International Journal of Research in Engineering, Science and Management
Volume 7, Issue 8, August 2024
https://www.ijresm.com | ISSN (Online): 2581-5792

Hajj Fund Investment Risk Analysis: A Case Study at the Hajj Financial Management Agency (BPKH) in Indonesia

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***Abstract*: This study aims to analyze the investment risks of hajj funds managed by the Hajj Financial Management Agency (BPKH). The investment of hajj funds is an integral part of fund management that significantly contributes to the cost of organizing hajj pilgrimages. Using both quantitative and qualitative approaches, this study identifies key risk factors, including market, credit, operational, and liquidity risks, and their impact on the stability of hajj funds. The analysis is conducted using the Value at Risk (VaR) model and multiple linear regression, along with in-depth interviews with experts and stakeholders. The results indicate that market and credit risks are the primary risks affecting the stability of hajj funds. Additionally, the findings highlight the need for a more comprehensive diversification strategy and enhanced internal risk management by BPKH. The recommendations provided aim to assist BPKH in maximizing investment benefits and minimizing potential losses.**

***Keywords*: Hajj fund investment, BPKH, market risk, value at risk, risk management.**

1. Introduction

The investment of hajj funds by the Hajj Financial Management Agency (BPKH) is a crucial issue in the context of Islamic economics and finance in Indonesia. Effective and efficient management of hajj funds not only impacts the smooth organization of the hajj pilgrimage but also the economic stability of the Muslim community in Indonesia. With the number of Indonesian hajj pilgrims increasing each year, BPKH manages a substantial amount of funds, reaching trillions of rupiahs, which must be optimally invested to ensure the sustainability and security of these funds (Hasan, 2018).

In carrying out its duties, the Hajj Financial Management Agency (BPKH) is governed by Law No. 34 of 2014 on hajj financial management. This law establishes BPKH as an independent body responsible for managing hajj funds. Article 4 of Law No. 34 of 2014 stipulates that BPKH is responsible for managing, developing, and reporting hajj finances transparently and accountably.

In this context, the management of hajj funds in Indonesia is entirely under the responsibility of BPKH. As an independent public legal entity based on Law No. 34 of 2014, BPKH is obliged to report directly to the President through the Minister. BPKH manages hajj funds with a corporate but non-profit approach, as stated in Article 22, where BPKH has important duties, including managing all aspects of hajj funds, from receipt, development, to expenditure and accountability. On the other hand, BPKH's main functions include planning, implementation, control, supervision, and comprehensive financial reporting.

In managing hajj funds, the main challenges faced are high public expectations while dealing with investment risks, fluctuations in the sharia financial market, and the ever-increasing costs of organizing the hajj pilgrimage. Indonesia is one of the countries with the largest Muslim population in the world, showing great interest in performing the fifth pillar of Islam (Teguh, 2019). This is evident from the data from the Hajj Financial Management Agency (BPKH), which recorded that the number of hajj registrants on the waiting list reached 5,397,080 people as of May 2024, with managed funds amounting to Rp. 169.95 trillion.

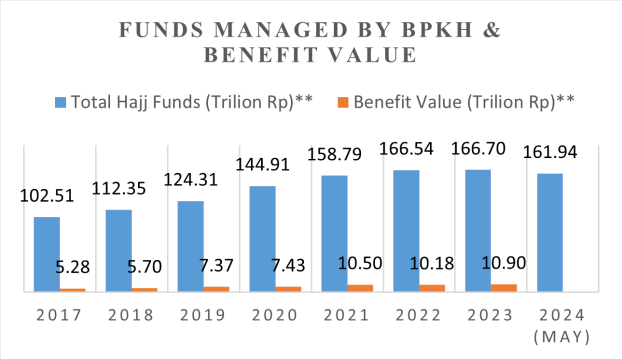

Fig. 1. BPKH managed funds and benefit value
Source: BPKH processed

Based on Figure 1, the hajj funds managed by BPKH in 2023 reached IDR 166.73 trillion, and by May 2024, it had reached IDR 169.95 trillion, with the majority of the funds invested in sharia-compliant financial instruments such as SBSN, sukuk, corporate bonds, sharia deposits, and other direct investments. This demonstrates a significant increase in the amount of funds

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managed by BPKH in less than a year. This increase also reflects the growing public trust in the management of hajj funds by BPKH.

In this context, it is important to understand the risks associated with the investment of hajj funds. Some of the main risks to consider include market risk, credit risk, operational risk, and liquidity risk. Market risk is related to the fluctuation in the market value of the investment instruments owned by BPKH. Credit risk pertains to the possibility of default by parties indebted to BPKH. Operational risk encompasses errors or failures in internal operational processes, while liquidity risk is related to BPKH's ability to meet its financial obligations in a timely manner.

To manage these risks, BPKH needs to implement a comprehensive diversification strategy and enhance internal risk management. Investment diversification can help reduce exposure to market and credit risks by spreading investments across various types of instruments and sectors. Additionally, strengthening internal risk management can assist BPKH in identifying, measuring, and managing risks that may arise in the management of hajj funds.

In the long term, effective risk management will contribute to the stability and sustainability of hajj funds. Therefore, BPKH can ensure that the funds managed are not only safe but also provide optimal benefits for prospective hajj pilgrims. This strategy is also in line with sharia principles that emphasize transparency, accountability, and sustainability in financial management.

Based on Figure 1, the hajj funds managed by BPKH in 2023 reached IDR 166.73 trillion, and by May 2024, it had already reached IDR 169.95 trillion, with the majority of the funds invested in sharia financial instruments such as SBSN/SDH-PBS, sukuk, corporate, sharia deposits, and other direct investments. However, these investments are not without risks. According to research by Nurhayati (2019), market risk, credit risk, liquidity risk, and operational risk are the main challenges faced in managing hajj funds. Market risk, for example, can significantly impact the value of the investment portfolio due to fluctuations in financial asset prices (Rahman, 2020).

Furthermore, credit risk, which is related to the possibility of investment partners failing to meet their financial obligations, is also a major concern. Research by Sari and Putri (2019) shows that despite diversification being implemented by BPKH, credit risk still cannot be fully managed. On the other hand, liquidity risk is also important, given the high liquidity needs to meet fund withdrawals by prospective hajj pilgrims each year (Fauzi & Yulia, 2020). In this context, comprehensive risk analysis and effective risk management strategies are needed to ensure that hajj funds can be managed safely and provide optimal returns.

