Gema Ekonomi
e-ISSN: 2621-0444
Vol. 13 No. 1 Januari 2024 pp 1-12

https://journal.unigres.ac.id/index.php/GemaEkonomi/index

Gema Ekonomi (Jurnal Fakultas Ekonomi)
e-ISSN: 2621-0444
Vol. 13 No. 1 Januari 2024

The Effectiveness of Artificial Intelligence in Improving Capital Market Efficiency in ASEAN: A Systematic Literature Study 2015–2025

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Abstract

The development of Artificial Intelligence technology in the capital market is increasingly affecting market efficiency, especially in terms of volatility prediction and price discovery processes. In the ASEAN region, which is experiencing rapid growth in market capitalization, market efficiency is an important factor in maintaining stock market stability and liquidity. This research aims to examine the effectiveness of AI application in improving capital market efficiency in ASEAN, focusing on predicting stock volatility and its impact on market liquidity. This systematic literature review analyzed 45 peer-reviewed articles published between 2015 and 2025. From 312 initially identified articles, 45 met the inclusion criteria after screening based on: AI/ML applications in stock volatility or market efficiency, ASEAN market focus, and empirical or theoretical methodologies. Exclusion criteria included non-peer-reviewed sources and articles without direct capital market data. The results show that machine learning (ML) and deep learning (DL) applications in volatility prediction improve accuracy by 15–35% compared to traditional GARCH models and accelerate price discovery processes. Specifically, 78% of reviewed studies (n=35) reported significant improvements in prediction accuracy, while 67% (n=30) documented enhanced market efficiency metrics including 18.4% reduction in price delay and 14.3% liquidity enhancement. However, implementation is limited by data infrastructure gaps and regulatory differences between ASEAN countries, with Singapore and Malaysia showing 2-3 times greater efficiency gains than emerging markets. The study concludes that transparent governance is needed to mitigate algorithmic risks. This study suggests policies supporting exchange-fintech collaboration, regulatory harmonization, and infrastructure development to optimize AI application in ASEAN capital markets.

Keywords: Artificial Intelligence, Stock Volatility, Market Efficiency, Machine Learning, Deep Learning, ASEAN

INTRODUCTION

Technological developments in recent decades, especially in the field of Artificial Intelligence (AI), have changed the way capital markets operate. AI is used to improve price discovery, predict market volatility, and optimize liquidity by leveraging machine learning (ML) and deep learning (DL). As the global market becomes increasingly complex, AI is considered a technology that can provide additional efficiencies in risk management and more accurate asset pricing. In the context of the capital market, this efficiency is important because it can improve the speed and accuracy of transactions as well as reduce the costs associated with market friction. With rapid economic growth and an increasingly large capital market in the ASEAN region, the use of AI in the capital market has become highly relevant. In relation to market volatility, AI is able to identify risk patterns that are difficult to recognize by traditional models such as ARCH or GARCH. While AI offers a great opportunity to drive market efficiency, challenges remain, including regarding model stability, potential algorithmic risks, and the need for transparent governance in its use. Meanwhile, while many studies have shown the advantages of AI, its widespread adoption in developing regions such as ASEAN requires more in-depth research to see how much AI can improve capital market efficiency in the region.

The ASEAN capital market, which includes Indonesia, Singapore, Malaysia, Thailand, the Philippines, and Vietnam, has been growing rapidly with ASEAN's total market capitalization reaching USD 2.8 trillion in 2023 and expected to rise to USD 3.0 trillion by 2024. This reflects the importance of the ASEAN region as a major player in the global economy. With rapid growth, the ASEAN capital market offers great opportunities for investors, but it also carries considerable risks, especially stock price volatility that can be influenced by various external and internal factors. In 2024, despite a temporary decrease in volatility, the region will again experience market uncertainty triggered by global factors, such as monetary policy in developed countries, geopolitical tensions, and global pandemics. In this context, efficient adoption of AI in ASEAN capital markets is critical to ensure markets can effectively manage risk and increase liquidity. Therefore, this study is very relevant to delve deeper into how the application of AI in the ASEAN capital market can improve efficiency, especially related to volatility prediction and price discovery improvements. Seeing that market efficiency is key in ensuring optimal resource allocation and fair risk distribution, the study aims to provide a clearer picture of AI's role in achieving these goals.

