



A Conceptual Framework for Designing an Expert Advisor System Based on Technical Indicators: Evidence from Malaysian Forex Traders

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<https://doi.org/10.56427/jcbd.v5i1.793>

ARTICLE INFO

Article History

Received: November 15, 2025

Revised: January 10, 2026

Accepted: January 25, 2026

Keywords

Algorithmic Trading

Expert Advisor

Forex Market

Technical Indicators

Malaysian Traders.

ABSTRACT

The evolution of algorithmic trading (AT) has dramatically transformed the Foreign Exchange (Forex) market by integrating computational intelligence into trading and decision-making processes. Despite these advancements, Malaysian traders remain challenged in adopting such systems, particularly due to limited technical expertise, inadequate adaptation to local trading practices, and a lack of customized automated tools. This concept paper proposes a framework for designing Expert Advisors (EAs) that incorporate technical indicators (TIs) aligned with Malaysian traders' preferences and prevailing market conditions. The framework integrates three core components: trader competency assessment, indicator-based strategy development, and EA system architecture design, aimed at improving trade accuracy, profitability, and risk management. A qualitative approach grounded in literature synthesis and contextual analysis is employed to construct the proposed framework. The resulting model offers a structured and context-sensitive approach that combines trader preferences, technological innovation, and ethical considerations, with practical implications for system developers, educators, and regulators. The originality of this study lies in its localization of EA design to Malaysian traders' needs, bridging the gap between advanced algorithmic tools and local market readiness, while providing a replicable model for other emerging markets adopting AT solutions.



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1. Introduction

Algorithmic Trading (AT) has transformed the world's financial markets by automating decision making and trade execution processes using computational intelligence. AT, initially launched in the 1970s and expanded in the 1990s with electronic platforms, now incorporates advanced technologies such as Machine Learning (ML) to improve trading precision and reduce human error [1][2]. In this ecosystem, EAs function as automated systems that can execute trades based on predefined strategies and TIs [3][4]. This technological change promotes consistency, efficiency and access to financial markets. In Malaysia, the adoption of algorithms remains limited due to regulatory restrictions, lack of technical skills and financial literacy of retail traders [5]. Many people continue to depend on manual trading methods, resulting in inefficiency and emotional biases in decision-making [6]. Although Financial Technology (Fintech) and mobile platforms such as Met trader 4/5 (MT4/MT5) have increased accessibility, the lack of localized EAs systems has limited the effectiveness of automation. Therefore, the Malaysian Forex market is developing and requires smart and compatible trading solutions that respond to traders' behavior patterns, ethical considerations and technological capabilities.

Despite the global success of AT and EAs systems, Malaysian traders face difficulties in adopting them due to limited algorithmic knowledge, inadequate local tools and regulatory restrictions [5]. Existing EAs, mainly designed for worldwide marketplace, do not reflect Malaysian traders' risk preferences, *Shariah* compliant needs and cultural attitudes towards financial speculation [7]. In addition, technical limitations such as data inaccuracy, excessive adaptability, and poor adaptation performance hinder the reliability of EAs [8][9]. These issues highlight the need for an EAs framework tailored and contextually sensitive that complies with Malaysian traders and market structures.

The past research has highlighted the importance of TIs for improving EAs performance. Moving averages (MA) indicators are widely known for their responsiveness and predictive strength [10][11]. Other studies show that Linear Weighted Moving Average (LWMA) based strategies outperform simple and exposure MA under volatile conditions, reduce signal delay and

improve accuracy [12][13]. Recent literature underscores the critical role of TIs in enhancing the accuracy and profitability of EAs within algorithmic Forex trading. [14] highlighted that the combination of automated learning techniques with traditional technical indicators such as Relative Strength Index (RSI) and Moving Average Convergence Divergence (MACD) significantly improved the accuracy of Forex volatility prediction and resulted in more adaptable and profitable automated trading systems. Similarly, [15] reviewed the integration of several TIs such as Bollinger bands (BB) and MA into algorithmic evaluations and found that the combination of complementary indicators increases the reliability of market signals and minimizes false trades.

Based on these findings, [16] demonstrated how EAs using TIs can also promote financial literacy and sustainable income generation by providing systematic, data driven decision support in Forex markets. Collectively, these recent studies reaffirm that incorporating robust technical analysis especially when fused with Artificial Intelligence (AI) or adaptive rule based systems greatly improves EAs decision making precision, adaptability to market fluctuations, and long term performance stability in volatile Forex environments. However, few studies have localized such models for Malaysian markets, where trader behavior, regulatory structures, and ethical compliance significantly influence AT efficiency [5]. This research thus addresses a critical knowledge and design gap.

