UTILISATION OF BIG DATA ANALYTICS IN ACCOUNTING INFORMATION SYSTEMS TO IMPROVE THE QUALITY OF CORPORATE FINANCIAL DECISION MAKING

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Abstract

The utilisation of Big Data Analytics (BDA) in accounting information systems provides significant transformation opportunities in the company's financial decision-making process. This study aims to analyse the role of BDA in improving the quality of financial decisions through a literature study approach that reviews various research results and recent scientific publications. The results show that BDA integration enables real-time financial data processing, anomaly detection, trend prediction, and more accurate and comprehensive multidimensional analysis. BDA also contributes to improved audit efficiency, risk management, and integration of financial data with external data to support evidence-based strategic decisions. However, challenges such as the need for large technological infrastructure, data security, human resource competence, and implementation costs are still obstacles that need to be overcome. With the right management strategy, BDA can be an important tool in supporting the transformation of modern accounting functions and strengthening the competitiveness of companies in the digital era.

Keywords: Big Data Analytics, accounting information system, financial decision making, audit, digital transformation.

Introduction

The utilisation of Big Data Analytics (BDA) in accounting information systems has become one of the important breakthroughs in the modern business world. The rapid development of information technology has encouraged companies to adapt to increasingly large, diverse, and complex data flows. In this digital era, data does not only come from internal financial transactions, but also from various external sources such as social media, IoT sensors, and global market reports. Thus, data management and analysis are both a challenge and a new opportunity for companies to improve the quality of financial decision-making (Nugroho, 2021) .

Big Data Analytics gives companies the ability to process data in large volumes, high speed, and very diverse variations. Through the application of BDA, accounting information systems can produce more accurate, relevant and timely information. This

is very important in supporting management to make strategic decisions that are data-driven decision making. This transformation also encourages a paradigm shift in the management of accounting information, from simply recording transactions to predictive and prescriptive analytical tools (Li, 2021) .

One of the main advantages of BDA is its ability to detect patterns, trends, and anomalies hidden behind a company's financial data. With in-depth analysis, companies can identify risks, opportunities, and potential fraud earlier (Zhang, 2022) . In addition, BDA enables the audit process to be based on population, rather than just sample testing, making the audit results more valid and accountable. The application of this technology has been proven to increase the effectiveness and efficiency of the audit process and strengthen the internal control function (Sari, 2023) .

In Indonesia, the application of BDA in accounting information systems has also begun to be adopted by various institutions, including the Supreme Audit Agency (BPK). The development of e-Audit and data warehouse applications is a strategic step to support big data-based audit processes. This initiative is in line with global efforts to improve transparency, accountability and quality of financial reports through the utilisation of the latest technology. Thus, BDA not only provides benefits at the corporate level, but also in the public sector in the context of better management of state finances (Marie Younis, 2020) .

However, the utilisation of BDA is inseparable from various challenges. One of them is the limitation of human resources who have competence in data analytics and accounting simultaneously. In addition, integration between structured and unstructured data is still a technical obstacle that requires innovative solutions. Another challenge is the need for adequate technological infrastructure and data protection and privacy that must be maintained in accordance with applicable regulations (Susanto, 2021) .

However, the opportunities offered by BDA far outweigh the challenges. With the right implementation strategy, companies can optimise the use of BDA to support various business functions, ranging from budget planning, cost control, to financial performance evaluation. BDA can also be used to simulate and predict future financial conditions, so that companies can be better prepared to face increasingly competitive market dynamics (Gunawan, 2024) .

In addition, the application of BDA in accounting information systems also encourages the birth of new business models that are more adaptive and responsive to changes in the external environment. Companies that are able to optimally utilise data will have a competitive advantage that is difficult to match. This is in line with the concept of value creation through effective and efficient information management (Pratama, 2021) .

In the context of financial decision-making, BDA provides a strong foundation for conducting evidence-based analyses. Information generated from the analytical

process can be used to support investment, financing, and risk management decisions more objectively. Thus, the quality of corporate financial decisions can be significantly improved (Setiawan, 2023) .

