THE ROLE OF MATHEMATICS IN ISLAMIC ACCOUNTING: EVALUATION, CHALLENGES, AND IMPLICATIONS

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis peran penting matematika dalam akuntansi syariah, terutama dalam hal evaluasi dan penghitungan transaksi keuangan yang selaras dengan prinsip syariah Islam. Prinsip-prinsip ini melarang riba, gharar, maysir, dan mendorong muamalah yang halal, mencakup penghitungan zakat, pembagian laba, dan analisis keuangan yang komprehensif. Melalui tinjauan literatur ekstensif, penelitian ini mengkaji peran matematika dalam berbagai aspek akuntansi Islam, termasuk pengaruhnya pada kualitas laporan keuangan, kepatuhan syariah, dan pengambilan keputusan finansial. Referensi spesifik dibuat pada karya-karya seperti Lewis (2001), Kamla (2009), Hassan dan Mollah (2018), serta Zaky dan Warsono (2022) untuk menyoroti pendekatan Quranik dalam pengajaran akuntansi Islam dan aplikasinya dalam praktik. Hasil penelitian menunjukkan bahwa penggunaan matematika dalam akuntansi syariah meningkatkan kualitas laporan keuangan dan efisiensi dalam perhitungan keuangan dan pajak. Selain itu, matematika berperan penting dalam penghitungan margin keuntungan dan audit akuntansi syariah. Namun, tantangan teridentifikasi, termasuk konflik potensial antara prinsip syariah dan metode matematika konvensional, serta keterbatasan dalam situasi kompleks. Studi ini menghadapi keterbatasan dalam bentuk ketergantungan pada teknologi, perlunya keterampilan dan pelatihan khusus, serta batasan metodologis dalam menghadapi kompleksitas praktik akuntansi syariah. Temuan penelitian ini mendukung kebutuhan pengembangan metode matematika yang lebih sesuai dengan prinsip syariah, peningkatan keterampilan matematika, dan pengurangan ketergantungan pada teknologi. Implikasi ini menawarkan wawasan tentang bagaimana matematika dapat membantu memastikan kepatuhan transaksi keuangan terhadap prinsip syariah dan meningkatkan pengambilan keputusan finansial yang bijaksana, sambil menyoroti perlunya strategi untuk mengatasi tantangan yang ada.

Kata Kunci: Matematika, Akuntansi Syariah, Prinsip Syariah, Keuangan Islam, Audit Syariah, Kualitas Laporan Keuangan.

ABSTRACT

This research aims to analyze the significant role of mathematics in Islamic accounting, particularly in the evaluation and calculation of financial transactions that comply with Islamic Sharia principles. These principles prohibit riba, gharar, maysir, and encourage halal muamalat, including zakat calculation, profit sharing, and comprehensive financial analysis. Through extensive literature review, this research examines the role of mathematics in various aspects of Islamic accounting, including

its influence on the quality of financial reports, Sharia compliance, and financial decision making. Specific references are made to works such as Lewis (2001), Kamla (2009), Hassan and Mollah (2018), and Zaky and Warsono (2022) to highlight the Quranic approach in teaching Islamic accounting and its application in practice. The research findings indicate that the use of mathematics in Islamic accounting enhances the quality of financial reporting and efficiency in financial and tax calculations. Additionally, mathematics plays a crucial role in profit margin calculation and Sharia accounting audits. However, challenges are identified, including potential conflicts between Sharia principles and conventional mathematical methods, as well as limitations in complex situations. This study faces limitations in the form of dependence on technology, the need for specific skills and training, and methodological constraints in dealing with the complexity of Sharia accounting practices. The research findings support the need for the development of mathematical methods more aligned with Sharia principles, improvement in mathematical skills, and reduction of dependence on technology. These implications offer insights into how mathematics can help ensure compliance of financial transactions with Sharia principles and enhance wise financial decision making, while highlighting the need for strategies to overcome existing challenges.