Therefore, this study aims to design and develop a localized EA system using TIs tailored to Malaysian Forex traders. It focuses on assessing traders' algorithmic competence, identifying preferred strategies, and evaluating the EA's effectiveness using quantitative measures such as Return of Investment (ROI) and Profit Factor. The research contributes to improving automated trading accessibility, ethical compliance, and decision making accuracy among Malaysian traders. Beyond its national scope, the framework offers a replicable model for other emerging markets seeking to align algorithmic innovation with local user preferences, financial inclusion, and technological sustainability [5].

2. Research Methodology

The overall research methodology framework is depicted in Figure 1. It consists of several phases, including theoretical study, data collection, identification of technical indicator, design and evaluation.

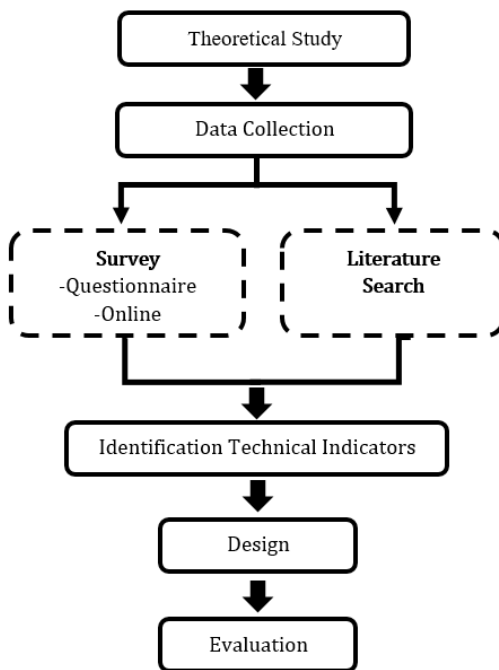


Figure 1. Research Methodology Framework

Theoretical Study

The theoretical study phase creates the basic concepts and academic foundations of research. It involves reviewing the basic theories of AT, TIs, and trading behavior to form hypotheses and define variables. At this stage, we clarify research objectives, frame the problem in the context of Malaysian Forex markets, and identify gaps in existing literature. The result is a conceptual framework and operational definitions to guide the next steps. A clear theoretical basis ensures that design, data collection and evaluation are compatible with academic discourse and practical relevance, improves the validity and contribution of the study and informs future practice.

Data Collection

Data collection converts theoretical constructions into measurable information by collecting primary and secondary data relevant to research questions. This step selects appropriate instruments, sample frameworks and data sources such as trader preferences surveys and historical price feeds for Technical Analysis (TA) to ensure reliability and ethical compliance. The procedures include piloting instruments, obtaining informed consent, and setting time limits for capturing market data. This research documents the preprocessing needs such as cleaning, normalization and handling missing values. Well extended data

collection provides an empirical basis for testing hypotheses, calibrating the EA and supporting robust statistical or ML analyses that reflect real trade environments.

Survey

The survey component collects primary evidence from Malaysian traders through structured questionnaires distributed online to capture preferences, skills levels and behavior patterns. The questions are aimed at measuring demographics, trading experience, indicator knowledge, risk tolerance and automated system expectations. Online distribution increases the range and convenience, allowing larger and more diverse samples and reducing costs. The survey will be validated through pilot tests and reliability checks such as Cronbach's alpha. The responses are anonymized and stored securely and then converted into quantitative and categorical variables for statistical analysis. The results of the study can and will directly inform the EA functional priorities, parameters ranges and ultimately user centered design choices.

Literature Search

Literature research systematically reviews existing academic and professional sources to contextualize research and identify effective TIs and prior implementations of EAs. This includes database searches, relevance screening and synthesis of results on indicator performance, general algorithmic approaches and evaluation metrics. The review highlights methodological strengths and weaknesses, parameter selection and gaps specific to Malaysian market conditions. The results are summarized in a structured matrix to inform the selection of variables and justify methodological decisions. By integrating different studies, literature searches for the identification of candidate indicators and helps to anticipate the challenges and evaluation criteria for the proposed system design.