Previous studies have also shown that the implementation of BDA in accounting information systems has a positive impact on company performance. Increased accuracy, speed, and relevance of financial information are the main factors that support the achievement of organisational goals. In addition, the use of BDA also contributes to increased transparency and accountability in financial reporting (Wang, 2024) .

The urgency of BDA utilisation is getting higher along with the increasing expectations of stakeholders on the quality of financial information. Companies are required to be able to provide financial reports that are not only timely, but also reliable and easy to understand. In this case, BDA is an effective solution to meet these demands (Ahmed, 2024) .

Finally, the utilisation of Big Data Analytics in accounting information systems is an unavoidable strategic move in the digital era. Companies that are able to adopt and develop this technology will have a greater chance to survive and thrive in the midst of global competition. Therefore, a literature review on the utilisation of BDA in accounting information systems is highly relevant to be conducted in order to provide a comprehensive understanding of the benefits, challenges, and implications of its implementation in improving the quality of corporate financial decision-making.

Research Methods

The research method used in this study is a qualitative approach based on a literature study, where researchers collect and review various relevant sources such as scientific journal articles, books, and research reports that discuss the use of Big Data Analytics in accounting information systems for corporate financial decision making (Adlini & et al., 2022) . The selected literature focused on key issues related to technology integration, the role of data in decision making, and the challenges of BDA implementation by accountants. The analysis process is carried out critically and systematically to identify patterns, concepts, and main themes from the literature findings, so that the results can be formulated in a structured descriptive form and provide a comprehensive picture of this research topic (Evanirosa & et al., 2022) .

Results and Discussion
Integration of Big Data Analytics in Accounting Information Systems

The integration of Big Data Analytics (BDA) into Accounting Information Systems (AIS) has changed the traditional paradigm of financial data management by utilising analytics capabilities based on data volume, velocity and variety. This transformation enables real-time processing of structured and unstructured data, improving the

accuracy of financial reporting through the identification of patterns and anomalies that were previously difficult to detect. BDA's technology architecture that combines machine learning and AI strengthens the system's predictive capabilities in presenting financial projections based on historical data and market trends (Susanto, 2021) .

The impact of BDA integration is reflected in the improved quality of strategic decision-making through multivariate analyses that combine financial data with non-financial variables such as consumer preferences and industry dynamics. BDA-based systems facilitate evidence-based analysis approaches by providing interactive dashboards and complex data visualisations to support managerial decisions. In addition, this technology increases the transparency of financial statements through population-based auditing of data, reducing the risk of oversight and improving the reliability of information (Santoso, 2023) .

The implementation of BDA in AIS faces technical challenges such as the need for high computing infrastructure to process data on an exabait scale and the complexity of integration between heterogeneous platforms. Data security aspects are a critical concern given the sensitivity of financial information, requiring the implementation of strict encryption and access control frameworks in accordance with data protection regulations. On the HR side, the adoption of BDA requires upskilling of accountants' competencies in data science and interpretation of analytical algorithms (Fauzi, 2023) .

BDA integration also revolutionises the audit process by automating substantive testing and financial forensic analysis using pattern recognition techniques. Auditors can identify material misstatement risks more proactively by comparing client data against industry benchmarks and historical patterns. This technology also improves audit efficiency by reducing manual examination time and increasing the scope of analysis (Mahmudi, 2024) .

Strategically, BDA creates competitive advantage through optimisation of resource allocation based on market demand prediction and business scenario simulation. The system integrated with IoT and cloud computing enables continuous monitoring of financial performance, supporting agile decision-making in a volatile business environment. However, successful implementation depends on the maturity of data governance and management commitment in building a data-driven organisation culture (Davis, 2022) .

Recent developments show the convergence of BDA with blockchain technology in improving transaction traceability and reducing the risk of data manipulation. This integration strengthens the integrity of the accounting system through transparent distributed bookkeeping and an immutable audit trail. In the future, the development of an ethical framework of AI-based accounting algorithms and standards to ensure the sustainability of BDA implementation in AIS.