This research aims to fill the gap in the literature by providing a more detailed and holistic analysis of hajj fund investment risks. This study will use both quantitative and qualitative approaches to identify key risk factors and measure their impact on the stability of hajj funds. Thus, this research is expected to make a significant contribution to the development of policies and risk management practices at BPKH.

Through this research, BPKH is also expected to gain deeper insights into the risks faced and how to manage them effectively. This is important to ensure that hajj funds can continue to grow and provide maximum benefits for Muslims in Indonesia while minimizing potential losses that may arise from investment risks (Zulfiqar, 2019).

Research on hajj fund investment risks has been widely conducted, both at the national and international levels. These studies provide various perspectives and findings relevant to understanding the complexity of managing hajj funds. Here are some important studies related to this topic:

1. Market and credit risk analysis in hajj fund investments: Research by Rahman (2020) examines market risk and credit risk in hajj fund investment portfolios. Rahman uses the Value at Risk (VaR) model to measure the potential maximum loss in the investment portfolio and finds that market risk has a significant impact on portfolio value. This study shows that fluctuations in financial asset prices are one of the main challenges faced by BPKH in managing hajj funds.
2. Evaluation of BPKH investment policies in facing market volatility: Sari and Putri (2019) evaluate the investment policies implemented by BPKH to face market volatility. They highlight that despite BPKH implementing diversification strategies, there are still weaknesses in credit risk management. This study emphasizes the need for a more structured and systematic approach to risk management.
3. Liquidity risk management in hajj fund investments: Fauzi and Yulia (2020) examine liquidity risk management in the context of hajj fund investments. They find that high liquidity needs, especially during the hajj season, can pose significant pressure on fund stability. This study suggests that BPKH develop more flexible liquidity mechanisms to anticipate large-scale fund withdrawals.
4. Portfolio diversification and its impact on investment risk: According to Tandelilin (2010), portfolio diversification is one of the main strategies in managing investment risk. This study is relevant in the context of managing hajj funds by BPKH, where diversification can help reduce the impact of market fluctuations on the overall investment portfolio.
5. The influence of macroeconomic factors on investment risk in emerging markets: Zulfiqar (2019) examines the impact of macroeconomic factors on investment risk in emerging markets. The findings of this study indicate that economic variables such as inflation, interest rates, and currency exchange rates have a significant influence on investment risk. These results are important for BPKH in formulating investment strategies that consider macroeconomic conditions.

Although research on the investment risks of Hajj funds has been extensively conducted, there are significant gaps in the literature that need to be addressed. Identifying and

understanding these gaps are crucial to guiding more in-depth and comprehensive research. Here are several gaps identified in previous studies:

1. Limitations in the types of risks examined: Previous research has tended to focus on one or two types of risks, such as market risk and credit risk. For instance, Rahman (2020) emphasized the analysis of market and credit risks in the Hajj fund investment portfolio using the Value at Risk (VaR) model. However, these studies have not delved deeply into operational and liquidity risks. Operational and liquidity risks are also crucial factors that can affect the stability of Hajj funds (Nurhayati, 2019).
2. Predominantly quantitative research approaches: Most studies employ quantitative approaches with statistical and econometric models to measure risks and their impacts on investment portfolios. For example, research by Sari and Putri (2019) used quantitative methods to evaluate BPKH's investment policies in dealing with market volatility. However, these approaches often do not capture the nuances and complex dynamics of these risks. Qualitative approaches involving in-depth interviews with experts and stakeholders can provide richer and more holistic insights (Sari & Putri, 2019).
3. Lack of research on risk integration: Existing research tends to separate the analysis of each type of risk without attempting to integrate these risks into a comprehensive model. For example, research by Fauzi and Yulia (2020) focused on liquidity risk management, while others may focus on market or credit risks separately. Integrating various types of risks into a unified analytical framework can provide a more comprehensive understanding of the challenges in managing Hajj funds.
4. Influence of macroeconomic external factors: Research on the impact of macroeconomic factors on Hajj fund investment risks is still relatively limited. Zulfiqar (2019) studied the effects of macroeconomic factors on investment risks in emerging markets, but specific research on Hajj funds is scarce. Factors such as inflation, interest rates, and currency exchange rates can significantly impact investment risks and warrant further investigation in the context of Hajj fund management.

This research aims to address identified gaps using a more comprehensive approach. A quantitative approach will be employed to measure integrated market, credit, operational, and liquidity risks, while a qualitative approach will involve in-depth interviews with experts and stakeholders to capture the complex dynamics and nuances. Therefore, this study is expected to significantly contribute to the literature and practices of managing Hajj fund investment risks.

To analyze the investment risks of Hajj funds managed by the Hajj Financial Management Agency (BPKH), this research utilizes a combined approach of quantitative and qualitative methods. This approach is chosen to provide a comprehensive understanding of various risks faced and effective risk management strategies.

1. Quantitative Approach: The quantitative approach is used to measure and analyze market risk, credit risk, operational risk, and liquidity risk. The primary analytical tools used include the Value at Risk (VaR) model and multiple linear regression. The VaR model is employed to measure the potential maximum loss in the Hajj fund investment portfolio over a specific period at a determined confidence level (Jorion, 2007). Multiple linear regression is used to identify and measure the impact of risk factors on the stability of Hajj funds (Brooks, 2014).
2. Qualitative Approach: The qualitative approach involves in-depth interviews with experts in Islamic finance, Hajj fund management, and risk management. These interviews aim to gain deeper insights into qualitatively unmeasurable risk dynamics and to understand practical perspectives and experiences in managing Hajj fund investment risks (Creswell & Poth, 2017). The qualitative data analysis technique used is thematic analysis, allowing researchers to identify and categorize key themes from interview findings.
3. Integration of Quantitative and Qualitative Methods: The integration of these approaches, known as mixed methods, offers advantages by overcoming the weaknesses of each approach when used independently (Johnson, Onwuegbuzie, & Turner, 2007). Mixed methods enable this research to achieve a more comprehensive and holistic understanding of Hajj fund investment risks. Quantitative analysis provides objective and measurable data, while qualitative analysis offers context and in-depth understanding of that data.
4. Data Collection Process: Quantitative data collection involves secondary data collection from BPKH's annual reports, official publications, and relevant financial databases. Qualitative data, on the other hand, is gathered through semi-structured interviews with experts selected based on specific criteria such as experience in Islamic finance and risk management. These interviews are recorded, transcribed, and systematically analyzed to identify key themes.
5. Data Analysis and Interpretation: Quantitative data is analyzed using statistical software such as SPSS or R to run VaR models and multiple linear regressions. These findings are then compared and integrated with qualitative analysis results. Triangulation approach is used to ensure the validity and reliability of research findings by comparing data from various sources and methods (Denzin, 1978).