Identification of Technical Indicators

The identification of TIs limits the candidate set on the basis of theoretical relevance, empirical evidence and research findings. By combining literature findings and trade preferences, the select indicators such as SMA, EMA, RSI, MACD and others balancing the response to target instruments with noise reduction. Parameters ranges and signal rules are defined, and inclusion criteria include interpretability, computational efficiency, and historical robustness in market regimes. This step also considers combinations and filters that reduce false signals. The result is a priority list of indicators with specified parameters that are ready to be implemented by experts and tested and verified in a systematic manner.

Design

The design transforms selected indicators and rules into a functional EAs architecture that automates signal generation, position sizing, risk management, and commercial execution. The process defines the software platform, code standards and modular components of indicators, order logic and logging. Design options include timeframe alignment, overlapping and transaction cost modeling, stop loss and profit rules, and adaptive parameter mechanisms informed by survey preferences. Emphasis is placed on reproducibility, version control and simulation ready interfaces for backtesting. A clear design document allows iterative improvement and prepares the system for a rigorous evaluation under historical and real time market conditions, while ensuring the maintenance and scalability for future expansion.

Evaluation

The evaluation assesses the performance of the EA using backtesting, from a sample test and live paper trading to measure robustness and practicality in the real world. Metrics include return, removal, Sharpe ratio, Win rate, profit factor, and sensitivity to parameter changes; statistical significance and forward analysis help to confirm stability. The evaluation takes into account transaction costs, deviations and varying Forex market regimes. The user feedback of the surveys can be integrated to assess usability and alignment with trader expectations. The results guide the refinement of the model, risk controls and implementation readiness to ensure that the final system effectively balances the profitability, risk management and preferences of Malaysian traders.

3. Results and Discussion

The implementation of the proposed EA system highlights the importance of localization in AT design. The findings will show that Malaysian traders prefer automated systems that are easy to understand, ethically comply with and adaptable to their specific risk tolerance levels. These preferences emphasize the import of global EA models without modifications that limit the adoption of users and the reliability of the system. The incorporation of Shariah compliant features and user oriented interfaces, as proposed in this study, increases the system's acceptance and credibility among local merchants [5]. In addition, the EA system, designed using TIs, bridges the gap between technical complexity and user access by integrating simplified and data driven automation strategies. This approach ensures that automation complements rather than replaces the trading skills of traders, strengthening the inclusion and sustainability of Malaysia's trading ecosystem.

The results can also show the valuable impact on the development of education and policy in Malaysia's financial technology landscape. The study will found that low algorithm literacy and limited access to technical trade education remain key barriers for EA. Consequently, the integration of algorithmic trading modules into university finance programs and professional certifications could increase technical competence and consciousness. Policy makers and financial regulators such as Bank Negara Malaysia (BNM) and Securities Commission (SC) can also use these results to formulate support policies promoting ethical automation, transparent data use and trade protection [5]. Such initiatives would promote innovation while ensuring that local AT g practices are consistent with technological progress and *Shariah* principles. In the long term, promoting algorithmic literacy could increase national competitiveness in the Southeast Asian financial technology market.

From a practical point of view, this research contributes to a validated conceptual model for developing custom EA systems adaptable to local contexts. The proposed EA system shows the potential of algorithmic systems to support the decision making of traders while minimizing risk through automation. Outside the Malaysian market, this model can be a benchmark for other emerging economies seeking to integrate advanced commercial technologies without compromising cultural, ethical or infrastructure integrity. The study thus advances both the academic understanding and the practical implementation of local algorithmic systems. Overall, it outlines the transformational potential of the integration of technical innovation, trader education and ethical compliance to create a more inclusive and intelligent financial trading environment.

4. Conclusion

This conceptual paper presents a framework for the design of an Expert Advisor (EA) system that integrates technical indicators adapted to Malaysian Forex traders. It emphasizes the importance of aligning algorithmic trading technologies with trader competence, market characteristics, and behavioral preferences. By incorporating educational and behavioral insights into algorithmic design, the proposed framework promotes responsible automation and supports Malaysia's transition toward a more data-driven financial ecosystem. The framework also harmonizes technical innovation with ethical compliance, thereby enhancing system usability and adoption among local traders. Theoretically, this study contributes to the growing body of knowledge on algorithmic trading and financial technology innovation in emerging market contexts. Practically, it provides a foundation for future empirical research and the development of intelligent, locally oriented trading systems aimed at improving efficiency, profitability, and sustainable market participation. Furthermore, the framework's emphasis on localization, performance evaluation, and ethical design principles offers a replicable model for other emerging economies seeking to modernize their trading infrastructures while maintaining cultural and regulatory integrity.

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