The classical economic theory of market efficiency states that the price of an asset reflects the information available in the market at a given time, and the market is considered efficient when the price of an asset reflects all relevant information. In this theory, volatility is a very important factor in measuring how quickly information is reflected in the price. The concept of volatility is usually analyzed with the ARCH (Autoregressive Conditional Heteroskedasticity) and GARCH (Generalized ARCH) models, which measure changes in variance over different time. However, with the rapid development of AI, many models are now enriched with machine learning approaches, such as Long Short-Term Memory (LSTM) or ensemble models such as XGBoost, which are able to take into account non-linear factors that are difficult for traditional models to reach. AI focuses not only on modeling volatility itself but also how this volatility affects the price discovery process in the capital market. In several recent studies, AI has been shown to be able to provide more accurate volatility

predictions, which in turn contributes to better market efficiency. By combining market data, sentiment, and macroeconomic factors in an AI-based model, capital markets can create a more efficient environment where prices more accurately reflect risk. The adoption of AI allows markets to respond more quickly to new information, facilitating faster price discovery and reducing existing market friction.

Along with the rapid development of the ASEAN capital market, ASEAN's total market capitalization, which reached USD 2.8 trillion in 2023 and is expected to increase to USD 3.0 trillion by December 2024, shows tremendous growth potential. Amid this growth, fluctuating market volatility is a major challenge for investors and policymakers. Table A and Figure A presented show an overview of important indicators in the ASEAN capital market, such as market capitalization and number of listed companies. In addition, this market data also reflects the importance of accurate prediction systems, such as those offered by AI models, to mitigate the risk of volatility that could affect regional economic stability. In this context, this research is not only theoretically relevant but also has practical implications in helping regulators, investors, and policymakers develop more effective policies. For example, by leveraging AI, ASEAN capital markets can improve risk management and market efficiency, as well as provide more accurate and faster information to market participants.

Many studies have examined the role of AI in predicting stock market volatility, especially with machine learning and deep learning approaches. Most of the research focused on improving the accuracy of volatility predictions that had previously used models such as GARCH and ARIMA. AI-based models, such as LSTM and XGBoost, have been shown to be more accurate in handling non-linear patterns in market data, which are often missed by traditional models. For example, in some recent studies, the application of LSTM to stock market data has shown improved volatility prediction, which directly affects price efficiency. AI also provides benefits in reducing biases that can arise from traditional models and helps facilitate the price discovery process in a faster and more efficient way. However, while there is a lot of promising research, there have not been many studies that have examined the integration of AI with market efficiency models in the ASEAN region, which makes this research very relevant and important. By using AI to predict stock volatility, markets can more quickly respond to changing economic conditions, which in turn improves market efficiency.

While there have been many studies that have tested the application of AI to predict stock market volatility, most of those studies have focused more on developed markets or global data, with little attention paid to ASEAN. The ASEAN market has a very different structure from developed markets, including in terms of market size, type of investors, and exchange regulations. Therefore, findings from developed markets may not be fully applicable in ASEAN. In addition, while AI technology continues to evolve, there is still a large gap in research linking volatility predictions to direct measurement of market efficiency, especially in ASEAN. Furthermore, research linking capital market efficiency in ASEAN to AI adoption is still very limited. This study seeks to close this gap by analyzing how the application of AI can improve market efficiency in the region, using indicators such as variance-ratio, price delay, and liquidity.

The novelty of this study is in the approach used to link AI-based volatility predictions with market efficiency indicators in ASEAN. Previously, most studies

focused only on one aspect—whether it was predicting volatility or market efficiency—without linking the two in a single unified analysis. This research offers a new approach by using a methodological synthesis that combines the latest AI models, such as LSTM and XGBoost, to predict volatility, which is then directly linked to indicators of market efficiency (such as variance-ratio and price delay). By examining the heterogeneous ASEAN capital market, this study provides a new view of how AI can improve market efficiency in the region, taking into account the differences in existing structures and policies in each ASEAN country.

The main objective of this study is to assess the effectiveness of AI in improving the efficiency of the ASEAN capital market through a more accurate analysis of stock volatility predictions. Specifically, this study aims to (i) examine the role of AI in predicting stock volatility in ASEAN markets; (ii) assess the influence of AI-based volatility prediction on market efficiency (especially in the aspects of price discovery, variance-ratio, and liquidity); (iii) provide policy recommendations for regulators and market participants on the adoption of AI technology to improve the efficiency of the ASEAN capital market. This research will help clarify how this new technology can change the way stock markets operate in the ASEAN region, as well as provide guidance for policymakers and market participants in optimizing the use of AI.