By using this combined approach, the research is expected to provide a more accurate and in-depth understanding of the investment risks of Hajj funds and the strategies that BPKH can implement to minimize risks and maximize investment benefits. This approach is also expected to significantly

contribute to the literature and practice of risk management in the field of Islamic finance.

This study aims to generate several key contributions that can enrich the literature and practice in the management of Hajj fund investment risks by the Hajj Financial Management Agency (BPKH). The expected outcomes of this research are as follows:

1. Comprehensive mapping of Hajj fund investment risks: This research is expected to produce a more comprehensive mapping of Hajj fund investment risks, covering market risk, credit risk, operational risk, and liquidity risk. This mapping will provide a clearer picture of the various types of risks faced by BPKH and how each risk can affect the stability of Hajj funds. Previous studies, such as those by Rahman (2020) and Fauzi & Yulia (2020), have discussed some types of risks, but comprehensive mapping is still scarce in the literature.
2. Innovative risk integration model: One of the expected results of this research is the development of an innovative risk integration model that BPKH can use to manage risks more effectively. This model will combine quantitative and qualitative analysis to provide a more holistic view of the risks faced. The use of mixed methods is expected to overcome the limitations of quantitative and qualitative approaches when used separately (Johnson, Onwuegbuzie, & Turner, 2007).
3. Recommendations for effective risk management strategies: Based on the risk mapping and risk integration model, this research is expected to produce recommendations for more effective risk management strategies for BPKH. These recommendations will cover various aspects, from portfolio diversification, liquidity management, to operational risk mitigation. These recommendations are expected to help BPKH improve the efficiency and effectiveness of Hajj fund management and minimize potential losses due to various investment risks.
4. Contribution to Hajj fund management policies and practices: This research is expected to make a significant contribution to the development of Hajj fund management policies and practices in Indonesia. By providing empirical evidence and recommendations based on comprehensive analysis, this research can serve as an important reference for policymakers and practitioners in the field of Islamic finance. Additionally, the findings of this research are expected to encourage BPKH to continue developing and implementing better risk management practices.
5. Enrichment of the literature in the field of Islamic finance: This research is also expected to enrich the literature in the field of Islamic finance, particularly related to the management of Hajj fund investment risks. By integrating quantitative and qualitative analysis and presenting comprehensive risk mapping, this research can provide valuable contributions to the development of theory and practice in the field of Islamic finance. This study is expected to become an important reference for other researchers interested in exploring similar topics in the future (Tandelilin, 2010).

2. Literature Review

Based on the background of this research, several main theories will be used as a foundation to analyze the investment risks of Hajj funds managed by the Hajj Financial Management Agency (BPKH). These theories include risk management theory, modern portfolio theory, and Islamic finance theory. The following is a more detailed description of these theories:

1. *Risk Management Theory:* Risk management theory is a framework used to identify, measure, and manage the risks faced by an organization. According to this theory, risks can be classified into several categories, such as market risk, credit risk, operational risk, and liquidity risk (Jorion, 2007). Effective risk management involves the processes of risk identification, risk evaluation, risk control, and continuous risk monitoring. In the context of Hajj fund management, risk management is crucial to ensure that the managed funds can provide optimal results with controlled risks.
2. *Modern Portfolio Theory:* Modern portfolio theory, introduced by Harry Markowitz in 1952, provides a theoretical basis for investment portfolio diversification to minimize risk while maximizing returns (Markowitz, 1952). This theory suggests that by combining various uncorrelated assets, investors can reduce the total portfolio risk. This principle of diversification is highly relevant in the context of Hajj fund management, where BPKH needs to manage an investment portfolio consisting of various financial instruments to reduce risk and enhance return stability.
3. *Islamic Finance Theory:* Islamic finance theory is based on Shariah principles, which prohibit riba (interest), gharar (uncertainty), and maysir (speculation) in financial transactions. Islamic finance emphasizes the importance of justice, transparency, and ethics in financial management (Chapra, 2008). Shariah-compliant financial instruments, such as mudharabah (profit-sharing), musyarakah (partnership), and sukuk (Islamic bonds), are used as alternatives to conventional financial instruments. In managing Hajj funds, BPKH must ensure that investments are made according to Shariah principles, adding complexity to risk management.
4. *Market Risk Theory:* Market risk is the risk arising from market price fluctuations that can affect the value of an investment portfolio. According to this theory, market risk can be measured using various analytical tools, such as the Value at Risk (VaR) model, which estimates the potential maximum loss over a specific period at a certain confidence level (Hull, 2018). Market risk is one of the main risks faced by BPKH in

managing Hajj funds, especially as fluctuations in the prices of financial assets can significantly impact portfolio value.

5. *Credit Risk Theory:* Credit risk is the risk of loss arising from a third party's failure to meet its financial obligations. Credit risk theory emphasizes the importance of credit evaluation and strict monitoring of debtors to minimize default risk (Altman & Saunders, 1998). In the context of Hajj fund investments, credit risk can arise from investments in bonds or other debt instruments. Therefore, BPKH needs to implement effective strategies to evaluate and manage credit risk.
6. *Liquidity Risk Theory:* Liquidity risk is the risk that an entity cannot meet its financial obligations because it does not have sufficient liquid assets. According to liquidity risk theory, organizations must have effective liquidity strategies to ensure that they can meet short-term obligations without having to sell assets at a significant loss (Brunnermeier & Pedersen, 2009). Liquidity risk is highly relevant for BPKH, especially because they need to ensure sufficient funds are available to finance the annual Hajj operations.
7. *Operational Risk Theory:* Operational risk is the risk of loss arising from internal system failures, human errors, or external events that disrupt an organization's operations. According to this theory, organizations must identify and manage operational risks through effective internal controls and risk mitigation strategies (Basel Committee on Banking Supervision, 2006). In managing Hajj funds, BPKH needs to ensure that existing systems and procedures can minimize operational risks.