***Keywords**: Mathematics, Islamic Accounting, Sharia Principles, Islamic Finance, Sharia Audit, Financial Report Quality.*

INTRODUCTION

Mathematics plays a crucial role in the field of Islamic accounting as it aids in evaluating and accounting for financial transactions that comply with Sharia principles (Latif & Ahmad, 2021). In Islamic accounting, it is essential to adhere to Sharia principles to ensure that all financial transactions conform to Islamic law. These principles include the prohibition of riba (interest), gharar (uncertainty), maysir (gambling), and engaging in halal transactions (lawful dealings) (Faruq, 2021). Mathematics helps in calculating and accounting for financial transactions that adhere to these principles.

Mathematics is vital in Islamic accounting, particularly in ensuring compliance with Sharia principles such as fairness, honesty, and the equitable distribution of investment risks and rewards. Lewis (2001) emphasizes that accounting in an Islamic context, including financial aspects and transactions, must conform to Sharia law. Islamic accounting possesses a comprehensive ethical framework that governs how business and finances are conducted (Lewis, 2001). Kamla (2009) highlights the

importance of the social and moral aspects in Islamic accounting, demonstrating how mathematics plays a key role in achieving these objectives (Kamla, 2009). Hassan and Mollah (2018) assert that Islamic accounting ensures adherence to Maqasid al-Shari'ah (the objectives of Islamic law) and aids in making prudent financial decisions (Hassan et al., 2018). Ather and Ullah (2009) discuss the features and goals of Islamic accounting, including how it differs from traditional accounting and how mathematics assists in incorporating Islamic principles into accounting (Ather & Ullah, 2009). Zaky and Warsono (2022) demonstrate how an Al-Qur'an-based approach to teaching Islamic accounting can enhance learning outcomes, including understanding the application of mathematics in Islamic accounting (Zaky & Warsono, 2023).

For instance, when calculating zakat on owned wealth, mathematics is employed to determine the zakat percentage that should be paid based on the total value of an individual's assets. Additionally, mathematics is used to calculate the profit percentage that should be shared between business owners and investors in Islamic accounting. Furthermore, mathematics is also utilized for financial analysis and measuring business performance in Islamic accounting. This analysis includes financial ratios such as liquidity ratios, profitability ratios, and debt ratios, which help in assessing the financial health of a business. Overall, mathematics is crucial in the field of Islamic accounting because it helps ensure that all financial transactions comply with Sharia principles and can be used to measure business performance.

Moreover, mathematics is also used in the process of calculating profit margins on products or services sold in Sharia-compliant businesses. The profit margin earned must adhere to Sharia principles and not violate the prohibitions on riba (interest) or gharar (uncertainty) in financial transactions. Mathematics is also employed in the audit and verification processes of Islamic accounting. An Islamic accounting audit involves assessing a business's compliance with Sharia principles in their financial transactions and accounting. Mathematics is used in performing calculations and verifying business financial data and ensuring that financial reports and accounting records are in accordance with Sharia principles. Additionally, mathematics is important in the calculation of tax liabilities in Islamic accounting. Mathematics is used

to calculate the taxes that must be paid by businesses and individuals based on applicable tax rules and requirements. Thus, mathematics plays a vital role in Islamic accounting. The use of mathematics in Islamic accounting assists in ensuring that all financial transactions conform to Sharia principles and can be utilized to gauge business performance. Additionally, mathematics aids in the audit and verification processes of Islamic accounting, the calculation of profit margins, and the determination of tax obligations.

There are several reasons why mathematics is critically important in the field of Islamic accounting. Here are some of the main reasons: Firstly, Ensuring Sharia Compliance: Sharia compliance enhances the quality of financial reporting, as demonstrated in a study observing companies across 15 predominantly Muslim countries. This study found that Sharia-compliant firms had lower accrual anomalies and less aggressive auditing, indicating better financial reporting quality (Noor & Sopian, 2023). Secondly, Improving the Quality of Financial Reports: Another study on waqf (Islamic endowment funds) found that while various Islamic-based organizations used different accounting practices, they remained in accordance with the Standards of the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI). However, this study also highlighted the need for more transparent disclosures in line with Sharia requirements (Che Azmi & Hanifa, 2015). Thirdly, Enhancing Efficiency and Accuracy: A 2023 study emphasizes the anticipation of unique standards for Islamic Financial Institutions (IFIs) in Malaysia by the Malaysian Accounting Standards Board, stressing the role of external Sharia audits in ensuring compliance and efficiency (Abdul Rahim et al., 2024). Fourthly, Assessing Business Performance: Research on Sharia-compliant business practices shows positive long-term financial effects, such as increased Return on Assets (ROA) and Return on Sales (ROS), affirming the effectiveness of Sharia compliance as a managerial strategy (Pepis & de Jong, 2019).

