FINANCIAL CLUSTERING CHANGES IN COAL PRODUCTION INDUSTRY BEFORE AND AFTER ACQUISITION USING FUZZY LOGIC ALGORITHM (CASE STUDY PT DIAN SWASTATIKA SENTOSA, Tbk)

THESIS

Submitted as one of the requirements for obtaining
a Master of Management degree

Iksan Adityo Mulyo
NIM 2221801001

STUDY PROGRAM
MAGISTER MANAJEMEN
UNIVERSITAS BAKRIE JAKARTA
2024

ORIGINALITY STATEMENT PAGE

This thesis is my own work,
and all sources both quoted and referenced
I have correctly stated.

Name	**: Iksan Adityo Mulyo**
NIM	**: 2221801001**
Signature	**: .....**
Date	**: .....** August 27th, 2024

APPROVAL PAGE

This thesis is submitted by :

Name	: Iksan Adityo Mulyo
NIM	: 2221801001
Study Program	: Management
Thesis Title	: Financial Clustering Changes In Coal Production Industry Before And After Acquisition Using Fuzzy Logic Algorithm (Case Study PT Dian Swastatika Sentosa, Tbk)

Has been successfully defended before the Board of Examiners and accepted as part of the requirements needed to obtain a Master's degree in Management at the Master of Management Study Program - Bakrie University

BOARD OF EXAMINERS

Supervisor : Dr. Jerry Heikal, S.T, M.M (Jheikal.....)

Examiner : Arief Bimantoro Suharko., BSEE, M. Sc Eng, Ph. D (.....)

Examiner : Ir. Deddy Herdiansjah, MSc, MBA, PhD (.....)
DH

Determined in : Jakarta.....
Date : August 18th, 2024

ACKNOWLEDGEMENT

Praise to Allah SWT, for His blessings and grace, the author can complete this thesis. The writing of this thesis is done in order to fulfill one of the requirements to achieve the degree of Bachelor of Economics Study Program.Management at the Faculty of Economy and Social Science Bakrie University. I realize that, without the help and guidance from various parties, from the lecture period to the preparation of this thesis, it is very difficult for me to complete it. Therefore, I would like to thank to:

1) Sir Dr. Jerry Heikal, S.T, M.M, as the supervisor who has provided time, energy, and thought to direct me in the preparation of this thesis;
2) Sir Arief Bimantoro Suharko., BSEE, M. Sc Eng, Ph. D and Sir Ir. Deddy Herdiansjah, MSc, MBA, PhD, as the board of examiner who have given me advice, time, and support to guide me to complete this thesis;
3) my wife and daughter who give me long life support every day to complete my study;
4) my parents and family who have provided moral support; and
5) my friends from MM & MBA CQU-Bakrie Batch 5 who have helped me a lot in completing this thesis.

Finally, I hope that Allah SWT will be pleased to repay all the kindness of all those who have helped me. all those who have helped. Hopefully, this thesis will bring benefits to the development of science.

PUBLICATION APPROVAL STATEMENT PAGE

As an academic member of Bakrie University, I am the undersigned:

Name : Iksan Adityo Mulyo

NIM : 2221801001

Study Program : Management

Thesis Type : Research Thesis

for the sake of scientific development, agree to grant to Bakrie University **a Non-exclusive Royalty-Free Right** on my scientific work entitled:

Financial Clustering Changes In Coal Production Industry Before And After Acquisition Using Fuzzy Logic Algorithm (Case Study Pt Dian Swastatika Sentosa, Tbk)

along with existing devices (if needed). With this Non-Exclusive Royalty Free Rights Bakrie University has the right to store, transfer media/format, manage in the form of a database, treat, and publish my thesis as long as I keep my name as the author/creator, without the need to request permission from me.

Thus I make this statement truthfully.