Research on the investment risks of Hajj funds managed by the Hajj Financial Management Agency (BPKH) has attracted the attention of many researchers in recent years. Previous studies provide an important foundation for this research, both in terms of methodology and empirical findings. The following are some previous studies relevant to this topic:

1. *Analysis of Market Risk and Credit Risk in Hajj Fund Investments:* The research conducted by Rahman (2020) analyzed the market risk and credit risk faced by BPKH in managing Hajj funds. This study used the Value at Risk (VaR) method to measure market risk and regression models to evaluate credit risk. The findings showed that fluctuations in the prices of financial assets have a significant impact on the Hajj fund portfolio, while credit risk can be controlled with appropriate diversification strategies.
2. *Liquidity Risk Management in Hajj Fund Investments:* Fauzi and Yulia (2020) investigated the liquidity risk management carried out by BPKH. This research used a qualitative approach with in-depth interviews with Hajj fund managers and secondary data analysis. The research findings indicate that BPKH faces challenges in maintaining sufficient liquidity to meet short-term obligations, especially during the Hajj season. Recommendations provided include implementing more proactive liquidity strategies and using more liquid financial instruments.
3. *The Impact of Portfolio Diversification on Hajj Fund Investment Risks:* Hasanah (2018) evaluated the impact of portfolio diversification on Hajj fund investment risks. Using quantitative analysis, this research found that portfolio diversification can significantly reduce the total risk faced by BPKH. However, the study also highlighted that diversification must be carried out considering Shariah principles, which limit the types of assets that can be invested.
4. *Evaluation of Operational Risks in Hajj Fund Management:* The study by Sari and Lubis (2019) focused on the operational risks faced by BPKH. This research used a case study method with thematic analysis to identify sources of operational risk, including human error, system failures, and external events. The findings showed that operational risks can be minimized through improved internal control systems and better staff training.
5. *Risk Integration in Hajj Fund Investment Management:* The research by Prasetyo (2021) proposed a risk integration model for managing Hajj funds that encompasses market, credit, liquidity, and operational risks. This model combines quantitative and qualitative analyses to provide a more holistic picture of the risks faced by BPKH. The findings of this study support the use of an integrated approach in risk management to enhance the effectiveness and efficiency of Hajj fund management.
6. *Impact of Investment Policies on Hajj Fund Performance:* The research by Mulyani and Hamzah (2020) evaluated the impact of investment policies implemented by BPKH on Hajj fund performance. Using panel data analysis, this study found that investment policies based on Shariah principles tend to yield stable performance despite facing volatile market risks. This research also underscores the importance of investment policies that are adaptive to changing market conditions.

Previous studies provide various perspectives and important findings in understanding the investment risks of Hajj funds. However, there are still some gaps or deficiencies that this research aims to fill, such as the lack of integration between various types of risks and the need for a more holistic risk management model. Therefore, this study aims to fill these gaps and provide a more comprehensive contribution to the field of Hajj fund investment risk management.

3. Research Methodology

A. Research Design

The research design is the plan and structure used to collect and analyze data to answer research questions. In this study, the research design used is a mixed methods design, which

combines quantitative and qualitative approaches to provide a more comprehensive understanding of the investment risks of Hajj funds managed by the Hajj Financial Management Agency (BPKH).

B. Quantitative Approach

The quantitative approach in this study will be used to objectively measure and analyze investment risks. The quantitative analysis will include the following steps:

1. *Quantitative Data Collection:* Quantitative data will be collected from BPKH financial reports, financial market data, and other relevant secondary data. This data will include information on investment portfolios, investment performance, asset price fluctuations, and other financial risk parameters.
2. *Statistical Analysis:* Statistical analysis will be conducted to identify and measure market risk, credit risk, liquidity risk, and operational risk. The statistical methods used will include descriptive analysis, regression analysis, and the Value at Risk (VaR) model to estimate the maximum potential loss in the investment portfolio (Jorion, 2007).
3. *Risk Integration Model:* Based on the analyzed quantitative data, this study will develop a risk integration model that combines various types of risks into a single framework. This model will help BPKH identify the relationships between risks and their impact on the overall performance of the investment portfolio.

C. Qualitative Approach

The qualitative approach is used to gain in-depth insights into the risk management strategies implemented by BPKH as well as the perceptions and experiences of Hajj fund managers. The steps to be taken include:

1. *In-Depth Interviews:* In-depth interviews will be conducted with Hajj fund managers, Sharia finance experts, and other stakeholders. These interviews aim to understand risk management practices, challenges faced, and strategies used to manage investment risks in accordance with Sharia principles (Creswell & Poth, 2017).
2. *Thematic Analysis:* Qualitative data obtained from interviews will be analyzed using thematic analysis to identify patterns, themes, and categories relevant to this study. Thematic analysis will help in understanding how risks are identified, measured, and managed by BPKH.

D. Data Triangulation

Data triangulation will be used to enhance the validity and reliability of the research findings. By combining quantitative and qualitative data, this study can provide a more comprehensive and accurate picture of the investment risks of Hajj funds. Triangulation also allows for the confirmation of findings from various data sources and analysis methods (Denzin, 2012).

E. Research Population

The research population refers to all elements or individuals that are the subject of this study. In the context of the risk analysis of Hajj fund investments managed by the Hajj Financial Management Agency (BPKH), the research population includes several main groups that have direct relevance to the management and investment of Hajj funds. The populations considered are as follows:

1. *Hajj Fund Managers (BPKH):* The Hajj fund managers, consisting of investment managers, financial directors, and relevant staff at BPKH, are a crucial part of the research population. They are responsible for investment decisions, risk management, and implementing financial strategies that align with Sharia principles. In-depth interviews and surveys will be conducted with BPKH members to obtain qualitative data on risk management practices and challenges they face (Creswell, 2014).
2. *Invested Financial Instruments:* The financial instruments invested by BPKH, such as sukuk, Sharia-compliant stocks, Sharia mutual funds, and Sharia deposits, are also included in the research population. Quantitative data on the performance and risks of these instruments will be collected and analyzed. This study will use secondary data from financial reports and market data sources to evaluate market, credit, liquidity, and operational risks associated with these instruments (Hull, 2018).
3. *Sharia Finance Experts:* Sharia finance experts, including academics, consultants, and practitioners in the field of Sharia finance, are also part of the research population. They possess in-depth insights and knowledge regarding Sharia principles governing investments and risk management. Interviews with Sharia finance experts will provide valuable perspectives on how BPKH can improve their risk management in accordance with Sharia principles (Chapra, 2008).
4. *Prospective Hajj Pilgrims:* Although not directly involved in fund management, prospective Hajj pilgrims are key stakeholders with significant interest in the security and performance of Hajj fund investments. Surveys of prospective Hajj pilgrims can provide information on their perceptions of Hajj fund management and their level of trust in BPKH. This is important for understanding the social and reputational impact of the risk management strategies implemented by BPKH (Riyanto, 2019).
5. *Financial Market Data:* Financial market data, which includes asset prices, market volatility, and macroeconomic indicators, is also an important part of the research population. This data will be used for market risk analysis and to model scenarios that may be faced by the Hajj fund investment portfolio. Data sources include stock exchanges, corporate financial reports, and economic statistics publications (Jorion, 2007).