Mathematics is extremely important in the field of Islamic accounting as it helps in ensuring business compliance with Sharia principles, improving the quality of financial reports and accounting records, enhancing efficiency and accuracy in

financial calculations, and aiding in measuring business performance and conducting financial analysis.

Despite the critical role of mathematics in Islamic accounting, there are some challenges that might arise in its use: Firstly, Conflict Between Sharia Principles and Mathematics: Lewis (2001) explains that Islamic accounting is governed by Sharia law, which regulates all aspects of a Muslim's life. This poses unique challenges, including potential conflicts between Sharia principles and conventional mathematical methods (Lewis, 2001). Secondly, Limitations of Mathematical Methods: Kamla (2009) highlights that the emphasis on the social and moral role in Islamic accounting could lead to a narrower, more mechanistic approach, indicating limitations of mathematical methods in more complex Islamic accounting (Kamla, 2009). Thirdly, Dependence on Technology: Abozaid (2016) points out that while technology is crucial in Islamic accounting, the internal challenges faced by the Islamic financial industry include dependence on technology, which can lead to security and data privacy risks (Abozaid, 2016). Fourthly, Skills and Training: Zaky and Warsono (2022) discuss the importance of an effective educational approach to teaching Islamic accounting, including mathematics, underscoring the need for specialized skills and training (Zaky & Warsono, 2023).

To address this issue, efforts are needed to develop mathematical methods that align with Sharia principles in Islamic business and finance, enhance skills and training in the use of mathematics in Islamic accounting, and reduce reliance on technology while increasing data security and privacy.

Several findings from research related to methods in Islamic accounting, Islamic financing, financial statement analysis, financial forecasting, financial modeling, taxation, and financial audit within the context of Islamic finance are outlined below: Islamic Accounting Methods: Alshater et al. (2022) explored the literature on Islamic accounting and identified global research trends for accounting in Islamic financial institutions, including accounting for waqf, zakat, Sharia audits, and corporate Sharia governance (Alshater et al., 2022). Islamic Financing Methods: Kharisova et al. (2018) discussed the financial accounting standards for Islamic financial institutions

developed by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) (Kharisova et al., 2018). Financial Statement Analysis: Kamla (2009) explored the potential of contemporary Islamic accounting research and its practices to contribute to a more emancipatory and enabling critical accounting (Kamla, 2009). Financial Forecasting: Lysenko and Akimov (2023) investigated the impact of forecasting methods and tax planning on decision-making in the areas of taxation, auditing, and analysis (Aleskerova et al., 2023; Matukhno et al., 2023). Financial Modeling: Voronova and Umarov (2021) discussed Islamic accounting models (partner) and their comparison with International Financial Reporting Standards (IFRS), including how these models differ from other accounting models (Voronova & Umarov, 2021). Taxation: Ma'wa, Indarningsih, and Irnandas (2023) researched the impact of Islamic Corporate Governance, Islamic Social Reporting, financial performance, and tax avoidance in Indonesian Islamic banks (Ma'wa et al., 2023). Financial Audit: Agriyanto (2016) examined the readiness of Islamic economic actors to face mandatory audits by public accounting firms, including understanding of Sharia transactions and mechanisms such as sharf and profit-sharing banks (Agriyanto, 2016).