The Impact of Big Data Integration on the Quality of Financial Decision Making

The integration of Big Data in accounting information systems significantly improves the quality of financial decision-making through improved prediction accuracy and multidimensional analysis. With the integration of Big Data, companies can utilise fast and accurate data analysis to improve operational efficiency and strengthen risk management and fraud detection (Warren, 2021) . Through the analysis of transaction patterns and customer behaviour, accounting information systems integrated with Big Data are able to detect potential risks and suspicious activities more effectively, so that companies can take more timely preventive measures. In addition, the use of artificial intelligence technology and predictive analytics in financial data management also supports more informative and strategic decision making, including the development of investment strategies and portfolio optimisation based on real-time analysis of market data, news, and social media sentiment (Patel, 2023) .

The real-time analysis enabled by BDA reduces latency in strategic decision-making, enabling rapid response to exchange rate fluctuations, changes in market demand or global economic turmoil. The technology facilitates simultaneous monitoring of macro and micro financial indicators, improving timeliness in executing hedging strategies or reallocating investment portfolios. Machine learning-based predictive models in BDA are able to simulate various business scenarios considering complex variables, reducing the risk of strategic errors through comprehensive *what-if analysis* (Smith, 2024) .

In risk management, BDA integration enables a multivariate approach that combines historical data, industry trends, and external factors such as government policies or natural disasters. The system is able to detect early warning signs for bad debts or commodity fluctuations with greater sensitivity, increasing the effectiveness of risk mitigation by 40% in the banking sector. AI-based anomaly detection capabilities are also revolutionising fraud detection by scanning millions of transactions per second, reducing financial fraud losses by 60% compared to traditional sampling methods (Zhang, 2022) .

Optimisation of market analysis through integration of external data such as consumer sentiment on social media and global commodity prices enriches the investment decision base. The heterogeneous data correlation technique in BDA yields a coefficient of determination (R^2) of up to 0.85 for stock movement prediction, reducing reliance on subjective intuition. On the resource allocation side, BDA enables worst-case scenario-based *stress testing* simulations, optimises cash flow through more accurate debt cycle predictions and reduces idle cash by 18% (Harris, 2021) .

Transparency of financial decisions is increased through a digitised audit trail that captures the entire process from data analysis to policy formulation. This system fulfils the demands of regulatory accountability while strengthening stakeholder trust. With a comprehensive digital audit trail, every step in the process of processing and analysing

financial data can be verified and traced, thus minimising the possibility of manipulation or misrepresentation of information (Putra, 2022) . The audit process, both internal and external, plays an important role in ensuring that the financial statements produced have undergone independent evaluation and meet applicable accounting standards, thereby increasing the reliability of the information received by stakeholders. The transparency realised through these digital audits not only strengthens management accountability, but also increases the confidence of investors, creditors and the wider public in the integrity and performance of the organisation as a whole (Chen, 2022) .

Implementation challenges include the need for high computing infrastructure to process exabait data and the complexity of integrating legacy systems. Algorithmic ethical issues such as data bias and *black box decision-making* require a robust governance framework to ensure fairness in automated decisions. Going forward, convergence of BDA with blockchain and development of *explainable AI* (XAI) are in focus to improve data integrity and transparency of algorithmic logic (Rahman, 2021) .

Overall, Big Data integration holistically improves the quality of financial decisions through the pillars of accuracy, speed and depth of analysis. Successful implementation hinges on the synergy between technical capabilities, data governance maturity, and enhanced HR competencies in a data-driven ecosystem.

Technical and managerial challenges in technology adoption today

The adoption of cutting-edge technologies such as Big Data in accounting and auditing presents complex technical and managerial challenges. One of the key technical challenges is the need for adequate technology infrastructure, including hardware, analytics software, and data storage systems capable of handling the enormous volume, velocity, and diversity of data. Significant investment is required to build this infrastructure, and it is often a major obstacle especially for smaller companies that have financial limitations (Siregar, 2022) .

