

CHAPTER I :INTRODUCTION

1.1 Background of Study

On 15th July 2020, Bursa Malaysia have revealed that the local retail participation standing had increased from 24% in mid-June last year to 41.44% (Tan, 2020). Consequently, this has progressed the FTSE Bursa Malaysia KLCI Index which helped in recuperating the losses from sell-off in March due to the Movement Control Order (MCO) implemented by Malaysian government (Lee, 2020). On 20th July 2020, Malaysian local bourse also has shown to continue in raising the stock trading volume to its highest level in Bursa's history of 12.5 billion in spite of the statement by the International Monetary Fund (IMF) that stated Covid-19 pandemic has been the worst financial crisis after 1930s Great Depression crisis (BBC News, 2020). Bursa Malaysia recorded a 62.0% increase of its Profit After Tax and Minority Interest of RM151.0 million from RM93.2 million in the previous year, the highest first-half financial performance since its listing in 2005, thus indicates the ongoing efforts in growing the stock market vibrancy and liquidity during the challenging pandemic situation have shown a positive influence on the stock market (Bursa Malaysia, 2020).

Even though the recent vast trading volume which marked an all-time peak of 27.8 billion on 11 August 2020 (The Star, 2020), Bursa Malaysia has expressed their concern over the retail investors, especially the beginners. It is essential for the first-time investors to have a proper assessment and analysis from a fundamental and technical perspective so that they could make informed investing decisions and understand that their investments complemented their investment goals and risk appetite. Based on the current fact that the CDS accounts opened in the first seven months of 2020 were 78% of investors aged 45 years and below, investor

education and literacy is equally significant agenda to be elevated as getting retail investors into stock market has always been a priority for the local bourse.

Therefore, the millennial investors in the stock market need to be knowledgeable in expanding the assort of digital trading platforms, stimulating many types of decision-making and analytical Artificial Intelligence (AI) powered tools as well as leveraging digital technology (Wei, 2020). These efforts could inspire retail investors to fully utilize the available sources in making sure to have a sustainable market in the long term. As a result, stock investment has been taking the interest of researchers in academic field as well as financial experts and investors.

Generally, in trading strategy, there are two different approach in analysis that they can do, namely fundamental analysis, and technical analysis. Both methods can be used for research and of course for forecasting future trends in stock prices. By definition, fundamental analysis is a method that is widely used for estimating the movement of the security price in order to analyse the impact of micro and macro-economic factors on the business of the corporation in predicting future financial and economic effects (Baresa et al., 2013). Meanwhile, technical analysis is a method used to forecast stock prices based on historical stock prices and volumes by observing different types of charts (Lo et al. 2000).

In technical analysis in particular, technical indicators play an important part of trading strategy. Technical indicators are mathematical formulas based on market data such as prices and volume to indicate possible changes in market direction that might not be apparent in fundamental analysis or price analysis (Schwager, 2017). Traders can take note of any information that they can get from technical indicator and justify them so that they can make a greater profit and lessen the risk. It matters in foreign exchange trading, share trading and even commodities trading because it can be beneficial to apply technical analysis indicators as component of trading strategy. Traders typically bring together a number of technical indicators

with further subjective forms of technical analysis, such as looking at chart patterns, to come up with trade ideas (Chen J. , 2020).

Nowadays with Algorithmic Trading, investors are looking into Machine Learning (ML) algorithms under artificial intelligence (AI) to make successful investment decisions (Khoo & Kaur, 2017). Based on calculations made by using ML models, it then takes initiatives to sell, hold, or buy stocks and given the trading operations are in vast volumes, even a small advantage is equivalent to significant profits. At the moment, there are various models that can be implemented as trading strategy to predict the direction of the stock price. It is known that traditional ML shows a robust ability in forecasting of stock prices (Dey et al., 2016; see also Basak et al., 2018; Zaini et al., 2019). Though these days, Deep Neural Network (DNN) under Deep Learning have made many big discoveries in the analysing big data such as image classification, language translation, generative adversarial networks, etc (Weidman, 2017). Consequently, deep learning is currently used in quantitative trading and time series prediction. Each ML algorithms have its own advantages and disadvantages when it is implemented as trading strategies. Since there are several of them, many researchers, not only traders, study and analyse the efficiency and performance of ML models as trading strategy in predicting stock price.

