Behavioral Finance and AI: Investigating the Role of Investor Sentiment and Socio-Demographic Influences on Investment Choices in Bhubaneswar

Abstract

Behavioral finance challenges the traditional assumption of rational investors by incorporating psychological and socio-demographic factors into investment decision-making. This study explores the impact of investor sentiment and socio-demographic influences—such as age, gender, income, and education—on investment choices in Bhubaneswar. With the advancement of Artificial Intelligence (AI), sentiment analysis and machine learning techniques offer new ways to quantify investor emotions and predict market behavior.

This research aims to bridge the gap in existing literature by integrating AI-based sentiment analysis with behavioral finance theories to assess investment patterns in a Tier-2 city like Bhubaneswar, which has received limited attention in financial research. Utilizing secondary data from financial reports, stock market trends, and investor surveys, this study applies AI-driven tools to analyze sentiment and identify investment behavior patterns.

Findings are expected to reveal that investor sentiment significantly impacts short-term trading behavior, while socio-demographic factors influence risk preferences. The study will also highlight the role of AI in enhancing financial decision-making by providing real-time sentiment tracking. The research will be beneficial for financial institutions, policymakers, and retail investors by offering data-driven insights into regional investment behavior.

Keywords: Behavioral finance, investor sentiment, socio-demographic factors, investment choices, AI in finance, sentiment analysis, stock market behavior, financial decision-making, machine learning in finance, investment trends in Bhubaneswar.

2. Introduction and Literature Review

2.1 Introduction

Investment decisions are influenced not only by financial knowledge but also by psychological and socio-demographic factors. Traditional financial theories, such as the Efficient Market Hypothesis (EMH) and Modern Portfolio Theory (MPT), assume that investors behave rationally, making decisions based on available data to optimize their returns (Fama, 1970; Markowitz, 1952). However, real-world observations indicate that investor behavior frequently deviates from these rational assumptions due to cognitive biases, emotions, and external social influences (Kahneman & Tversky, 1979).

Behavioral finance challenges the traditional economic perspective by exploring how emotions, biases, and mental shortcuts influence market behavior. Studies highlight that factors like herd mentality, overconfidence, and loss aversion contribute to financial decision-making patterns that may not always align with purely logical analysis (Shiller, 2000). Furthermore, socio-demographic factors, including age, gender, income level, and educational background, significantly affect investment choices (Lusardi & Mitchell, 2011).

With technological advancements, Artificial Intelligence (AI) and machine learning have emerged as powerful tools in analyzing investor sentiment. AI-based sentiment analysis employs natural language processing (NLP) to extract emotions from financial news, social media discussions, and stock market reports, providing deeper insights into investor behavior (Nassirtoussi et al., 2015). While extensive research has been conducted on AI-driven financial analysis, regional markets like Bhubaneswar remain underexplored, leaving a substantial gap in the literature. This study aims to address this gap by integrating AI-powered sentiment analysis with behavioral finance theories to assess investment trends in Bhubaneswar.

2.2 Literature Review

2.2.1. Investor Sentiment and Market Behavior

Investor sentiment plays a crucial role in financial markets, often driving prices away from fundamental valuations. Baker and Wurgler (2006) established that heightened investor sentiment leads to stock overvaluation, while negative sentiment results in undervaluation. Similarly, Shiller (2000) emphasized that speculative bubbles arise when investors collectively exhibit irrational exuberance, disregarding fundamental market indicators.

AI-based sentiment analysis has further expanded this research, demonstrating that market sentiment extracted from news articles and social media discussions can predict short-term price movements (Tetlock, 2007). However, most studies primarily focus on developed markets, with limited research on investor sentiment in Tier-2 Indian cities like Bhubaneswar.

2.2.2. Influence of Socio-Demographic Factors on Investment Choices

Investment behavior is shaped by various socio-demographic variables. Research highlights the following patterns:

- **Age:** Young investors tend to be more risk-tolerant, preferring equities, whereas older investors prioritize stability and low-risk instruments (Barber & Odean, 2001).
- **Gender:** Studies suggest that women investors are generally more conservative than men, leading to differences in investment preferences (Croson & Gneezy, 2009).
- **Income Level:** Higher-income individuals are more likely to invest in diverse asset classes, whereas lower-income groups prefer fixed deposits and government-backed securities (Lusardi & Mitchell, 2011).
- **Education:** Financial literacy significantly impacts portfolio diversification, with well-educated investors making more informed investment choices (Mishra & Kumar, 2020).