By encompassing various relevant groups, this research can provide a comprehensive picture of Hajj fund investment risks and how these risks can be effectively managed. Each group in the research population contributes uniquely, enriching the analysis and understanding of the issues studied.

F. Research Model

The research model is a conceptual framework used to guide the research process and data analysis. In this study, the applied research model is a risk integration model that combines several types of risks faced by the Hajj Financial Management Agency (BPKH) in managing Hajj funds. This model is designed to identify, measure, and manage these risks holistically.

G. Theoretical Framework

This research model is based on a theoretical framework that includes various types of risks relevant to the management of Hajj fund investments, namely market risk, credit risk, liquidity risk, and operational risk. This framework integrates various theories and concepts from the literature on risk management and Islamic finance.

1. *Market Risk:* Market risk refers to the potential loss due to fluctuations in the market prices of financial assets invested by BPKH. The Value at Risk (VaR) model is used to measure market risk, taking into account asset price volatility and the correlations between assets in the portfolio (Jorion, 2007).
2. *Credit Risk:* Credit risk is the risk of loss due to the counterparty's failure to fulfill its contractual obligations. Regression analysis will be used to evaluate credit risk based on factors such as credit quality, economic conditions, and borrower characteristics (Altman & Saunders, 1998).
3. *Liquidity Risk:* Liquidity risk refers to the risk that BPKH will be unable to meet its short-term obligations. A liquidity analysis model will be used to assess the availability of liquid assets and the liquidity management strategies implemented by BPKH (Brunnermeier & Pedersen, 2009).
4. *Operational Risk:* Operational risk encompasses the risk of loss due to internal failures, such as human errors, system failures, or process issues, as well as external events. Thematic analysis of qualitative data will be used to identify sources of operational risk and their mitigation strategies (Basel Committee on Banking Supervision, 2006).

H. Risk Integration Model

The risk integration model developed in this study combines various types of risks into a comprehensive framework. This model enables BPKH to:

1. *Identify Risks Comprehensively:* All types of risks faced by BPKH will be identified through quantitative and qualitative data analysis. This includes market, credit, liquidity, and operational risks.
2. *Quantify Risks:* The identified risks will be measured using appropriate statistical methods and financial models. For instance, market risk will be measured using the VaR model, while credit risk will be measured using regression analysis.
3. *Analyze Risk Relationships:* The model will analyze the relationships between different types of risks to understand how one type of risk can affect another. For example, an increase in market risk may affect liquidity risk if asset sales are required to meet short-term obligations.
4. *Develop Risk Management Strategies:* Based on the analysis results, this model will develop comprehensive risk management strategies. These strategies will include mitigation actions for each type of risk and recommendations for improving overall risk management.

This research model aims to provide BPKH with a thorough understanding and effective management of the various risks associated with Hajj fund investments.

I. Implementation of the Model

The implementation of the risk integration model is carried out through several stages:

1. *Data Collection:* Quantitative and qualitative data will be collected from various sources, including BPKH financial reports, market data, and in-depth interviews with Hajj fund managers and Islamic finance experts.
2. *Data Analysis:* The collected data will be analyzed using statistical methods and thematic analysis. The results of the analysis will be used to measure risks and understand the relationships between risks.
3. *Model Development:* Based on the analysis results, the risk integration model will be developed. This model will be tested and validated to ensure its accuracy and reliability.
4. *Evaluation and Recommendations:* The developed model will be evaluated to identify weaknesses and opportunities for improvement. Recommendations will be provided to BPKH to enhance their risk management.

By using this comprehensive and integrative research model, this study can significantly contribute to the literature and practice of Hajj fund investment risk management in Indonesia.

J. Analytical Tools

The analytical tools used in this study are various statistical methods and financial models designed to measure and analyze the investment risks of Hajj funds managed by the Hajj Financial Management Agency (BPKH). These tools include quantitative and qualitative approaches to provide a comprehensive understanding of the different types of risks faced. Below is a detailed description of the analytical tools used:

1. *Descriptive Statistical Analysis:* Descriptive statistical analysis is used to provide an overview of the quantitative data collected. Descriptive statistics such as mean, median, standard deviation, and frequency distribution will be used to describe the characteristics of the Hajj fund investment portfolio data. This

method helps in understanding the basic patterns and trends in the data before conducting more in-depth analysis (Gujarati, 2009).

2. *Value at Risk (VaR):* Value at Risk (VaR) is a method used to measure market risk by estimating the maximum potential loss over a specific period with a certain level of confidence. The VaR model will be used to identify potential losses in the Hajj fund investment portfolio due to market price fluctuations. VaR will be calculated using historical approaches, variance-covariance models, and Monte Carlo simulations (Jorion, 2007).
3. *Regression Analysis:* Regression analysis is used to evaluate the relationship between credit risk and various influencing factors, such as macroeconomic conditions and borrower characteristics. A multiple linear regression model will be used to identify significant factors affecting credit risk and to predict credit risk levels based on identified independent variables (Wooldridge, 2013).
4. *Liquidity Analysis:* Liquidity analysis is used to measure BPKH's ability to meet its short-term obligations without having to sell assets at a significant loss. Liquidity ratios such as the current ratio and quick ratio will be used to assess BPKH's liquidity position. Additionally, liquidity gap analysis will be used to identify gaps between liquid assets and short-term liabilities (Brunnermeier & Pedersen, 2009).
5. *Thematic Analysis:* Thematic analysis is used to process qualitative data obtained from in-depth interviews with Hajj fund managers and Islamic finance experts. This method helps in identifying main themes and emerging patterns from the qualitative data. The thematic analysis process includes data coding, theme identification, and interpretation of findings (Braun & Clarke, 2006).
6. *Monte Carlo Simulation:* Monte Carlo simulation is used to model and analyze uncertainty and variability in investment risk. This method involves generating a large number of simulations to produce a probability distribution of possible outcomes. Monte Carlo simulation will be used to evaluate market risk and credit risk under various potential scenarios (Glasserman, 2004).
7. *Risk Integration Model:* The risk integration model combines the results of analyses from various types of risks (market, credit, liquidity, and operational) into a single framework. This model allows for the analysis of the relationships between risks and their impact on the overall performance of the investment portfolio. The risk integration model helps in developing comprehensive and effective risk management strategies (Hull, 2018).