1.2 Problem Statement

One of the basic problem for beginner investors is that the investors have a preconceived notion on investment which results in biasness when making an investment decision without taking account of other information and knowledge (Shafii et al., 2019). Consequently, Bursa Malaysia has expressed their concern over the retail investors especially beginner investors (The Star, 2020). Thus, it is important to understand the model used in trading strategy so that it fulfils the investor's objective when trading.

Recent finding from by Dash & Dash (2016) stated that, it is more profitable to use a combination of technical indicators with computational intelligence tools in making stock trading decision. It is consistent with previous findings (Phooi M'ng et al., 2016, Dongdong et al., 2019) which show that the technical indicators that combined with ML models as a trading strategy has higher Annualized Return Rate (ARR) than the well-known Buy and Hold strategy. Hence, it is useful to explore and develop more robust algorithm like ML with technical indicators in forecasting returns (Yao et al., 1999; Phooi M'ng, 2016).

Nonetheless, insufficient research development and limited broad data analysis of different ML models has put constraints on the usefulness of ML as stock market prediction methods. Most study either use traditional ML or deep learning models, but only few uses both traditional ML and Deep Learning for comparison in performance of the models (Dongdong et. al, 2019; see also Krauss et al., 2016; Samad et al., 2019; Ryll & Seidens, 2019; Zaini et al., 2019). Previous findings generally concentrate on the stock index's prediction or select a few stocks with restricted features based on their own preferences (Agarwalla et al., 2016; Sagir & Sathasivam, 2017; Soon et.al, 2018). Other than that, there are past studies that uses short backtesting period in price prediction (Yiing & Thim, 2015).

1.3 Research Aim and Objectives

The study aims to analyse the performance of stocks using six ML models as trading strategy in forecasting stock price movement. Hence, the specific objectives of this study are listed below:

- i. To examine the efficiency of ML models in price prediction by assessing the directional evaluation indicators.
- ii. To investigate the efficiency of ML models in price prediction through performance evaluation indicators.

- iii. To test the significant difference of evaluation indicators between ML models in price prediction.

1.4 Research Questions

The research questions for this study are as follows:

- i. How efficient is the ML models in price prediction in assessing the directional evaluation indicators?
- ii. How efficient is the ML models in price prediction through performance evaluation indicators?
- iii. Is there any significant difference of evaluation indicators between the ML models in price prediction?

1.5 Importance of the Study

This study is significant especially for investors or analysts who are aiming to either maintain or boost their profit value by investing in the listed company's stock with higher expected income. They should be able to generate stock investment judgments once they know which ML model fits to be utilized in predicting the future direction of the ups and downs of the stock. This will not only help the investors but also the stock trading prediction developer companies that provides services for investors in price prediction. Based on the findings of this study, the developer can implement the selected ML models to their system in price prediction according to their purposes. Moreover, this study is important for researchers as the findings can contribute to extension of ideas and data analysis on predicting stock prices and stock trading strategy. This then can also help boost the application of ML in quantitative trading and time series prediction.

1.6 Scope and Limitation of the Study

The scope of the research is on the daily trading stock prices in Malaysia and limited to the stocks from Bursa Malaysia only. This study focuses on the technical analysis, instead of fundamental analysis. Given the amount of time to finish this study, three traditional ML models, and three Deep Learning models are selected, respectively. Thus, the comparison on the efficiency between the ML models is made based on the selections. It is worth to mention that the term ML model can be used interchangeably with trading strategy. Finally, the default programming language used in this study is R language.