These studies demonstrate a diverse and in-depth approach to specific aspects of Islamic accounting and finance, highlighting how Sharia principles are integrated into contemporary accounting and financial practices. Research Methods Used in Studies on the Role of Mathematics in Islamic Accounting: Literature Studies and Theoretical Analysis: Kamla (2009) conducted a critical analysis of contemporary Islamic accounting research, emphasizing social and moral aspects, which helps in understanding the concepts and principles of Islamic accounting and relevant mathematics (Kamla, 2009). Surveys and Literature Analysis: Alshater et al. (2022) adopted a survey approach with literature analysis to identify global research trends in accounting for Islamic financial institutions (Alshater et al., 2022). Case Studies and Experimental Approaches: Zaky and Warsono (2022) used an experimental field design with pre-tests and post-tests to understand the impact of a Quranic approach in learning Islamic accounting (Zaky & Warsono, 2023). Descriptive and Qualitative

Analysis: Alam (2022) adopted a descriptive analysis approach to examine Islamic accounting research, including issues, contexts, methods, and theoretical paradigms over the last 30 years (Alam, 2022). Regression Analysis and Quantitative Methods: While no specific studies were found in the sample using regression analysis, quantitative methods such as these can be used to study the relationship between mathematics and Islamic accounting. Mixed Methods Approach: Abdullahi (2018) explored Islamic economic methodologies, particularly in the use of mathematical models to build Islamic economic theory, providing insights into the use of mathematics in Islamic accounting (Abdullahi, 2018).

DISCUSSION

Mathematics can assist in ensuring business compliance with Sharia principles.

The application of mathematics to ensure business compliance with Sharia principles encompasses several important aspects, including: Development of Sharia Financial Products: Ghazali et al. (2019) developed a new formula for Islamic home financing, where profit is calculated based on a third of the total financing amount. This mathematical model aids in the development of Sharia financial products that meet Sharia principles (Ghazali et al., 2019). Financial Data Analysis: Can (2020) found that Sharia compliance enhances financial reporting quality by reducing discretionary accruals and audit aggressiveness. This highlights the importance of statistical analysis in ensuring business compliance with Sharia principles (Can, 2020). Use of Blockchain: Muryanto (2022) underscores the importance of Sharia compliance settings for Islamic Fintech. In this context, blockchain technology can support transparency and Sharia compliance in the Islamic financial sector (Muryanto, 2022). Sensitivity Analysis and Decision Theory: Pepis and de Jong (2019) explored the long-term effects of Sharia-compliant business practices on financial performance, showing that Sharia compliance has positive implications on the long-term value of companies. This indicates the critical role of sensitivity analysis and decision theory in ensuring business compliance with Sharia principles. Optimization of Investment Portfolios: Guizani and Abdalkrim (2022) provide new evidence on the impact of Sharia

compliance on internal capital allocation efficiency, showing that Sharia compliance can reduce financial constraints and improve efficient capital allocation (Guizani & Abdalkrim, 2022). These studies demonstrate that mathematics plays a critical role in ensuring business compliance with Sharia principles, whether in product development, financial analysis, technology use, decision-making, or investment allocation.

The use of mathematics in Islamic accounting can enhance the quality of financial reports and accounting records.

The use of mathematics in improving the quality of financial reports and accounting records in Islamic accounting includes aspects such as the development of Islamic financial models, qualitative analysis, and technology integration, including: Development of Islamic Financial Models: Ghazali et al. (2019) developed a new mathematical model for Sharia home financing. This model helps in calculating risks and developing payment schemes that adhere to Sharia principles (Ghazali et al., 2019). Infusing Islamic Financial Literacy in Mathematics Education: Kusumawati et al. (2023) examine how mathematical approaches can be applied in Islamic financial education. They developed a framework for integrating Islamic financial literacy with mathematics education in Islamic schools (Kusumawati et al., 2023). Qualitative Characteristics of Accounting Information in Islamic Financial Institutions: Cheng (2011) discusses the qualitative characteristics of accounting information within the financial reporting framework for Islamic financial institutions, highlighting the importance of principles such as the relevance and reliability of accounting information (Cheng, 2011). Integration of AI in Islamic Banking: Mbaidin et al. (2024) investigate the impact of integrating artificial intelligence (AI) in enhancing the quality of financial reporting in the Islamic banking industry. The study states that the use of AI can increase transparency and accuracy in financial reporting (Mbaidin et al., 2024). Islamic Corporate Reports: Birton et al. (2022) examine Islamic Corporate Reports (ICRs) and provide insights into how these reports can be reformed to better reflect Islamic value-added principles and financial reporting ethics (Birton et al., 2022). These studies show how mathematics and technology can be leveraged to enhance the

quality of financial reporting in Islamic accounting, both in technical and ethical aspects.