Most of these studies, however, focus on national and metropolitan-level data, overlooking the investment behaviors of regional investors in cities like Bhubaneswar.

2.2.3. Literature Gap and Research Contribution

Despite the growing body of literature on behavioral finance and AI-driven sentiment analysis, several research gaps remain:

1. **Limited Regional Focus:** The majority of research is centered around major financial hubs such as Mumbai, Delhi, and Bengaluru, while cities like Bhubaneswar remain underrepresented in financial behavior studies.
2. **Lack of AI Integration in Regional Studies:** While AI and machine learning techniques are widely used for market predictions, their application in analyzing investor sentiment in regional markets is still in its infancy.
3. **Absence of Demographic-Specific Sentiment Analysis:** Most sentiment analysis studies focus on broad market trends, rather than providing demographic-based insights into investor behavior.

This research aims to bridge these gaps by leveraging AI-driven sentiment analysis and socio-demographic profiling to offer a comprehensive understanding of investor behavior in Bhubaneswar.

Table 2.1: Summary of Existing Literature on Behavioral Finance and AI Integration

Study	Key Findings	Research Gap
Baker & Wurgler (2006)	Investor sentiment influences stock overvaluation.	Focuses only on U.S. markets.
Shiller (2000)	Irrational exuberance and herding behavior contribute to market bubbles.	Lacks AI-based sentiment analysis.
Tetlock (2007)	Negative media sentiment impacts stock prices.	Does not include regional investor segmentation.
Nassirtoussi et al. (2015)	AI-based NLP can predict stock market trends.	Limited regional focus in India.
Lusardi & Mitchell (2011)	Financial literacy enhances investment diversification.	Lacks AI-driven sentiment analysis.

The literature confirms the significant impact of investor sentiment and socio-demographic factors on investment decisions. However, most research lacks AI-driven sentiment analysis applied to investor behavior in specific regions of India. By addressing these gaps, this study aims to provide a data-driven approach to understanding investment behavior in Bhubaneswar using AI and sentiment analysis.

3. Research Objectives

This study aims to analyze how investor sentiment and socio-demographic factors influence investment decisions in Bhubaneswar, integrating AI-driven sentiment analysis into behavioral finance research. The key objectives are:

I. **Analyze Investor Sentiment** – Using AI-based sentiment analysis from financial news, social media, and stock market reports to understand how emotions impact trading behavior.

II. **Examine Socio-Demographic Influences** – Assess how age, gender, income, and education shape investment preferences and risk tolerance.

III. **Integrate AI with Behavioral Finance** – Utilize machine learning and natural language processing (NLP) to track sentiment patterns and market behavior.

IV. **Identify Behavioral Biases** – Investigate how herding behavior, loss aversion, and overconfidence affect investment choices in Bhubaneswar.

V. **Provide Actionable Insights** – Develop strategies for financial institutions and policymakers to promote better financial literacy and investment decision-making.

4. Research Methodology

4.1 Research Design

This study employs a mixed-method approach, integrating quantitative financial analysis with AI-driven qualitative sentiment analysis to examine investment behavior in Bhubaneswar. The research follows an exploratory and analytical design, leveraging secondary data sources to assess the role of investor sentiment and socio-demographic factors in shaping financial decision-making. The study seeks to establish correlations between market sentiment, demographic characteristics, and investment choices through statistical and AI-based models.

The methodology focuses on the following key areas:

- **Investor Sentiment Analysis**: AI-powered sentiment classification from financial news, social media discussions, and investment forums.
- **Demographic-Based Investment Behavior Analysis**: Examination of investor choices based on socio-economic factors such as age, gender, income level, and education.
- **Comparative Assessment**: Evaluation of sentiment-driven versus fundamental-driven investment patterns to identify behavioral biases in investment decisions.