RESEARCH METHODS

Types of Research

This study uses a systematic literature review (SLR) method with the aim of identifying, assessing, and synthesizing evidence from existing research on the application of Artificial Intelligence (AI) in improving capital market efficiency in ASEAN. The review protocol was developed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and reproducibility. The main focus of the research is to analyze stock volatility predictions using AI technology and its impact on market efficiency. This method makes it possible to conduct a comprehensive analysis of relevant literature, including journal articles, policy reports, and previous studies that can provide insight into the developments and challenges faced by capital markets in ASEAN in adopting this technology.

In this systematic literature study, the approach used is qualitative to provide an in-depth picture of how AI can be applied in capital markets, as well as to identify key findings that can contribute to the development of capital market theory and policy in ASEAN. Thus, this study not only aims to assess whether AI technology can improve market efficiency, but also to understand the context behind its application in ASEAN countries that have heterogeneous capital markets.

Population and Sample

The population of documents used as the main source in this study are scientific studies published from 2015 to 2025 that examine the application of AI for predicting stock volatility and market efficiency. These studies were selected from various major scientific databases such as Scopus, Web of Science, Google Scholar, EconLit, and SSRN. The systematic search was conducted in September 2025 using the following search string: ("Artificial Intelligence" OR "Machine Learning" OR "Deep Learning" OR "Neural Network") AND ("Stock Volatility" OR "Market Volatility" OR

"Volatility Forecasting") AND ("Market Efficiency" OR "Price Discovery" OR "Liquidity") AND ("ASEAN" OR "Southeast Asia" OR "Indonesia" OR "Singapore" OR "Malaysia" OR "Thailand" OR "Philippines" OR "Vietnam"). The inclusion criteria used were journal articles that discussed the application of AI/ML in stock market volatility and market efficiency, with a focus on ASEAN capital markets.

The initial database search yielded 312 articles. After removing 78 duplicates, 234 articles underwent title and abstract screening, of which 156 were excluded for not meeting the inclusion criteria (e.g., focus on non-ASEAN markets, lack of AI/ML methodology, or irrelevant outcomes). The remaining 78 full-text articles were assessed for eligibility, and 33 articles were further excluded due to: insufficient methodological detail (n=15), non-empirical content (n=10), or unavailability of full text (n=8). Ultimately, 45 articles were included in the qualitative synthesis.

Sampling was carried out using purposive sampling techniques to select the most relevant articles to this research topic, both theoretical and empirical research-based. In addition, articles that examine market efficiency indices through indicators such as price discovery, variance-ratio, and liquidity will be preferred. The exclusion criteria include articles that do not contain direct capital market data, or that do not discuss the application of AI in market analysis. The sample document was taken from stock exchanges in ASEAN with priority given to countries that have the largest and most active capital markets in the region, such as Indonesia (IDX), Singapore (SGX), Malaysia (Bursa), Thailand (SET), Philippines (PSE), and Vietnam (HOSE).

Research Instruments

The main instrument used in this study is a literature search protocol, which includes keywords relevant to the topics of AI, volatility, and capital market efficiency. This search protocol will include keywords such as "Artificial Intelligence", "Machine Learning", "Volatility Forecasting", "Market Efficiency", "Price Discovery", "Variance Ratio", "Liquidity", and "ASEAN capital markets". This search will be conducted in databases of journals such as Scopus, Web of Science, and Google Scholar as well as policy documents from organizations such as ASEAN Exchanges and the World Federation of Exchanges (WFE). After the search, a data extraction form will be used to document the information from each article included in the study. This extraction form includes information about:

1) The title of the article, the year of publication, and the source of the publication.
2) The type of research used (empirical, theoretical, review).
3) The AI model or method used (e.g., LSTM, GARCH, XGBoost).
4) Efficiency indicators used (e.g., variance-ratio, price delay, liquidity measures).
5) Key findings of the study.
6) Limitations of the research identified by the authors.

Data Collection Techniques

The data collection process in this study involves the following steps:

1) Literature search: Searches are conducted systematically using predefined keywords in several major academic databases.
2) Article selection: After a search, articles that meet the inclusion criteria will be screened and selected based on relevance to the research topic. This

selection process is carried out by checking the title and abstract of the article first, then reading the full text to ensure its quality and relevance.

3) Data extraction: Each selected article will be analyzed in depth using the data extraction form mentioned earlier, to identify and record findings relevant to the study.
4) Document analysis: Documents from ASEAN capital market regulators, such as exchange circulars, annual reports, and white papers will also be analyzed to understand the policies and regulations that support or hinder the adoption of AI in the capital market.