Mathematics can enhance efficiency and accuracy in financial calculations and tax computations.

The use of mathematics in improving efficiency and accuracy in financial calculations and tax computations includes aspects such as the application of mathematical models and technology in accounting and taxation, including: "Accuracy, Complexity, and the Income Tax" by L. Kaplow (1994): This article highlights the importance of accuracy in income taxation and proposes a framework for analyzing the value of accuracy in taxation. It demonstrates how the complexity of income tax affects the accuracy and efficiency of tax computations (Kaplow, 1994). "Optimal Tax Planning with Mathematical Programming Models" by E. Parra (2018): This research explores the use of mathematical programming models in tax planning, helping firms to enhance returns from their investment plans and optimize complex tax systems (Parra, 2018). "The Capabilities of Computers in Accounting" by Mohammad Hekmati et al. (2011): This study describes how computers can enhance efficiency and productivity in accounting tasks such as general bookkeeping, payroll, and other transaction recordings (Hekmati et al., 2011). "Financial Mathematics Using Web Technologies" by Ahmet Sekreter (2012): This article discusses mathematical finance theory and how web-based applications can be used in predicting market behaviors and trends, as well as suggesting investment strategies (Sekreter, 2012). "Economic Model of Tax Authorities' Costs Optimisation and Tax Revenue Receipt" by A. Anisimov (2018): This research explores the development of a uniform system for assessing the performance of tax authorities, including their efficiency systems. The developed economic-mathematical model can optimize the costs of tax authorities (Anisimov, 2018). These studies show how the use of mathematical models and technology in accounting and taxation can enhance the accuracy and efficiency of financial and tax calculations.

Mathematics is used in measuring business performance and conducting financial analysis.

The use of mathematics in measuring business performance and conducting financial analysis includes various methods and approaches, such as: Financial Ratio Analysis: Delen et al. (2013) utilized exploratory factor analysis (EFA) to identify underlying dimensions of financial ratios, followed by predictive modeling methods to find potential relationships between company performance and financial ratios (Delen et al., 2013). Break-Even Point Analysis: Kononenko et al. (2022) highlight the importance of digital economic transformation, enabling companies to respond to market changes and remain competitive. Economic and mathematical methods become crucial tools for corporate economic analysis, including the study of indicator changes and identifying the causes of changes in the context of break-even analysis (Kononenko et al., 2022). Regression Analysis: Venkatraman and Ramanujam (1987) collected data on three dimensions - sales growth, net income growth, and profitability (ROI) - using measurement methods and testing the convergence level among these methods (Venkatraman & Ramanujam, 1987). Variance Analysis: Turlea (2021) emphasizes the importance of performance measurement using indicators that show the efficiency and effectiveness of company activities, including variance analysis which helps in understanding data variability in companies (Turlea, 2021). Time Value of Money: Ende (2017) uses the Economic Value Added (EVA) method to measure financial performance, demonstrating how it can be used to assess investments or projects based on expected returns (Ende, 2017).These studies show how mathematics and statistical methods can be used to measure business performance and conduct financial analysis, providing valuable insights into financial conditions and making better business decisions.

Challenges in Using Mathematics in Sharia Accounting and How to Overcome Them

Challenges in using mathematics in Sharia accounting reveal various important aspects, including issues of interpretation, data limitations, complexity, and security, such as: Interpretation Issues and Data Limitations: Lewis (2001) outlines that Islam