In addition, data quality and integration are crucial issues. Data coming from various internal and external sources is often unstructured, incomplete, or contains errors, making it difficult to analyse and make decisions. Poor data management can decrease the reliability of analytics results and potentially lead to inaccurate decisions (Dewi, 2023) .

Data security and privacy are also major concerns in the adoption of Big Data technologies. Sensitive financial information must be protected from the risk of leakage, misuse, or violation of regulations such as GDPR. Companies need to implement strict cybersecurity protocols, encryption, and access control to ensure the protection of client and organisational data (Lee, 2022) .

The next challenge is the lack of human resources with technical and analytical expertise in Big Data. Many traditional accountants and auditors do not have the skills to optimally utilise advanced analytical tools, hence the need for continuous training

and competency development. Collaboration with educational institutions and technology providers is also crucial to create an ecosystem of competent human resources (Kumar, 2023) .

The complexity of the system and the process of integrating new technology into existing systems often leads to change resistance at the managerial and operational levels. Changes in organisational culture towards data-driven decision making require top management commitment and effective socialisation so that all lines of the organisation can accept and adopt new technology (Kurniawan, 2022) . In addition to technical aspects, managerial challenges also arise in the form of change management. Management must be able to manage the transition from conventional systems to Big Data-based systems without disrupting business operations, as well as ensuring that all processes run according to good governance. Lack of planning and adoption strategy can lead to implementation failure and waste of resources (Othman, 2023) .

Another challenge is ensuring the quality and reliability of the data used in the analyses. Invalid or irrelevant data can produce misleading analytical outputs, so a strict quality assurance mechanism is needed at every stage of data management. Data testing and validation are important steps before data is used in the decision-making process (Widodo, 2022) .

Budget constraints are also often a barrier, especially for small and medium-sized enterprises. The costs of technology implementation, HR training, and infrastructure maintenance often exceed the company's financial capacity, so prioritisation strategies and collaboration with third parties are needed to overcome these limitations (Brown, 2020) .

Technology risk management is also an important aspect that must be considered. Excessive reliance on automated systems can reduce auditors' professional scepticism and increase the risk of oversight of potential errors or data manipulation that are not detected by algorithms. Therefore, the balance between the use of technology and professional judgement must be maintained (Nugroho, 2021) .

The next challenge is the need for regulation and governance that is adaptive to technological developments. Rigid regulations can stifle innovation, while a lack of regulation can increase the risk of data misuse and ethical breaches. Adapting responsive regulatory frameworks is necessary for safe and responsible technology adoption (Li, 2021) .

In addition, the speed of technological development requires companies to continuously update systems and processes on a regular basis. Lagging behind in technological updates can cause companies to lose competitiveness and be unable to optimally utilise the opportunities offered by Big Data (Zhang, 2022) .

Finally, organisations must also be able to manage stakeholder expectations regarding the outcome of technology implementation. Too high expectations without

sufficient understanding of the technology's limitations can lead to further disappointment and resistance within the organisation. Therefore, transparent communication and continuous education are key in dealing with the technical and managerial challenges of technology adoption today.

Conclusion

The utilisation of Big Data Analytics in accounting information systems has proven to have a significant positive impact on the quality of corporate financial decision-making. Through broader, faster and more accurate data analysis, companies can identify patterns, trends and financial risks in a more comprehensive and predictive manner. Big Data Analytics enables the integration of data from various sources, both structured and unstructured, thus supporting the process of budget planning, risk mitigation, liquidity management, and investment evaluation with a higher level of accuracy. The results also show that data-driven decision-making supported by Big Data Analytics directly contributes to improving the performance and competitiveness of companies in the digital era.

However, to obtain optimal benefits from Big Data Analytics, companies need to ensure the readiness of technology infrastructure, human resource competence, and good data governance. Challenges such as data quality, security, privacy, and system integration must be addressed so that the analysis process runs effectively and the results are reliable. With proper management, the utilisation of Big Data Analytics in accounting information systems not only improves operational efficiency, but also strengthens the basis for more responsive, adaptive and evidence-based financial decision-making, thus supporting long-term business sustainability.

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