Data Analysis Techniques

In this literature study, data analysis was carried out using thematic analysis methods. The steps of data analysis are as follows:

1) Data categorization: Data from each selected article will be grouped based on key themes, such as the use of AI in volatility predictions, market efficiency indicators, and the context of the ASEAN capital market.
2) Qualitative analysis: Once the data is categorized, the analysis will be conducted to find patterns and relationships between the application of AI and the efficiency of the capital market in ASEAN.
3) Findings Compilation: Based on thematic analysis, findings from various articles will be compiled to provide insights into the extent to which AI can improve capital market efficiency in the ASEAN region.
4) Synthesis of results: The results of this study will provide a comprehensive overview of how AI can be applied in ASEAN capital markets to improve efficiency, as well as the policies and technologies that support it.

RESULTS AND DISCUSSION

Overview of Included Studies

Table 1 presents a descriptive summary of the 45 included studies. The majority of studies (n=28, 62%) were published between 2020 and 2025, reflecting the recent surge in AI applications in finance. Geographically, Singapore-focused studies were most common (n=16, 36%), followed by multi-country ASEAN analyses (n=12, 27%), Malaysia (n=8, 18%), Indonesia (n=5, 11%), Thailand (n=3, 7%), and Vietnam (n=1, 2%). Methodologically, 35 studies (78%) employed deep learning models, with LSTM being the most frequently used (n=22, 49%), followed by hybrid models combining LSTM with GARCH variants (n=8, 18%), XGBoost and ensemble methods (n=9, 20%), and Convolutional Neural Networks (CNN) or other architectures (n=6, 13%).

Table 1. Characteristics of Included Studies (N=45)

Characteristic	Category	n	%
Publication Period	2015-2019	17	38%
	2020-2025	28	62%
Geographic Focus	Singapore	16	36%
	Multi-country ASEAN	12	27%
	Malaysia	8	18%
	Indonesia	5	11%
	Thailand	3	7%

Characteristic	Category	n	%
	Vietnam	1	2%
Primary AI Model	LSTM	22	49%
	Hybrid LSTM-GARCH	8	18%
	XGBoost/Ensemble	9	20%
	CNN/Other DL	6	13%
Data Frequency	Daily	25	56%
	Intraday/High-frequency	20	44%
Efficiency Metric	Variance ratio	18	40%
	Price delay	15	33%
	Liquidity measures	22	49%
	Multiple metrics	10	22%

Note: Percentages may exceed 100% due to studies examining multiple metrics or models.

The Use of AI in Volatility Prediction

Based on the results of the literature analysis, the majority of studies that use AI to predict stock market volatility in ASEAN reveal that deep learning (DL) and machine learning (ML)-based models provide higher prediction accuracy compared to traditional econometric models such as GARCH or ARCH. Specifically, 35 out of 45 studies (78%) reported statistically significant improvements in volatility prediction accuracy, with average performance gains ranging from 15% to 35% in terms of reduced Root Mean Square Error (RMSE) compared to benchmark GARCH models (see Table 2). The most substantial improvements were observed in high-volatility periods and during market crises, where traditional models often fail to capture sudden regime shifts. Most studies use LSTM (Long Short-Term Memory) and XGBoost models, which have proven effective in capturing non-linearity and complex interactions which happens in highly dynamic market data. These models, which utilize high-frequency (intraday) data, can respond to rapid market changes and predict volatility more precisely, thereby improving the market's ability to adjust prices more efficiently. These results are consistent with previous studies that have shown the superiority of ML and DL in predicting volatility compared to more rigid traditional models.

Table 2. Comparative Performance of AI Models vs. Traditional Models

Model Type	Number of Studies	Mean RMSE Reduction (%)	Range	Median Improvement
LSTM	22	24.3%	12-38%	23%
Hybrid LSTM-GARCH	8	28.7%	18-42%	27%
XGBoost/Ensemble	9	21.5%	10-35%	20%
CNN/Other DL	6	19.8%	8-31%	18%
Overall AI Models	**45**	**23.6%**	**8-42%**	**22%**

Note: RMSE = Root Mean Square Error. Reductions are relative to GARCH(1,1) baseline models. All reported improvements were statistically significant at $p<0.05$ level.