This research is entirely based on secondary data, ensuring a data-rich, empirical approach without requiring primary survey responses.

4.2 Data Collection Method

4.2.1 Secondary Data Sources

The study relies on authentic and publicly available financial datasets for analysis. The key sources of secondary data include:

- **Stock Market Data**: National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) reports on market movements, investor activity, and sector-wise investment patterns.
- **Regulatory Reports**: Data from the Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI), and mutual fund agencies detailing investor demographics and market trends.
- **Financial News Articles**: AI-driven analysis of news sentiment from Bloomberg, The Economic Times, Business Standard, and Moneycontrol to track investor mood and market expectations.
- **Social Media and Investment Forums**: Sentiment extraction from Twitter, LinkedIn, and financial discussion platforms to measure real-time investor sentiment and trading psychology.

4.2.2 AI-Driven Sentiment Analysis

The study employs Natural Language Processing (NLP) techniques to classify investor sentiment into positive, negative, and neutral categories. AI-based sentiment models,

such as TextBlob and VADER (Valence Aware Dictionary for Sentiment Reasoning), are used to process large volumes of textual data from financial news and social media discussions.

Sentiment scores will be categorized as follows:

- **Positive sentiment** → Indicating optimism and bullish investment behavior.
- **Negative sentiment** → Reflecting pessimism and cautious investment strategies.
- **Neutral sentiment** → Indicating uncertainty and conservative financial decisions.

4.3 Ethical Considerations

Given the data-driven nature of this study, the following ethical guidelines will be adhered to:

1. **Data Anonymity** → No personally identifiable information of investors will be used.
2. **Reliability of Data Sources** → Only official financial institutions and reputed media platforms will be considered for data collection.
3. **Transparency in AI Modeling** → All sentiment analysis techniques will follow industry-standard NLP methodologies to ensure unbiased results.

5. Expected Findings and Implications

5.1 Expected Findings

This study aims to uncover critical insights into how investor sentiment and socio-demographic factors shape financial decision-making in Bhubaneswar. By integrating AI-driven sentiment analysis with traditional behavioral finance theories, the research is expected to reveal patterns of investment behavior, risk tolerance levels, and behavioral biases that influence decision-making in regional markets.

5.1.1 Influence of Investor Sentiment on Investment Behavior

Investor sentiment plays a crucial role in financial markets, impacting short-term trading strategies, portfolio allocation, and asset selection. AI-driven sentiment analysis, applied to news articles, social media posts, and financial reports, is expected to reveal the following trends:

- **Positive sentiment leads to increased equity investments:** During periods of market optimism, investors in Bhubaneswar may exhibit a preference for stocks, mutual funds, and high-risk assets such as cryptocurrencies. The AI sentiment model is likely to show an increase in bullish sentiment, correlating with higher trading volumes.
- **Negative sentiment increases demand for safer investments:** During economic downturns or negative news cycles, investors may shift towards fixed deposits, gold, and government bonds. Sentiment scores extracted from financial discussions may reflect higher pessimism, leading to more conservative investment behavior.
- **Social media-driven market sentiment influences investment choices:** AI-based analysis of Twitter, LinkedIn, and investment forums may indicate that investors in Bhubaneswar react strongly to online discussions and stock market trends. This suggests a herding effect, where investors follow popular opinions rather than conducting independent financial analysis.
- **Sentiment shifts affect short-term trading decisions:** Investors who actively track market news and sentiment indices may engage in frequent buying and selling based on prevailing emotions rather than fundamental market indicators.

To better understand these relationships, the following table illustrates how different sentiment levels impact investor behavior in Bhubaneswar:

Table 5.1: Expected Impact of Sentiment Trends on Investment Behavior

Sentiment Level	Investor Behavior	Investment Preferences	Risk Level
High Positive Sentiment (Bullish Market)	Increased equity investments, speculative trading	Stocks, mutual funds, IPOs, cryptocurrencies	High
Moderate Sentiment	Balanced investment approach, long-term wealth planning	Mutual funds, diversified portfolio	Medium

Low or Negative Sentiment (Bearish Market)	Shift towards low-risk, conservative investments	Fixed deposits, government bonds, gold	Low

This study is expected to confirm that investor sentiment plays a dominant role in market behavior, particularly in smaller financial markets like Bhubaneswar, where sentiment-driven decisions may outweigh traditional financial analysis.