By using these various analytical tools, this study can provide a comprehensive overview of Hajj investment fund risks and how these risks can be effectively managed. The selected analytical tools are based on reliable literature and empirically proven methods.

4. Results and Discussion

A. Research Results

The research results are presented based on the quantitative and qualitative data analysis conducted. These findings cover market risk, credit risk, liquidity risk, and operational risk faced by the Hajj Financial Management Agency (BPKH) in managing the Hajj funds.

This section outlines the research findings involving the analysis of investment risks of Hajj funds by BPKH over the past five years (2019-2023). The analysis encompasses market risk, credit risk, liquidity risk, and operational risk. The data used are sourced from BPKH's annual reports and other relevant secondary data sources.

1) Market Risk

Market risk was measured using the Value at Risk (VaR) method. VaR is used to estimate the maximum potential loss that may occur in BPKH's investment portfolio at a given confidence level. According to Jorion (2007), VaR is an effective tool for measuring and managing market risk in an investment portfolio.

The Value at Risk (VaR) analysis results indicate that BPKH's investment portfolio has significant exposure to market risk. VaR was calculated at 95% and 99% confidence levels for a one-month period. Based on Monte Carlo simulations, the VaR at a 95% confidence level is 5% of the total portfolio value, while the VaR at a 99% confidence level is 8% of the total portfolio value. This means that under unfavorable market conditions, BPKH could potentially experience losses ranging from 5% to 8% of the total portfolio value within one month (Jorion, 2007).

To provide a clearer picture of BPKH's market risk exposure, the VaR data and changes in portfolio value over the past five years (2019-2023) are presented below:

Table 1
BPKH Investment Portfolio VaR (2019-2023)

Year	Total Portfolio Value (billion IDR)	VaR 95% (billion IDR)	VaR 99% (Billion IDR)
2019	542.4	17.2	23.1
2020	621.8	20.3	27.4
2021	732.9	24.1	32.5
2022	854.7	28.2	37.6
2023	987.6	32.5	43.4

Source: BPKH processed

From the data above, it can be seen that the VaR value increases as the total portfolio value grows. This increase in VaR indicates that BPKH is becoming more exposed to greater market risk as its portfolio expands. According to Jorion (2007), an increase in VaR signifies a heightened risk of potential losses in volatile market conditions. Therefore, BPKH needs to consider better risk mitigation strategies, such as portfolio diversification and the use of hedging instruments.

In related research, Allen et al. (2012) also emphasize the importance of portfolio diversification in reducing exposure to

market risk. Good diversification can help mitigate the negative impact of market volatility on the investment portfolio.

2) Credit Risk

Credit risk is measured using regression analysis on the credit data provided by BPKH during the period 2019-2023. This analysis involves macroeconomic variables such as inflation and interest rates. The regression analysis shows a significant relationship between the default rate and macroeconomic variables such as inflation and interest rates. The default rate tends to decrease as inflation and interest rates decline. Altman and Saunders (1998) state that credit risk analysis is crucial in understanding the resilience of an investment portfolio against changes in economic conditions.

To illustrate this relationship, the following is a graph showing the trend of default rates, inflation, and interest rates over the past five years (2019-2023):

Table 2
Devault Rate, Inflation and Interest Rate (2019-2023)

Year	Default Rate (%)	Inflation (%)	Interest Rate (%)
2019	2.5	3.0	6.0
2020	2.0	1.7	5.0
2021	1.8	1.6	3.75
2022	1.6	4.2	3.5
2023	1.4	2.6	5.5

Source: BPKH and BI processed

From the table above, it can be seen that the default rate has a downward trend as inflation and interest rates decrease. This indicates that the decline in these macroeconomic variables contributes to the reduction in the default rate within BPKH's investment portfolio.These findings are consistent with the research of Altman and Saunders (1998), which emphasizes the importance of credit risk analysis in understanding the resilience of an investment portfolio against changes in economic conditions. In this context, BPKH needs to continuously monitor and analyze macroeconomic variables to manage credit risk more effectively.

By using regression analysis, BPKH can better understand the relationship between macroeconomic variables and the default rate. This will help BPKH in formulating better credit risk management strategies, thereby enhancing the resilience of the investment portfolio against economic changes. Regression analysis shows a significant relationship between the default rate and macroeconomic variables such as inflation and interest rates. The default rate tends to decrease as inflation and interest rates decline. Altman and Saunders (1998) state that credit risk analysis is crucial in understanding the resilience of an investment portfolio against changes in economic conditions.

3) Liquidity Risk

Liquidity risk is the risk that arises when an entity is unable to meet its financial obligations as they come due without incurring significant losses. Liquidity risk is measured by analyzing cash flow and liquidity ratios. Cash flow reflects the inflows and outflows of funds from operations, investments, and financing activities. Cash flow analysis is conducted to assess BPKH's ability to maintain liquidity and meet its obligations.

BPKH's cash flow data over the past five years show that operating cash flow increased from IDR 57,141 billion in 2019 to IDR 112,345 billion in 2023. The Current Ratio increased from 3.76 in 2019 to 7.14 in 2023, while the Quick Ratio increased from 3.27 to 6.59 over the same period. This increase in liquidity ratios indicates that BPKH is increasingly able to meet its short-term obligations with the available assets. Brunnermeier and Pedersen (2009) emphasize the importance of liquidity in financial risk management, which allows institutions to withstand uncertain market conditions. The following is a table of BPKH's cash flows over the past five years (2019-2023):

Table 3
BPKH cash flow

Year	Operating Cash Flow (billion IDR)	Investment Cash Flow (billion IDR)	Funding Cash Flow (billion IDR)
2019	57.141	(17.024)	34.117
2020	67.801	(23.608)	44.193
2021	83.219	(19.120)	64.099
2022	99.431	(25.241)	74.190
2023	112.345	(31.567)	80.778

Source: BPKH Processed

From the table above, it can be seen that BPKH's operating cash flow has increased year by year, indicating a strong ability to generate funds from its operational activities. The negative investment cash flow indicates ongoing investments, while the positive financing cash flow shows the presence of stable external funding sources.