has authority over the totality of a Muslim's existence, including in economic, political, religious, and social affairs—accounting included. Accounting, in both a broad and specific sense, is central in Islam, as accountability to God and the community for all activities is crucial to a Muslim's faith. Challenges in Islamic accounting include interpretation and the use of data in accordance with Sharia (Lewis, 2001). Complexity Issues: Kamla (2009) emphasizes that many theoretical, normative, and prescriptive studies in economics, finance, and Islamic accounting highlight the social and moral character of this discipline. This research critiques how modern Islamic accounting sometimes deviates from the social and moral roles it professes, especially due to uncritical adoption of conventional accounting practices and standards. This reflects the challenge of simplifying the complexity of Islamic accounting (Kamla, 2009). Data Security and Privacy Issues: Iqbal and Molyneux (2005) highlight that Islamic banking, like any other system, should be seen as an evolving reality. They review various challenges faced by Islamic banks, including security and data privacy issues that arise in the use of technology in Islamic accounting and finance (Iqbal & Molyneux, 2005). Complex Technology Usage in Mathematics: Zaky and Warsono (2022) identify the effects of a Quranic approach on the understanding of Islamic accounting among accounting students. The study shows that the Quranic approach provides better learning outcomes compared to technical approaches but also highlights challenges in integrating complex mathematical methods and understanding of Sharia accounting (Zaky & Warsono, 2023). These studies indicate that while mathematics provides significant benefits in Sharia accounting, there are challenges such as interpretation, data limitations, complexity, and security that need to be addressed. To face these challenges, a good understanding of Sharia principles along with the use of appropriate and secure technology is required.

Technological advancements can influence the use of mathematics in Sharia accounting.

The impact of technology on the use of mathematics in Sharia accounting highlights several important aspects, including: Islamic Finance and New Technology Challenges: Kamdzhalov (2020) emphasizes that Islamic finance needs to embrace

new IT opportunities to stay relevant in the contemporary financial industry. Blockchain technology, for example, provides maximum transaction security and stimulates crowdfunding, which aligns with the profit and loss sharing paradigm in Islamic finance (Kamdzhalov, 2020). Impact of FinTech on the Financial Performance of Islamic Banking: Siska (2022) investigates how FinTech services affect the financial performance of Islamic banks. The study uses financial ratio data from Bank Syariah Indonesia (BSI) and finds that FinTech services impact BSI's financial performance in terms of financial ratios such as Capital Adequacy Ratio (CAR), Return on Assets (ROA), and Return on Equity (ROE) (Siska, 2022). The Role of Financial Technology in Enhancing Digital Services at Islamic Banks: Ali (2023) examines how financial technology promotes digital services at Islamic banks. This technology enables the development of mobile applications, online banking services, and innovative electronic payment services (Ali, 2023). Impact of FinTech on the Performance of Islamic and Conventional Banks: Yudaruddin (2022) finds that FinTech startups have a negative effect on bank performance, but when interacting with Islamic banks, a greater number of FinTech startups have a positive effect on the performance of Islamic banks, especially in the peer-to-peer lending category (Yudaruddin, 2022). Understanding Islamic Accounting: A Quranic Approach: Zaky and Warsono (2022) prove that a Quranic approach in learning Islamic accounting provides better learning outcomes. This indicates the need for integrating Sharia accounting understanding with modern mathematical technology (Zaky & Warsono, 2023). This research shows that technology, including FinTech and blockchain, can influence how mathematics is used in Sharia accounting, from enhancing transaction security and accounting understanding to financial performance. However, challenges such as integrating technology that complies with Sharia principles and ensuring data security remain areas that need attention.

Skills and Training Needed for Effective Use of Mathematics in Sharia Accounting

The skills and training required for effectively using mathematics in Sharia accounting encompass various aspects, from integrated mathematics education to

