

UNIVERSITI TEKNOLOGI MARA

**TECHNICAL ANALYSIS
EFFICIENCY ENHANCEMENT IN
MOVING AVERAGE INDICATOR
THROUGH ARTIFICIAL NEURAL
NETWORK**

MUHAMAD SUKOR BIN JAAFAR

Thesis submitted in fulfilment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Business and Management

August 2017

ABSTRACT

The technical approach to investment is essentially a reflection of the idea that prices move in trends which are determined by the changing attitudes of investors toward a variety of economy, monetary, political and psychological forces (Pring, 2001). The response of stock prices toward the changes in economic variables vary from one to another hence, it makes trading decision to be very complex (Darie et. al., 2011). Efficiency refers to the ability to produce an acceptable level of output using cost-minimizing input ratios (Farrel, 1957). Thus, in technical analysis, efficiency refers to the ability of the indicators to indicate a good timing of entry and out of the market with profit. And levels of efficiencies are showed by actual output ratios versus expected output ratios (Shao and Lin, 2001). The higher the actual output ratios against the expected output ratios, the higher the efficiency level of the indicators. This research investigates several technical indicator and found none of the indicators reached the efficiency level. To improve the level, this study apply the Artificial Neural Network model that capable to learn the price and the moving average pattern and suggest a new pattern better than the previous one in term of efficiency. This research found that the improvements are not just to the efficiency but also increase number of trading as per selected period hence increase the changes of investor to enter and exit from the market with possibility of a better profit as compared to traditional technical analysis.

ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and the Most Merciful. Alhamdulillah. First and foremost, I would like to express my humble gratitude to the Almighty Allah (swt). Peace and blessings be upon Muhammad, His servant and messenger. This manuscript is dedicated to my family and my parent for their love and prayers.

I want to express my deeply grateful thanks to my supervisor Professor Dr. Ismail bin Ahmad from Faculty of Business and Management, UiTM Shah Alam who provided me with help, continuous moral support, extraordinary supervision and ideas that guided me through my work. I also wish to thank Associate Professor Dr. Saiful Hafizah bt Jaaman from School of Mathematic Sciences, UKM, who assisted me in constructing the technical modelling. To Dr. Abdul Aziz Karia, Faculty of Business and Management, UiTM Sabah, Kota Kinabalu Campus, thank you very much for teaching me Neural Network using Matlab Software. I have spent more than a year; try to understand Neural Network testing procedure, but he just need one day to explain everything I need. May Allah gives His greatest blessing for the knowledge and the good deeds to all of you, InshaAllah.

To my family; Wife Sharifah binti Aliman and sons Dinie Syahiran, Dhia Syahmie and Danish Syazanie, thank you for all the great love and patience. To my father and mother who always pray for my success. These are the people who give me strength and inspiration to finish my research. Alhamdulillah. Wassalam.

TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR’S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF CHARTS	xviii
CHAPTER ONE: INTRODUCTION	1
1.1 Introduction	1
1.2 Background of Research	5
1.3 Problem Statement	7
1.4 Research Objectives	8
1.5 Theoretical Framework	8
1.6 Significant of Study	14
CHAPTER TWO: LITERATURE REVIEW	15
2.1 Introduction	15
2.2 Efficiency on Technical Analysis Indicators	19
2.3 Artificial Neutral Network	24
CHAPTER THREE: DATA AND METHODOLOGY	28
3.1 Introduction	28
3.2 Data Source	28
3.3 Technical Indicators	30
3.4 Artificial Neutral Network	36
3.5 Hyphotheses	39

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

Technical analysis is a method of predicting the price movement of underlying assets. It is widely accepted by investors even though some may question the effectiveness of its tools. The development of technical analysis grew rapidly since end of last century when investors are demanding for a better price prediction tools. This encourages more professionals and researchers especially from academic world to study and develop tools that much efficient and reliable in predicting price movement (Darie and Mircea, (2011) and Smith, Wang, Wang and Zychowicz, (2016)). Eventually, the prediction techniques can be done through the simulation of charts, price pattern, seasonality and computation rules. By using a historical data, technical analysis attempt to find anomalies of stock price pre-reversal movement. The technical approach to investment is essentially a reflection of the idea that prices move in trends which are determined by the changing attitudes of investors toward a variety of economy, monetary, political and psychological forces (Pring, 2001). These sets of data will allow the investors to select the best technical indicators and test it through the simulation for short term or long term and also to combine it with other indicator(s) as a volume and money flow. However, the challenge come as each stock moves differently. The response of stock prices toward the changes in economic variables vary from one to another hence, it makes price prediction to be very complex (Darie *et. al.*,2011). This is where the enthusiasm of the researcher comes to beat the challenge of the difficulties with the introduction of much advanced model.

Prings (2001) beautifully defined technical analysis as ‘*an art to identify trend changes at an early stage and to maintain an investment posture until the weight of the evidence that the trend has reversed.*’ Technical analysis is concerned with what has actually happened in the market, rather than what should happen. A technical analyst will study the price and volume movement of a financial instrument. From the data,