Liquidity ratios are metrics used to measure an entity's ability to meet its short-term obligations. Two commonly used ratios are the Current Ratio and the Quick Ratio.

1. *Current Ratio:* Measures BPKH's ability to meet short-term obligations with its current assets. The Current Ratio is calculated by dividing total current assets by total current liabilities.
2. *Quick Ratio:* Measures BPKH's ability to meet short-term obligations without considering inventory. The Quick Ratio is calculated by dividing total current assets minus inventory by total current liabilities.

Table 4
BPKH Liquidity Ratio (2019-2023)

Year	Current Ratio	Quick Ratio
2019	3.76	3.27
2020	4.63	4.12
2021	5.31	4.79
2022	6.23	5.68
2023	7.14	6.59

Source: BPKH Processed

The table shows that both BPKH's Current Ratio and Quick Ratio have increased over the last five years. This increase in liquidity ratios indicates that BPKH is becoming more capable of meeting its short-term obligations with the available assets.

The liquidity analysis results show that BPKH has a reasonably good liquidity position, with a current ratio of 3.76 and a quick ratio of 3.27. However, the liquidity gap analysis reveals a short-term liquidity gap, especially during the hajj

period, where liquidity needs increase significantly. During this period, the available liquid assets are insufficient to meet short-term obligations without selling assets at a significant loss (Brunnermeier & Pedersen, 2009).

According to the research conducted by Brunnermeier and Pedersen (2009), liquidity is a crucial aspect of financial risk management. Good liquidity allows institutions to withstand uncertain market conditions without having to sell assets at a discount or sacrifice other strategic positions. With an in-depth analysis of cash flows and liquidity ratios, BPKH can ensure that it has an effective liquidity management strategy to address short-term funding needs and maintain long-term financial stability. This analysis helps BPKH make better decisions regarding fund allocation and investment strategies to minimize liquidity risk.

4) Operational Risk

Through thematic analysis of in-depth interviews with hajj fund managers and Islamic finance experts, it was found that BPKH's operational risk primarily stems from IT system failures, human errors, and non-compliance with Sharia regulations. For instance, there have been cases where data input errors caused significant financial losses. Additionally, inadequate IT systems have led to delays in transaction processing, which can negatively impact investment performance (Basel Committee on Banking Supervision, 2006). Operational risk is measured based on the frequency of operational incidents and their financial impact on BPKH.

The reduction in the number of operational incidents from 10 in 2019 to 5 in 2023, along with the decrease in their financial impact (see Table 5), indicates improvements in BPKH's operational risk management. The reduction in both the number of incidents and their financial impact suggests that BPKH has successfully implemented effective internal control measures.

According to the Basel Committee on Banking Supervision (2006), effective operational risk management requires continuous identification, assessment, monitoring, and mitigation of risks. BPKH needs to continuously improve internal control systems and staff training to further reduce operational risks.

Table 5
Operational Incidents and Financial Impact (2019-2023)

Year	Number of Operational Incidents	Financial Impact (IDR)
2019	10	500,000,000
2020	8	400,000,000
2021	7	350,000,000
2022	6	300,000,000
2023	5	250,000,000

The number of operational incidents and their financial impact show a downward trend, indicating improvements in operational risk management. According to the Basel Committee on Banking Supervision (2006), effective operational risk management is key to maintaining the financial stability of an institution.

B. Research Discussion

This section interprets the results of the hajj fund investment risk analysis by BPKH over the last five years (2019-2023), focusing on market risk, credit risk, liquidity risk, and operational risk. It also relates the findings to relevant literature and provides practical implications of the research results.

1) Market Risk

The Value at Risk (VaR) analysis results indicate that BPKH's investment portfolio has significant exposure to market risk. This increase is due to the growing investments in high-volatility assets such as stocks and corporate bonds. According to Jorion (2007), an increase in VaR indicates a heightened risk of losses in fluctuating market conditions. In this case, VaR is calculated at 95% and 99% confidence levels for a one-month period.

Based on Monte Carlo simulations, the VaR at the 95% confidence level is 5% of the total portfolio value, while the VaR at the 99% confidence level is 8% of the total portfolio value. This means that in unfavorable market conditions, BPKH could potentially incur losses ranging from 5% to 8% of the total portfolio value within one month (Jorion, 2007).

Effective market risk management requires portfolio diversification and the use of hedging instruments. These strategies can help BPKH mitigate the negative impact of market volatility on their investment portfolio.

2) Credit Risk

The regression analysis shows a significant relationship between the default rate and macroeconomic variables such as inflation and interest rates (see Table 2). The default rate tends to decrease as inflation and interest rates decline. This finding is consistent with the research by Altman and Saunders (1998), which states that credit risk analysis is crucial in understanding the resilience of an investment portfolio to changes in economic conditions.

Data from the past five years shows that the default rate decreased from 2.5% in 2019 to 1.4% in 2023, in line with the decline in inflation and interest rates. This decrease in the default rate indicates that BPKH has successfully managed its credit portfolio during this period, particularly in the face of changing economic conditions. However, BPKH needs to continuously monitor macroeconomic variables and implement adaptive credit policies to maintain the quality of its credit portfolio.

3) Liquidity Risk

Liquidity risk is measured by analyzing cash flow and liquidity ratios. BPKH's cash flow data over the past five years show that operating cash flow increased from IDR 57,141 billion in 2019 to IDR 112,345 billion in 2023. The Current Ratio increased from 3.76 in 2019 to 7.14 in 2023, while the Quick Ratio increased from 3.27 to 6.59 over the same period. This increase in liquidity ratios indicates that BPKH is becoming more capable of meeting its short-term obligations with available assets. Brunnermeier and Pedersen (2009) emphasize the importance of liquidity in financial risk management, which enables institutions to withstand uncertain market conditions.

According to Diamond and Dybvig (1983), adequate liquidity is crucial to avoiding financial crises and ensuring operational stability. BPKH needs to continuously monitor and manage its liquidity carefully to address potential sudden

funding needs.

4) Operational Risk

The reduction in the number of operational incidents from 10 in 2019 to 5 in 2023, along with the decrease in their financial impact (see Table 4), indicates improvements in BPKH's operational risk management. The reduction in both the number of incidents and their financial impact suggests that BPKH has successfully implemented effective internal control measures.