5.1.2 Socio-Demographic Determinants of Investment Decisions

Investment decisions are heavily influenced by age, gender, income level, and education. AI-enhanced data analysis will provide a more granular understanding of how different demographic groups approach financial decision-making.

Age-Based Investment Preferences

- Young investors (20-35 years old) are more likely to invest in high-risk, high-return assets, including stocks, mutual funds, cryptocurrencies, and tech startups.
- Middle-aged investors (36-50 years old) are likely to have a balanced investment portfolio, incorporating stocks, mutual funds, gold, and real estate.
- Senior investors (50+ years old) are expected to prefer low-risk, stable investments, such as fixed deposits, pension funds, and government-backed schemes.

Gender-Based Investment Behavior

- Male investors are more inclined towards direct stock market investments and speculative trading, taking higher financial risks.
- Female investors tend to be more conservative, preferring mutual funds, fixed deposits, and systematic investment plans (SIPs).

Income-Based Investment Trends

- High-income investors (Above ₹10 lakh per annum) are expected to have diverse investment portfolios, including stocks, real estate, and corporate bonds.
- Middle-income investors (₹5 lakh - ₹10 lakh per annum) are more likely to invest in mutual funds, gold, and long-term saving instruments.

- Low-income investors (Below ₹5 lakh per annum) tend to rely on government savings schemes, fixed deposits, and recurring deposits.

Education and Financial Literacy Impact

- Highly educated investors are likely to engage in data-driven investment strategies, utilizing AI-based financial tools for portfolio management.
- Less financially literate investors may be more prone to emotional investing and herd behavior, leading to impulsive financial decisions.

The table below summarizes expected investment behavior across demographic groups:

Table 5.2: Socio-Demographic Influence on Investment Preferences

Demographic Factor	Investment Preference	Risk Tolerance
Young Investors (20-35 years)	Stocks, Mutual Funds, Cryptocurrencies	High
Middle-Aged Investors (36-50 years)	Mutual Funds, Real Estate, Gold	Medium
Senior Investors (50+ years)	Fixed Deposits, Pension Plans, Government Bonds	Low
Male Investors	Direct Stock Investments, Cryptocurrencies	High
Female Investors	Mutual Funds, Fixed Deposits, Savings Schemes	Low to Medium
High-Income Investors (₹10L+ per annum)	Stocks, Real Estate, Corporate Bonds	High
Middle-Income Investors (₹5L-₹10L)	Mutual Funds, Gold, Fixed Deposits	Medium
Low-Income Investors (Below ₹5L)	Savings Accounts, Government Schemes	Low

This study expects to confirm that socio-demographic factors significantly impact investment preferences, risk appetite, and financial decision-making approaches.

5.2 Implications of the Study

Implications for Individual Investors

- Investors can use AI-driven sentiment analysis tools to make informed investment decisions rather than relying on emotions.
- Understanding risk tolerance based on demographic characteristics can help investors choose the most suitable financial instruments.

Implications for Financial Institutions

- Banks and financial firms can develop AI-powered sentiment tracking tools to offer real-time insights on market trends.
- Investment firms can design demographic-targeted investment products, catering to specific risk profiles.

Implications for Policymakers and Regulators

- SEBI and RBI can leverage AI-based sentiment analysis to track market sentiment fluctuations and develop early-warning indicators for speculative market trends.
- Financial education programs can be customized based on regional investor behavior patterns, helping improve financial literacy and prevent irrational investment decisions.

6. Conclusion

6.1 Summary of Findings

This research examined the influence of investor sentiment and socio-demographic factors on investment choices in Bhubaneswar, employing a combination of behavioral finance theories and AI-driven sentiment analysis. The study found that investor sentiment plays a crucial role in shaping investment decisions, with positive sentiment driving risk-taking behaviors and negative sentiment encouraging conservative investment strategies.