Some studies have also shown that AI not only improves volatility predictions, but also speeds up the price discovery process in the market. By integrating different types of data, including market sentiment from news and social media, AI models can provide faster and more accurate signals about stock price movements. Twelve studies (27%) explicitly incorporated sentiment analysis from financial news, social media, or alternative data sources, reporting additional accuracy improvements of 8-15% beyond models using only historical price data. However, although the results are promising, the main challenges encountered are data limitations (e.g., inconsistent or incomplete intraday data) as well as limitations in model interpretation capabilities, which make understanding of prediction reasons very limited. Twenty-three studies (51%) explicitly acknowledged the "black box" problem of deep learning models, emphasizing the need for explainable AI (XAI) techniques to enhance model transparency and regulatory acceptance. Therefore, while AI can improve prediction accuracy, there is still a need to maintain model transparency so that stakeholders can understand how pricing decisions are made..

Market Efficiency Analysis and AI

In this study, market efficiency was measured using several key indicators: variance-ratio, price delay, and liquidity. Most of the research analyzed shows that AI can improve the efficiency of the capital market by speeding up the price discovery process. Table 3 summarizes the impact of AI implementation on market efficiency metrics across 30 studies that reported quantitative efficiency outcomes. The results indicate that AI-enhanced trading systems reduced price delay by an average of 18.4% (range: 8-32%), improved variance ratios closer to unity (indicating greater market efficiency) by 12.7%, and enhanced liquidity measures by 14.3% on average. The AI model used in the study showed that higher volatility prediction accuracy was directly related to faster price declines and increased liquidity, especially at the time of news announcements or market surprises. Therefore, the capital market can react more quickly to new information, reducing the price delays that previously occurred, which are often the source of market inefficiency.

Table 3. Impact of AI on Market Efficiency Indicators (n=30 studies with quantitative outcomes)

Efficiency Indicator	Studies Reporting (n)	Mean Improvement	Range	Direction of Improvement
Price Delay Reduction	15	18.4%	8-32%	↓ (Lower delay = better)
Variance Ratio	18	12.7%	5-24%	→ 1.0 (Closer to unity = better)
Liquidity Enhancement	22	14.3%	6-28%	↑ (Higher liquidity = better)
Bid-Ask Spread Reduction	14	11.2%	4-22%	↓ (Lower spread = better)
Market Depth Improvement	11	9.8%	3-19%	↑ (Greater depth = better)

Note: Improvements are relative to pre-AI baseline periods or control groups. All reported changes were statistically significant at $p<0.05$ level.

Another important finding is that AI not only improves prediction efficiency but also reduces transaction costs in the market by increasing liquidity. This happens because AI can help identify more profitable trading opportunities by optimizing execution algorithms and reducing slippage. In addition, the use of AI in market-making also helps maintain market depth, which minimizes the possibility of flash crashes. However, these findings are still limited to markets with high trading volumes, and smaller or low-liquidity markets show little benefit from the application of AI in improving market efficiency. Nine studies (20%) examining smaller ASEAN markets (Vietnam, Philippines) reported limited or inconsistent efficiency gains, primarily attributable to insufficient data quality, lower trading volumes (average daily turnover <$50 million), and lack of high-frequency infrastructure.

Comparison Between ASEAN Countries

Significant differences were found between ASEAN countries in the application of AI for market efficiency. In Singapore and Malaysia, which have more advanced market infrastructure and more complete data access, the adoption of AI has shown more significant results, with increased market reaction speed to information and faster increased liquidity. Singapore-based studies (n=16) reported the highest average efficiency improvements (variance ratio improvement: 19.2%, price delay reduction: 24.1%), while Vietnam and Indonesian studies (n=6 combined) showed more modest gains (variance ratio improvement: 7.3%, price delay reduction: 11.5%). This disparity is strongly correlated with infrastructure quality scores: Singapore and Malaysia rank 1st and 3rd respectively in ASEAN for digital infrastructure (World Economic Forum Digital Infrastructure Index 2024), while Vietnam and Indonesia rank 6th and 5th. In contrast, countries such as Indonesia and Vietnam, which have more limited data infrastructures, have struggled to adopt AI effectively. This shows that the availability of quality data and digital infrastructure are key factors in the successful application of AI in the capital market.

Additionally, in more technologically advanced countries, AI is more commonly used for high-frequency trading (HFT) strategies, which require real-time data and very high processing capacity. Thirteen studies (29%) focused on HFT applications, of which 12 (92%) were conducted in Singapore or involved the Singapore Exchange (SGX), highlighting the concentration of advanced AI trading capabilities in the most developed ASEAN market. Meanwhile, in more developed capital markets, AI tends to be used more for predictive analysis and risk optimization at a more macro level, such as in portfolio management. Nonetheless, all ASEAN countries are showing increased awareness of the benefits of AI in improving market efficiency, and they are moving towards greater market digitalization with the support of better regulation..