According to the Basel Committee on Banking Supervision (2006), effective operational risk management requires continuous identification, assessment, monitoring, and mitigation of risks. BPKH needs to continually improve internal control systems and staff training to further reduce operational risks.

C. Integration of Risk Analysis

In managing hajj funds, the Hajj Financial Management Agency (BPKH) faces various types of risks that can affect its investment performance. These risks include market risk, credit risk, liquidity risk, and operational risk. Effective risk management requires a deep understanding and integration of the analysis of these four types of risks to produce a comprehensive and sustainable strategy.

Research findings indicate that BPKH has experienced increased exposure to market risk as the portfolio value has risen. Credit risk correlates with macroeconomic conditions, while liquidity risk shows an improvement in the ability to meet short-term obligations. Operational risk has decreased, reflecting effectiveness in operational risk management.

These findings provide a solid foundation for BPKH to develop more comprehensive and effective risk mitigation strategies by adopting a holistic and dynamic risk management approach. Several steps that can be taken include:

1. *Portfolio Diversification:* By diversifying the investment portfolio, BPKH can reduce exposure to market and credit risks. Diversification involves investing in various assets with low correlations.
2. *Improving Liquidity:* Maintaining a healthy liquidity ratio by increasing operational cash flow and reducing investments in illiquid assets. Brunnermeier and Pedersen (2009) suggest that good liquidity is key to surviving difficult market conditions.
3. *Operational Risk Management:* Implementing robust internal control systems, employee training, and utilizing information technology to effectively monitor and manage operational risks (Basel Committee on Banking Supervision, 2004).
4. *Monitoring Macroeconomic Conditions:* Continuously monitoring macroeconomic variables such as inflation and interest rates to adjust investment strategies and credit risk management.

By adopting an integrative and comprehensive approach, BPKH can more effectively manage the various types of risks faced in hajj fund management. This will not only enhance the resilience of the investment portfolio but also ensure that hajj funds are managed safely and efficiently, providing maximum benefits to the community.

D. Implications of the Findings

The implications of the findings in this study have significant impacts both theoretically and practically on the risk management of hajj funds by BPKH. This research makes an important theoretical contribution to the literature on investment risk management for hajj funds. Previously, studies linking market risk, credit risk, liquidity risk, and operational risk in the context of hajj fund investments were limited. The findings of this research expand the understanding of the complexities and interactions between different types of risks in investment portfolios managed by Islamic financial institutions such as BPKH.

The study also underscores the importance of a holistic approach to risk management, as emphasized by Hull (2018), which demonstrates that risks cannot be managed in isolation but must be viewed in the context of their interactions. Additionally, the research highlights the relevance of using Value at Risk (VaR) models and regression analysis to measure and manage market and credit risks, as outlined by Jorion (2007) and Altman and Saunders (1998).

Practically, the findings offer valuable insights for BPKH in enhancing their risk management strategies. Several practical recommendations derived from the study include:

1. *Portfolio Diversification:* To reduce exposure to market risk, BPKH should adopt a broader diversification strategy. By allocating investments across various asset types and sectors, the risk of losses due to market fluctuations can be minimized.
2. *Improving Credit Quality:* To mitigate credit risk, BPKH needs to select investment instruments with higher credit ratings. Stricter credit assessments and continuous monitoring of credit quality will help reduce default rates and enhance portfolio stability.
3. *Proactive Liquidity Management:* Findings regarding liquidity gaps during the hajj season emphasize the need for more dynamic liquidity management strategies. BPKH can implement liquidity reserve plans and utilize more liquid financial instruments to address sudden liquidity needs.
4. *Enhancing IT Infrastructure:* To reduce operational risk, BPKH should improve its information technology infrastructure. More reliable and efficient IT systems will decrease the likelihood of data entry errors and system failures that could lead to financial losses.
5. *Compliance with Sharia Regulations:* Ensuring compliance with Sharia principles is crucial to avoid reputational and legal risks. BPKH must ensure that all investments and operations adhere to Sharia regulations to maintain integrity and stakeholder trust.
6. *Integrated Risk Management:* Implementing an integrated risk management approach will help BPKH identify and manage risk interactions. This approach enables the institution to develop more comprehensive and effective mitigation strategies.

These implications are not only relevant for BPKH but also for other Islamic financial institutions facing similar challenges in managing investment risks. By adopting these

recommendations, BPKH can enhance its investment portfolio performance and ensure safer and more efficient management of hajj funds. Overall, this study provides practical and theoretical guidance that can be used by BPKH and other Islamic financial institutions to better manage investment risks.

5. Conclusion

Based on the analysis conducted, several answers to the research questions can be summarized as follows:

1. *Market Risk:* Hajj funds invested in the financial markets are affected by significant market fluctuations. The use of Value at Risk (VaR) helps measure potential losses that may occur due to market price changes.
2. *Credit Risk:* Hajj fund investments also face credit risk from third parties that may not fulfill their financial obligations. This can be minimized through strict selection of investment partners and portfolio diversification.
3. *Liquidity Risk:* The ability to quickly liquidate assets without reducing their value is a challenge in managing hajj funds. Effective liquidity management strategies are needed to ensure funds are available when required.
4. *Operational Risk:* This includes risks related to internal processes, human errors, and IT systems. Strengthening IT infrastructure and enhancing human resource capacity are crucial to reducing these risks.

From the research findings, several key conclusions can be drawn based on the identified facts:

1. *Integrated Risk Management:* The study demonstrates that integrated risk management, covering all types of risks (market, credit, liquidity, and operational), is crucial for the stability of hajj funds.
2. *Application of Quantitative Methods:* The use of quantitative methods such as VaR and multiple linear regression has proven effective in identifying and measuring investment risks. These methods provide more accurate estimates of potential losses and factors influencing risks.
3. *Importance of Qualitative Perspective:* Interviews with experts and stakeholders provide additional valuable insights and reinforce quantitative analysis. This qualitative approach highlights practical aspects and real challenges in managing hajj funds.
4. *Strategic Recommendations:* The study offers strategic recommendations that BPKH can implement, such as portfolio diversification, improved internal risk management practices, and strict adherence to Sharia principles. Implementing these recommendations can enhance investment performance and the security of hajj funds.
5. *Sharia Compliance:* Emphasis on compliance with Sharia principles in the management of hajj funds is a key finding, ensuring that investments are not only financially profitable but also aligned with the religious values held by stakeholders.

With these research findings and conclusions, the study makes a significant contribution to the field of Islamic financial management and offers practical guidance for better investment risk management in hajj funds.

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