Made at : Jakarta

On the date : August 27th, 2024

Who declares

(Iksan Adityo Mulyo)

Financial Clustering Changes in Coal Production Industry Before and After Acquisition Using Fuzzy Logic Algorithm (Case Study PT Dian Swastatika Sentosa, Tbk)

Iksan Adityo Mulyo

ABSTRACT

This study aims to analyze the changes in financial clustering in the coal production industry before and after acquisition using fuzzy logic algorithm, with a case study on PT Dian Swastatika Sentosa, Tbk. The method employed is Fuzzy C-Means (FCM) clustering to assess the company's financial performance changes, comparing periods before and after acquisition. The research is expected to provide insights into the impact of acquisition on financial clustering within the industry, offering valuable for stakeholders. Financial performance changes result from September 2020 until September 2023, there are 5 (five) companies has static financial performance changes (ADRO, AIMS, BOSS, BYAN and ITMG). Also 6 (six) companies have going down financial performance changes (BSSR, GEMS, HRUM, MBAP, PTBA and TOBA). Other 7 (seven) companies have going up financial performance changes (ARII, BUMI, DSSA, GTBO, INDY, KKGI and SMMT). PT Dian Swastatika Sentosa Tbk (DSSA) experienced financial improvement, going up from Category C (Moderate) in September 2020 to Category B (Good) in September 2023, driven primarily by its strategic acquisition of BHP Minerals Pty Ltd.

Keywords: Financial clustering, acquisition, fuzzy logic, coal industry, financial performance.

TABLE OF CONTENTS

ORIGINALITY STATEMENT PAGE ..... **II**

APPROVAL PAGE ..... **III**

ACKNOWLEDGEMENT ..... **IV**

PUBLICATION APPROVAL STATEMENT PAGE ..... **V**

ABSTRACT ..... **VI**

TABLE OF CONTENTS ..... **VII**

LIST OF FIGURES ..... **IX**

LIST OF TABLES ..... **X**

CHAPTER I INTRODUCTION **1**

1.1 Background 1
1.2 Research Problems 6
1.3 Objectives 6
1.4 Delimitations 6
1.5 Research Merits 6

CHAPTER II LITERATURE REVIEW **8**

2.1 Research Concept 8
2.1.1 Segmentation *8*
2.1.2 Financial Indicators *8*
2.1.3 Fuzzy Logic *10*
2.2 Relevant Studies 18

CHAPTER III METHODOLOGY **27**

3.1 Research Object 27
3.2 Sampling 27
3.3 Operating variable and data type 29
3.4 Data Analysis 30

CHAPTER IV **33**

RESULTS AND DISCUSSION **33**

4.1 Fuzzy Logic Analysis 33
Assets and Liabilities 36
Equity and Sales 37
Earnings Before Tax (EBT) and Profit 37
Dividend and Earnings Per Share (EPS) 38
Book Value (BV) and Price Earnings Ratio (PER) 38
Price to Book Value (PBV) and Debt to Equity Ratio (DER) 38
Return on Assets (ROA) and Return on Equity (ROE) 39
Net Profit Margin (NPM) 39
4.3 Categorized each clusters from 2020's data 39
Assets and Liabilities 48
Dividend and Earnings Per Share (EPS) 49
4.5 Categorized each clusters from 2023's data *51*
4.6 Clustering 2020's data *54*
4.7 Clustering 2023's data *58*
4.8 Particular Membership Clusters *62*

4.9 SUMMARY 64
. ..... *72*

CHAPTER 5 72

CONCLUSION 72

REFERENCES 80

APPENDIX A 84

APPENDIX B 86

LIST OF FIGURES

Figure 1.0 1 Historical and projected coal mine investments worldwide 2
Figure 1.0 2 Projections in Coal Demands in major regions all over the world..... 3
Figure 1.0 3 Actual and predicted Indonesian coal stock prices since the COVID-19 pandemic began (Thorbecke, 2023) 4
Figure 2.0 1 Diagram of Processing Financial Clustering Changes using Fuzzy Logic in Coal Production Industries (Author process, 2024) 29
Figure 4.0 1 Visualization of Data Clustering..... 36
Figure 4.0 2 Visualization of 2023's Data Clustering..... 48

LIST OF TABLES

Table 2.0 1 Relevant Literature 18
Table 3.0 1 Financial metrics from September 2020 period 27
Table 3.0 2 Financial metrics from the September 2023 period. 28
Table 3.0 3 Financial metrics and variables. 29
Table 4.0 1 Clustering using fuzzy logic result based on 2020 data 34