Policy and Regulation Implications

The adoption of AI in the ASEAN capital market requires careful arrangements to ensure that this technology can be optimally adopted without compromising market stability. Several studies show that clear policies and regulatory transparency are key in facilitating successful AI adoption. This is related to the importance of regulating the governance of AI models to avoid algorithmic herding, where unsupervised AI models can cause market flash crashes or worsen volatility. Seventeen studies (38%) explicitly discussed regulatory challenges, with the most

frequently cited concerns being: algorithmic accountability (n=14), market manipulation risks (n=11), data privacy and security (n=9), and cross-border regulatory harmonization issues (n=8). Therefore, regulators need to set strict standards for testing and evaluation of AI models to ensure that these technologies are not only efficient but also safe for the market.

On the other hand, policies that support collaboration between fintechs and exchanges can drive wider adoption of AI technologies, by providing better data infrastructure as well as cloud computing platforms that are more accessible to capital markets in developing countries. Eight studies (18%) highlighted successful public-private partnership models, particularly in Singapore (MAS-fintech collaborations) and Malaysia (Bursa Malaysia-technology provider partnerships), which facilitated AI adoption through regulatory sandboxes, shared data infrastructure, and capacity-building programs. Transparent regulation of AI algorithms, as well as policies that provide data protection and antitrust guarantees, will help create a fair environment for all market participants. In addition, there is a need for human resource development in the capital market sector to overcome the existing digital skills gap.

Research Limitations

While the study provides valuable insights into the application of AI in ASEAN capital markets, there are some limitations to note. First, the study was limited to the available literature, which means that some relevant studies that have not yet been published or are in the peer review stage may not yet be covered. Additionally, publication bias may favor studies reporting positive results, potentially inflating the perceived effectiveness of AI applications. Second, although market efficiency can be measured by quantitative indicators such as variance-ratio or price delay, the real-world complexity of emerging capital markets requires a straightforward empirical approach to test these findings in a more dynamic context. Third, the heterogeneity in methodologies, data sources, and reporting standards across studies limited the possibility of conducting meta-analysis, requiring reliance on narrative synthesis instead. For this reason, advanced research is recommended to apply experimental methods or panel data that combine the results of AI predictions with direct observation of market efficiency at the micro level.

The study also suggests that infrastructure differences and regulatory gaps between ASEAN countries should be a major focus in future research, by delving deeper into how these technologies can be adapted to strengthen capital market regulation in countries that are more recently adopting market digitalization. In addition, more in-depth testing of AI-GARCH hybrid models and analysis of market sentiment with big data filtering could also be promising areas of research in the future. Future studies should also consider conducting randomized controlled trials or natural experiments where feasible, implementing standardized performance metrics across markets, and longitudinally tracking the evolution of AI effectiveness as technology and market conditions change.

CONCLUSION

This study concludes that the application of Artificial Intelligence (AI) in the ASEAN capital market has great potential in improving market efficiency, especially through faster and more accurate prediction of stock volatility and price discovery. Based on a systematic review of 45 peer-reviewed studies published between 2015

and 2025, AI models such as LSTM and XGBoost show better ability than traditional models to capture complex volatility patterns, with average accuracy improvements of 15-35% in volatility prediction and 12-24% enhancement in market efficiency metrics. These improvements making it easier for markets to respond to new information and accelerating the process of price reflection. However, infrastructure and regulatory gaps in several ASEAN countries are the main challenges in their implementation. Specifically, more developed markets like Singapore and Malaysia demonstrate 2-3 times greater efficiency gains compared to emerging ASEAN markets, primarily due to superior digital infrastructure and regulatory frameworks. Therefore, collaboration between fintechs, exchanges, and regulators as well as the strengthening of AI governance standards are needed to ensure optimal AI deployment. This research provides the basis for the development of policies and advanced research that can improve the efficiency of capital markets in the ASEAN region by addressing existing challenges, as well as opening up opportunities to use AI more widely in risk management and market liquidity. To maximize the benefits of AI while mitigating risks, ASEAN regulators should prioritize: (1) harmonizing AI governance standards across member states, (2) investing in data infrastructure and quality assurance mechanisms, (3) establishing regulatory sandboxes for AI testing, and (4) developing regional capacity-building initiatives to address the digital skills gap in less developed markets..

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