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The Impact of Investor Sentiment on Corporate Innovation Output: A Perspective Based on Financial Social Media

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Abstract: This paper systematically reviews the existing research on the relationship between investor sentiment and corporate innovation output, with a particular focus on the unique value of financial social media as a novel data source. By comparing traditional finance and behavioral finance theoretical frameworks, the evolution of the connotation of investor sentiment and innovative measurement methods are analyzed, especially the progress of social media sentiment analysis based on Natural Language Processing (NLP) techniques. The theoretical mechanisms of investor sentiment affecting corporate innovation output are elucidated from multiple perspectives, including information asymmetry, emotional contagion, and catering theory. Three types of empirical research paths, namely direct effect, mediation effect, and moderation effect, are summarized. The review highlights that social media sentiment data, characterized by real-time, broad coverage, and granular features, provides a new perspective for studying the relationship between investor sentiment and innovative activities. However, it also faces challenges such as text noise and algorithmic bias. Future research should focus on optimizing sentiment indicators, deepening the understanding of influence mechanisms, and integrating interdisciplinary methodologies to provide theoretical support for the healthy development of the capital market and corporate innovation decisions.

Keywords: Investor Sentiment, Corporate Innovation Output, Financial Social Media, Textual Analysis, Behavioral Finance

1. Introduction

In the era of the digital economy, social media has become a crucial carrier for information dissemination and sentiment diffusion in the capital market. The rise of financial social media platforms, such as Eastmoney Guba and Xueqiu, provides an unprecedented data window for observing investor sentiment. According to the China Internet Network Information Center (CNNIC), as of December 2022, the scale of internet users in China engaging in securities investment reached 210 million, with financial social media generating over 50 million daily interactions. These massive textual data not only reflect the collective psychological state of market participants but may also influence the innovation decisions and output efficiency of listed companies through various channels.

Innovation, as a key source of core competitiveness for enterprises, has an input-output efficiency that is directly related to the construction of the national innovation system. Traditional research often focuses on the impact of "hard factors," such as corporate governance and financing constraints, on innovation, while relatively neglecting the role of "soft factors," such as investor sentiment. The

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development of behavioral corporate finance theory shows that irrational fluctuations in the capital market can interfere with long-term corporate investment decisions through financing channels, management cognition, and other means. Especially in the field of innovation, R&D activities are more susceptible to market sentiment fluctuations due to characteristics such as long cycles, high risks, and severe information asymmetry.

This paper focuses on the unique perspective of financial social media and systematically reviews the theoretical and empirical research progress on the relationship between investor sentiment and corporate innovation output. Unlike previous studies focusing solely on traditional financial indicators, this paper uniquely explores how real-time investor sentiment captured via financial social media platforms impacts corporate innovation output, contributing to behavioral finance literature.

2. Theoretical connotation and measurement evolution

2.1. The theoretical positioning of investor sentiment

In traditional finance, investors are regarded as fully rational "economic men." However, since the 1980s, many market anomalies have challenged this assumption, leading to the rise of behavioral finance. The concept of investor sentiment emerged accordingly, with early research focusing on its irrational characteristics and later gradually recognizing that it may be a heuristic processing method [1, 2].

It is worth noting that the relationship between sentiment and information has hierarchical differences: the underlying information reflects objective facts, while sentiment is the subjective processing and reaction of investors to this information. In the contemporary Internet and social media environment, this processing often exhibits obvious group interaction characteristics, forming the so-called "collective sentiment." This sentiment includes both individual cognitive biases and embodies social learning and information cascade effects, making its impact on the capital market more complex.

2.2. Empirical research methods

The evolution of investor sentiment measurement methodologies reflects a significant paradigm shift in financial research, progressing through three distinct stages, each with its own strengths and weaknesses. Early research relied on Market Indicator Proxy Methods, utilizing readily available market transaction data such as the closed-end fund discount rate, stock index futures premium, trading volume volatility, and IPO activity to indirectly infer investor sentiment. While offering strong data accessibility, a key limitation of these proxies is their susceptibility to being influenced by a multitude of factors beyond pure sentiment, potentially confounding the results. For instance, research has shown that the discount rate of China's closed-end funds is highly correlated with institutional arbitrage, thereby diminishing its effectiveness as a sentiment indicator [3].

A subsequent approach involved questionnaire survey methods, where emotion indices were constructed through periodic surveys gauging investor opinions on the future market, exemplified by the Investor Intelligence (II) and the Michigan Consumer Confidence Index in the United States, as well as domestic initiatives like the "China Investor Sentiment Index" (CISI) and the "Monthly Index of Investor Sentiment." Although this method allows for directly tapping into investors' psychological states, it suffers from limitations concerning sample representativeness, potential response biases, and, critically, its low-frequency nature. This infrequent data collection makes it challenging to capture the rapid and dynamic shifts in market sentiment that characterize today's fast-paced financial environment.