Quranic approaches in learning, including: "Infusing Islamic Financial Literacy in Mathematics Education for Islamic Schools" by Kusumawati et al. (2023): This research aims to develop an instructional design for social arithmetic learning using a Mathematics-Based Islamic Financial Literacy (MIFL) framework for Islamic schools. It helps students enhance their numeracy and Islamic financial literacy through various Islamic financial issues as contexts in mathematical tasks (Kusumawati et al., 2023). "Understanding Islamic Accounting: A Quranic Approach" by Zaky and Warsono (2022): This study identifies the effects of a Quranic approach on the understanding of Islamic accounting among accounting students, finding that the Quranic approach yields better learning outcomes in Islamic accounting than technical approaches (Zaky & Warsono, 2023). "Islamic Financial Literacy in Mathematics Education: Proposed Design for Instruction" by Kusumawati et al. (2022): This research proposes a learning design for social arithmetic by integrating Islamic economic principles into mathematical tasks. It aims to support students' Islamic financial literacy skills (Kusumawati et al., 2023). "Islam and Accounting" by M. Lewis (2001): This article discusses accounting within the broad context of Islam, highlighting the importance of accountability to God and the community in all activities, including accounting. It demonstrates the need for a comprehensive understanding of Sharia law in Islamic accounting (Lewis, 2001). "Pragmatic on Islamic Accounting Education" by Sari, Triyuwono, and Djamhuri (2016): This study explores the pragmatic mindset of Islamic accounting students who learn technically, concluding that technical learning can limit the holistic understanding of Islamic accounting that should involve moral and social aspects (Sari et al., 2016). "The Opportunities and Challenges of Islamic Accounting Learning for Vocational Students and Its Application in Islamic Microfinance Institutions" by Nasim, Widarsono, and Riennovita (2016): This study explores the development of Islamic accounting and the effectiveness of teaching in vocational schools to meet accounting workforce needs. It highlights the uniqueness of Islamic accounting in the context of BMT and Sharia Cooperatives (Nasim et al., 2016). These studies underscore the importance of comprehensive and integrated education

and training to develop the necessary skills for using mathematics in Sharia accounting, emphasizing an understanding of Sharia principles and Quranic approaches.

Risks or Negative Impacts of Using Mathematics in Sharia Accounting

The risks and negative impacts of using mathematics in Sharia accounting include various aspects, such as dependency on technology, data processing errors, and security risks: Dependency on Technology and Security Risks: Neifar and Jarboui (2017) investigated the influence of corporate governance mechanisms on the voluntary disclosure of operational risk information in Islamic banks. They found that dependency on technology, especially in terms of operational risk disclosure, increases security risks and data confidentiality issues (Neifar & Jarboui, 2018). Errors in Data Processing: Kabir, Worthington, and Gupta (2015) compared the credit risk levels between Islamic and conventional banks. They discovered that relying solely on accounting information to assess credit risk can be misleading, particularly in Islamic banking. This highlights potential data processing errors in the use of mathematics in Sharia accounting (Kabir et al., 2015). Impact of Systemic Risk on the Performance of Islamic Banks: Al-Sharif (2018) studied the impact of systemic risk on the performance of Islamic banks in Jordan. The research shows that systemic banking risks, including operational risks, affect the performance of Islamic banks. This underscores the importance of effective risk management in the use of mathematics and technology in Sharia accounting (Al-Sharif, 2018). Difficulties in Data Interpretation: Zaky and Warsono (2022) emphasize the importance of a Quranic approach in understanding Islamic accounting among accounting students. The study indicates that a deeper and integrated approach is necessary to understand data generated from the use of mathematics in Sharia accounting (Zaky & Warsono, 2023). These studies indicate that while mathematics provides significant benefits in Sharia accounting, it also carries risks such as technology dependency, data processing errors, security risks, and difficulties in data interpretation that require effective management.

Challenges and Expectations of Mathematics in Sharia Accounting

The challenges and expectations of using mathematics in Sharia accounting cover various important aspects, including: Challenges in Understanding Sharia Principles:

Lewis (2001) emphasizes that accounting within the context of Islam is central, as accountability to God and the community for all activities is core to a Muslim's faith. Islamic accounting poses unique challenges in understanding and implementing Sharia principles in accounting practices (Lewis, 2001). Development of Appropriate Mathematical Models: Kamla (2009) critiques the use and application of Islamic accounting principles in research and practice. The study reveals that many Islamic accounting research projects tend to deviate from the social and moral roles they profess, particularly due to the uncritical adoption of conventional accounting operations and standards (Kamla, 2009). Challenges in Understanding Financial Data: Napier (2009) highlights that historical research on Islamic accounting is still evolving, with studies focusing on accounting practices in the Middle East and other Muslim regions. This research opens insights into challenges in understanding financial data in the context of Islamic accounting (Napier, 2009). Expectations in Enhancing Accuracy and Efficiency: Trokić (2015) discusses the history of Islamic accounting, its influence on conventional accounting, and compares Islamic and conventional accounting from theoretical and practical perspectives. The study also addresses the prospects and challenges of the Islamic accounting system focused on justice and equity (Trokić, 2015). Expectations in Generating More Useful Information: Zaky and Warsono (2022) show that a Quranic approach in learning Islamic accounting yields better results than technical approaches. This underlines the importance of integrating Sharia accounting understanding with modern mathematical technology (Zaky & Warsono, 2023). These studies highlight the importance of a deep understanding of Sharia principles and the challenges in developing appropriate mathematical models, as well as expectations in enhancing accuracy, efficiency, and the quality of information in Sharia accounting.

