Chapter 4: Results and Discussion

# 4.1 Introduction

This chapter presents comprehensive results and analysis of the GSE Sentiment Analysis and Prediction System developed to address the research question: "How can big data analytics and sentiment analysis be leveraged to predict stock market movements on the Ghana Stock Exchange?" The analysis encompasses multiple dimensions including data collection outcomes, sentiment analysis performance, machine learning model evaluation, correlation studies between sentiment and stock price movements, predictive accuracy assessments, and sector-specific analyses.  
  
The chapter is structured to provide a systematic examination of the research findings, beginning with data collection results and progressing through increasingly complex analytical layers. Each section includes statistical validation, methodological justification, and interpretation of results within the context of existing literature on behavioral finance and sentiment analysis (Tetlock, 2007; Baker & Wurgler, 2006).  
  
All results are presented with appropriate statistical measures, confidence intervals, and significance testing to ensure academic rigor and research integrity. The analysis draws upon established methodologies in financial econometrics and natural language processing, adapted for the specific context of an emerging African market (Bollen et al., 2011; Loughran & McDonald, 2011).

# 4.2 Data Collection and Processing Results

## 4.2.1 Research Methodology and Data Sources

The data collection phase employed a multi-source approach consistent with established practices in financial sentiment analysis research (Garcia, 2013; Heston & Sinha, 2017). The system integrated automated web scraping, social media monitoring, and manual expert input to ensure comprehensive coverage of market sentiment. The data spans a 24-month period from January 2023 to December 2024, providing sufficient temporal coverage for robust statistical analysis and model training.

## 4.2.2 News Articles Collection

The automated news scraping system successfully collected comprehensive financial news data from six major Ghanaian news sources, representing broad coverage of financial journalism in Ghana. The sources were strategically selected based on their market reach, journalistic credibility, frequency of financial reporting, and influence on investor sentiment. The collection yielded a total of 3,147 news articles over the 24-month analysis period, averaging 4.30 articles per day.

### Table 4.1: News Articles Collection Summary

|  |  |  |  |
| --- | --- | --- | --- |
| News Source | Articles Collected | Percentage | Average Daily Volume |
| GhanaWeb | 847 | 26.9% | 1.16 |
| MyJoyOnline | 623 | 19.8% | 0.85 |
| Citi FM | 456 | 14.5% | 0.62 |
| Joy News | 521 | 16.6% | 0.71 |
| Graphic Online | 389 | 12.4% | 0.53 |
| Daily Graphic | 311 | 9.8% | 0.43 |
| Total | 3,147 | 100% | 4.30 |

Note: Daily volume calculated over 730-day collection period.