

Table of Contents

ABSTRACT	II
ACKNOWLEDGMENT	V
GLOSSARY OF KEY TERMS USED	XI
CHAPTER 1 BACKGROUND	1
1.1 INTRODUCTION	1
1.2 PROBLEM FORMULATION	5
1.3 RESEARCH OBJECTIVE	5
CHAPTER 2 LITERATURE REVIEW	6
2.1 SUSTAINABLE AVIATION FUEL (SAF)	6
2.2 SUPPLIER SELECTION IN SUSTAINABLE PROCUREMENT	11
2.3 DECISION SUPPORT SYSTEM (DSS)	15
2.3.1 Data Integration and Processing	18
2.3.2 Deep Learning (DL) in Decision Support Systems	20
2.3.3 Expert Systems and Knowledge-Based Systems in AI-based Decision Support Systems	22
2.3.4 Architecture and Implementation of AI-Based Decision Support Systems	24
2.4 MACHINE LEARNING (ML) IN DECISION SUPPORT SYSTEMS	26
2.4.1 Decision Tree (DT)	27
2.4.2 Random Forest (RF)	30
2.4.3 XGBoost	31
2.5 MULTI-CRITERIA DECISION-MAKING (MCDM) IN SUSTAINABILITY	32
2.5.1 AHP method	33
2.5.2 TOPSIS Method	33
2.6 GAP RESEARCH	36
2.9 RELEVANCE OF RESEARCH TO THE SDGS	37
CHAPTER 3 RESEARCH METHODOLOGY	38
3.1 RESEARCH DESIGN	38
3.1.1 Overview of Research Approach	38
3.1.2 Comparison with Alternative Methods	38
3.1.3 Reason for Method Selection	39
3.2 CRITERIA SELECTION	41
3.3 MODEL DEVELOPMENT	43
3.4 SCENARIO DESIGN	45
3.5 MODEL EVALUATION AND VALIDATION	46
CHAPTER 4 RESULT	49
4.1 DATA SOURCE IDENTIFICATION	49
4.2 DATA PREPROCESSING	50
4.2.1 Data Integration	51
4.2.2 Data Cleaning	52
4.2.3 Data Transformation	55
4.3 FEATURE SELECTION	60

4.3.1 Random Forest Feature Importance.....	60
4.3.2 Recursive Feature Elimination (RFE).....	61
4.4 PREDICTIVE ANALYTICS AND MODEL PERFORMANCE	63
4.4.1 Model Training and Evaluation Setup	63
4.4.3 Model Comparison Results.....	64
4.5 SCENARIO ANALYSIS	69
4.5.1 Scenario Setup	69
4.5.2 Results of Scenario	71
4.6 BEST MODEL SELECTION AND RECOMMENDATIONS	74
4.7 KEY FINDINGS SUMMARY	74
CHAPTER 5 DISCUSSION.....	76
5.1 INTERPRETATION OF RESULTS.....	76
5.3 RESEARCH LIMITATIONS.....	78
5.4 RECOMMENDATIONS FOR FUTURE RESEARCH.....	78
CHAPTER 6 CONCLUSION	79
REFERENCE.....	80