added value for the company.

> "Utilization of data analytics does not provide added value to the client but the auditee. Because auditors use data analytics to generate valuable insight/input for auditees. It will automatically improve good relations at PT, XXX. Data analytics at PT. XXX received appreciation from the auditee because the auditee used it and enjoyed the results because it helped in operations as well."(Participant C, 2022)

The results of the interview with participant D stated that the use of continuous auditing through data analytics serves to monitor the company's accounts receivable. For example, the scenario of setting a deadline for leasing company payments, if within the specified time limit the leasing company has not paid its debt to PT. XXX then the data analytics system will give a signal to the company so that the finance team can follow up on the collection of the account receivable.

6. CONCLUSION AND RECOMMENDATION

The findings of this study explain that management support plays an important role in the adoption of data analytics. Management tends to adopt data analytics based on cost-benefit analysis where the costs incurred by management for the decision to adopt data analytics provide added value for the organization in the long term. In addition, the ease of use of data analytics is a factor that companies consider when adopting data analytics. Internal auditors at PT. XXX explained that Microsoft Excel and IDEA software have a level of ease of use in carrying out audit assignments. The quality of human resources at PT. XXX has the technical knowledge and has been proficient in the use of data analytics so this has become a driving factor for management. Temporary, environmental factors were found to be less encouraging for PT. XXX in adopting and utilizing data analytics.

In the utilization of data analytics at PT. XXX, management sees that data analytics provides added value for the company, especially in finding transaction anomalies that are indicated by fraud and analyzing data to be audited with a record of more than 1 million transaction data. In addition, data analytics can shorten audit assignment time by implementing continuous audit continuous monitoring (CACM). Thus data analytics software accelerates management in making decisions for the organization.

Based on the findings of researchers in this study, recommendations can be given to PT. XXX, namely the utilization of data analytics will be maximized if; (1) all company data is in the database system, making it easier for auditors to carry out audit assignments because of some of the data in PT. XXX is still outside the system and this hinders the maximum utilization of data analytics, (2) increases continuous audit scenarios, especially for potential fraud and

anomalous transactions that often occur. Thus it can improve the company's internal control, (3) the audit management system must be integrated with enterprise risk management to make it easier for auditors to detect company risks in the audit process, (4) internal audit develops types of data analytics from descriptive analytics to predictive analytics so that the system can detect when and where anomalous transactions occur, (5) Management provides training to auditors and monitors the development of auditor competencies related to the use of data analytics in audits on a regular basis.

Educational institutions are expected to be able to develop and form practical curricula related to the development of skills in the use of data analytics. It aims to prepare graduates to have skills in applying data analytics for problem solving as well as designing rekosoftware that supports the audit process. Suggestions for the regulator are expected to establish audit standards that can introduce the use of useful technology to improve audit performance and not only focus on the specifics of using certain technologies and regulators are expected to be able to conduct training related to the importance of data analytics for auditors.

This research is limited to one case study object, namely a company engaged in the distribution of motorcycles,spare partsas well as some other subsidiary lines, Limited access given by informants so they cannot provide direct observation of utilizationdata analyticsused by PT. XXX, and This research is limited within the TOE conceptual framework. Suggestions for further research are : (1) use quantitative data collection through questionnaires (2) this research can be expanded in the context of other industries so as to broaden knowledge (3) use a research framework outside the TOE framework (4) carry out analysiscost benefitson adoption and benefitsdata analytics (5) further research can linkdata analyticswith other types of technology such asblockchainsorartificial intelligence (6) develop the use of technologies such as: blockchainsandartificial intelligenceto help auditors analyze data in the audit process.

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APPENDIX

Appendix 1. Technology, Organization, and Environment (TOE)
Framework in the adoption of data analytics

Previous research	Context		
	Technology	**Organization**	**Environment**
(Widuri, 2016)	Compatibility with IT which exists	Audit approach/methodology	Needs/expectations from existing standard
	Compatibility with IT client	Audit office size	Availability of auditors with IT expertise
	Suitability to the task	Auditor behavior	Client's needs and expectations
	Complexity	Auditor experience	Client's size and industry
	Sharing capability information	Company policies and support	External investment expectations
		IT budget	Software provider
	Language compatibility	Auditor with IT expertise	Regulator
	Ease of use	IT support staff	
		Study fee	
(Li et al., 2018)	IT Complexity	Support management	Professional help
	Competency Technology	Size	Standard
(Krieger et al., 2021)	Technological complexity	Technology skills	Client complexity & Client preferences
	Technology needs	How to acquire technology skills	Market competition
	Technology advantage	Technology challenge	Audit specific requirements
		Company size, structure, context	Audit assignment structure
		Auditor relationship with a client	

Appendix 2 Table of Interview Questions

	Question	Source	Research Questions
	This interview begins with demographic questions related to your work experience in using analytical data in internal audit assignments.		

1.	How long have you worked at company XXX?
	    A. > 1 Year
	    B. 5 – 10 Years
	    C. > 10 Years
			1 & 2

2.	What is your position in company XXX?
	    A. Junior Auditor
	    B. Senior Auditor
	    C. Audit Manager
	    D. Head of Internal Audit
	    E. Etc., e.g.:…………………
			1 & 2

3.	How long have you been familiar with data analytics?
	    A. < 5 Years
	    B. 5 – 10 Years
	    C. > 10 Years
			1 & 2

Data Analytics Usage			
	Next is the question regarding the use of data analytics in internal audit activities. In answering the following questions, you are requested to refer to your experience when carrying out the audit		
Questions about Technology			
1.	What type of analytic data do you use at company XXX?	(Muliawan, 2015)	2
2.	How long have you been using the data analytic software?	(Muliawan, 2015)	2
3.	What do you use data analytics for in your audit work?	(Muliawan, 2015)	2
4.	What procedures / steps do you usually do when using (data analytics software) to complete an examination task?	(Muliawan, 2015)	2
5.	What are the advantages of using data analytics as well? What are your weaknesses in your job?	(Muliawan, 2015)	2

6.	What is your opinion regarding the impact of data analytics in improving the quality of the audit process?	De Santis & D'Onza, 2020)	2
7.	Does the company consider compatibility factor in data analytics adoption?	(Chong & Olesen, 2017)	1
8.	Is the level of ease of use of the software a management consideration in adopting data analytics?	(Chong & Olesen, 2017)	1
9.	What conditions or factors have you experienced that prevented you from achieving a high quality examination?	(Muliawan, 2015)	1 & 2
10.	What are your actions if there are disturbances and obstacles when using data analytics software?	(Tang, JJ and Karim, KE 2017)	2
11.	What are your views on doing traditional audit work and auditing with software?	(Tang, JJ and Karim, KE 2017)	2
12.	Why do organizations decide to leverage data analytics?	(Rakipi et al., 2021)	1
13.	Is management support important in adopting data analytics? Who is involved in the decision to use data analytics software?	(Rakipi et al., 2021)	1
14.	What are the factors that can influence data adoption *analytics*in carrying out the audit in your office?	(Dagilienė & Klovienė, 2019)	1
15.	What are the things that hinder the use of data analytics at PT. XXX? What makes you continue to use existing data analytics software?	(De Santis & D'Onza, 2020)	1
16.	Is the size of the company a driving factor in the adoption of data analytics at PT. XXX?	(Chong & Olesen, 2017)	
17.	Are auditing standards and regulations a driving factor for the adoption of data analytics in your company? (Regulations/government)	(Widuri et al., 2016)	1
18.	How are competitive pressures a factor to be considered in the adoption of data analytics? (Competition)	(Schull & Maslan, 2018)	1