CONCLUSION

In the field of Islamic accounting, mathematics plays a crucial role in ensuring compliance with Sharia principles, enhancing the quality of financial reports and accounting records, improving efficiency and accuracy in financial and tax

calculations, as well as measuring business performance and conducting financial analysis. However, the use of mathematics in Islamic accounting also presents challenges and risks that need to be considered, such as issues with interpretation and understanding of concepts, the risk of calculation errors, and data security risks.

To effectively utilize mathematics in Islamic accounting, adequate skills and training are required, including proficiency in basic mathematics, understanding of Sharia accounting concepts, and mastery of relevant technology. Furthermore, the ongoing development of technology can influence the use of mathematics in Islamic accounting, both positively and negatively. By addressing challenges and optimizing existing potential, mathematics can significantly contribute to the future development of Islamic accounting. Therefore, professionals in the field of Islamic accounting need to continually enrich their knowledge and enhance their skills in effectively using mathematics to address future changes and challenges.

Findings as an interdisciplinary field, the use of mathematics in Islamic accounting can bring benefits in several aspects such as enhancing the quality of financial reports, improving efficiency and accuracy in financial and tax calculations, and enabling more detailed business performance measurement and financial analysis. However, there are several challenges and risks that need to be addressed in the use of mathematics in Islamic accounting, such as interpretation issues and erroneous decision-making due to data limitations or the mathematical models used. To effectively use mathematics in Islamic accounting, adequate skills and training are required, as well as a deep understanding of Sharia principles and applicable accounting regulations. The theoretical implications of using mathematics in Islamic accounting can contribute to the development of stronger and more detailed Sharia accounting theories, while its practical implications can assist companies and financial institutions in complying with Sharia principles and improving their financial performance.

The contribution of mathematics to Islamic accounting is crucial as it can assist in financial calculations and data analysis quickly and accurately. The use of mathematics can also help ensure business compliance with Sharia principles and

enhance the quality of financial reports and accounting records. However, there are challenges and risks in the use of mathematics in Islamic accounting such as calculation errors, neglect of ethical and social values, and inability to understand Sharia principles. To effectively use mathematics in Islamic accounting, specific skills and training are required. In the future, technological advancements and innovations can enhance the contribution of mathematics to Islamic accounting and streamline financial calculations and data analysis more efficiently and effectively.

Some further research suggestions regarding the role of mathematics in Islamic accounting include: The influence of mathematical model usage on the quality of financial reports of Islamic companies. This research can test the effectiveness of mathematical models in improving the quality of financial reports and compliance with Sharia principles. Analysis of the use of mathematical methods in the calculation of zakat for Islamic companies. This research can discuss which mathematical methods are most effective in calculating zakat for Islamic companies, and how the application of these methods can improve the efficiency and accuracy of zakat calculations. Study on the use of artificial intelligence technology to support the use of mathematics in Islamic accounting. This research can discuss the potential use of artificial intelligence technology to assist in the use of mathematics in Islamic accounting, such as data analysis and financial calculations. The influence of training and development of mathematical skills on the effectiveness of Islamic accountants in using mathematics. This research can test the effectiveness of training and development of mathematical skills on the ability of Islamic accountants to use mathematics in their work. Analysis of the risks and negative impacts of using mathematics in Islamic accounting. This research can discuss the risks and negative impacts that may occur due to the use of mathematics in Islamic accounting, and how to reduce or avoid these risks.

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