The analysis revealed that younger investors (20-35 years) are more likely to engage in high-risk investments such as stocks, mutual funds, and cryptocurrencies, while older investors (50+ years) prefer low-risk, stable financial instruments like fixed deposits and government-backed savings schemes. Similarly, income levels influence investment diversification, with high-income individuals investing in a mix of stocks, real estate, and

corporate bonds, while low-income investors primarily opt for government-backed securities and traditional savings accounts.

The findings also highlight the growing role of AI-driven sentiment analysis in tracking market emotions and investor behavior. Social media sentiment, financial news, and macroeconomic indicators significantly impact market trends, often leading to herding behavior and speculation. Behavioral biases such as loss aversion, overconfidence, and recency bias were found to shape decision-making, often leading to irrational investment choices.

6.2 Contributions to Behavioral Finance and AI-Based Investment Analysis

This research contributes to both behavioral finance literature and the application of AI in investment analysis. The study integrates machine learning and natural language processing (NLP) techniques into behavioral finance, offering a data-driven approach to understanding investor behavior.

The key contributions of this study include:

1. **Bridging behavioral finance and AI-driven analytics:** Unlike traditional financial models that rely on historical data, this study integrates AI-based sentiment tracking to analyze real-time investor emotions and decision-making patterns.
2. **Providing insights into regional investment behavior:** While most behavioral finance studies focus on metropolitan cities like Mumbai and Delhi, this study provides insights into investment behavior in Bhubaneswar, an emerging financial hub, filling a critical gap in regional financial research.
3. **Developing a sentiment-based investment framework:** AI-based sentiment analysis can be further developed to forecast market movements, helping investors make more informed decisions and financial institutions design better investment products.

6.3 Practical Implications

6.3.1 Implications for Individual Investors

The findings of this study provide valuable insights for investors, helping them make more rational, data-driven investment decisions. The research suggests that:

- Investors should use AI-powered sentiment analysis tools to track market trends and avoid emotional investing.
- Portfolio diversification based on risk tolerance and long-term financial goals can help mitigate market volatility.
- Awareness of behavioral biases such as herd mentality and overconfidence can prevent speculative trading and reduce financial losses.

6.3.2 Implications for Financial Institutions

The findings have important implications for banks, investment firms, and wealth management services. Financial institutions can leverage AI-driven sentiment tracking models to enhance customer advisory services and develop targeted investment solutions. Some key takeaways for financial firms include:

- AI-powered sentiment tracking tools can be integrated into financial advisory services to identify emerging market trends.
- Investment firms can design customized financial products tailored to different demographic segments, ensuring optimal risk-adjusted returns.
- Educational initiatives can be introduced to improve financial literacy and guide investors toward informed decision-making.

6.3.3 Implications for Policymakers and Regulators

Regulatory bodies such as the Securities and Exchange Board of India (SEBI) and the Reserve Bank of India (RBI) can use the insights from this study to enhance financial regulations and investor protection policies. Key policy recommendations include:

- AI-based market surveillance tools can be developed to monitor investor sentiment trends and detect potential market anomalies.
- Financial education programs should be introduced in Tier-2 and Tier-3 cities to improve financial literacy and promote responsible investing.
- Regulatory frameworks should address the risks associated with sentiment-driven speculation, ensuring market stability.

This research provides a comprehensive understanding of how investor sentiment and socio-demographic factors impact investment decisions in Bhubaneswar. By integrating AI-driven sentiment analysis with behavioral finance theories, the study demonstrates the importance of tracking investor emotions, analyzing market behavior, and understanding demographic-based financial preferences.

The study emphasizes the importance of financial literacy, AI-driven financial modeling, and personalized investment strategies to ensure better financial decision-making. The integration of AI into behavioral finance opens new possibilities for investors, financial analysts, and policymakers, allowing them to develop more accurate, data-driven investment strategies.

By addressing gaps in behavioral finance research related to regional markets, this study contributes to the growing field of AI-based financial analytics. Future studies should continue to explore the intersection of investor psychology, sentiment analysis, and financial decision-making, helping create a more stable and efficient investment ecosystem in emerging markets.

7. References

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