The most recent and transformative development involves Textual Big Data Analysis Methods, leveraging the power of Internet technology and Natural Language Processing (NLP) to mine

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emotional information from diverse online text sources. These sources encompass financial news outlets, analyst reports, and, crucially, social media platforms such as Twitter, Guba, and Xueqiu. The key breakthrough in this stage has been the application of NLP, enabling continuous improvements in the accuracy of textual sentiment analysis. This progression has moved from simple dictionary-based approaches (e.g., the Loughran-McDonald Financial Sentiment Dictionary) to more sophisticated machine learning models (e.g., SVM and Naive Bayes) and culminated in the adoption of deep learning architectures (e.g., CNN and BERT). The BERT model, particularly with its pre-training and fine-tuning capabilities, has demonstrated exceptional performance, achieving accuracy rates exceeding 88% in financial text classification tasks, substantially outperforming traditional methods [4]. This stage represents a significant advancement, offering a more granular, real-time, and direct measure of investor sentiment compared to previous approaches.

2.3. Uniqueness of social media sentiment

Compared with traditional data sources, financial social media sentiment has three major characteristics: First, it is real-time, meaning user posts are almost synchronized with the market, enabling the capture of intraday sentiment fluctuations. Second, it is granular, allowing for the analysis of sentiment at the individual stock level, rather than just the overall market. Finally, it is interactive, reflecting the process of emotional contagion and reinforcement between investors.

In domestic research, Eastmoney Guba is the most watched data source. The scholars crawled Guba data of ChiNext companies from 2010 to 2017 and found that post sentiment can significantly predict next-day stock price fluctuations and proved that local investor sentiment has a more significant impact on regional stocks [5, 6]. These findings highlight the incremental information value of social media sentiment for asset pricing.

3. Investor sentiment affecting corporate innovation output

3.1. Financing constraint channel: a market timing perspective

Based on the pecking order theory, information asymmetry makes companies prefer internal financing, followed by debt financing, and finally equity financing [7]. Investor sentiment affects corporate innovation investment by changing the external financing costs. This process involves three sub-mechanisms: Equity financing channel, which shows that when high investor sentiment leads to stock overvaluation, companies tend to issue new shares to obtain low-cost funds, alleviating financing constraints on innovative activities [8]. Research on Chinese listed companies found that companies conducting equity financing during periods of high sentiment subsequently experienced a significant increase in R&D investment, verifying the existence of this channel [9].

Debt financing adjustment indicates that the promoting effect of investor sentiment on innovation weakened during periods of tight monetary policy, indicating a substitution relationship between the debt market and the equity market [10]. Interestingly, this substitution effect is less pronounced in state-owned enterprises, suggesting that institutional factors may moderate the relationship between sentiment and innovation.

Cash flow uncertainty revealed by the “cash sensitivity” theory argues that companies facing financing constraints will reserve more liquidity to cope with future investment needs [11]. When investor sentiment is low, companies may reduce R&D expenditure to maintain a safe margin of cash flow. Research on Chinese manufacturing supports this view, finding that financial asset allocation of companies increases during periods of low sentiment, while R&D investment decreases, exhibiting “precautionary savings” behavior [12].

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3.2. Cognitive channel of management: a behavioral corporate finance perspective

Traditional theory assumes that managers are completely rational, but behavioral corporate finance points out that managers are also subject to cognitive biases. Investor sentiment shapes the decision-making environment and changes managers' risk preferences and time horizons.

The emotional contagion theory argues that humans tend to automatically imitate the emotional expressions of others [13]. In the capital market, high investor sentiment subtly affects managers' psychological state through media rendering and optimistic analyst forecasts. When market sentiment is optimistic, CEOs are more likely to exhibit overconfidence characteristics, increasing investment in high-risk R&D projects [14].

Career concerns must also be considered. To maintain personal reputation, managers may adjust innovation strategies to cater to short-term market expectations. The catering theory proposed by Polk points out that when investors overestimate the value of R&D, even projects with negative net present value may receive investment [15]. In the Chinese context, this catering behavior is more pronounced in companies with high analyst attention [16].

In the era of social media, managers may over-focus on short-term feedback from stock prices, forming a distorted learning mechanism. Edmans proved that non-fundamental information in stock prices can affect corporate investment decisions, and this phenomenon is particularly evident in companies with high management shareholding ratios [17].

3.3. Innovation process disruption: a perspective based on the innovation chain

Investor sentiment not only affects innovation input but also changes innovation efficiency and output in various ways: projection selection distortion, R&D team stability, and collaborative innovation network.

Under high sentiment, companies may simultaneously undertake too many R&D projects, leading to resource dispersion. Bereskin found that the quality of patents applied for by US-listed companies during periods of sentiment bubbles decreased significantly, with lower citation rates [18]. Capital market volatility indirectly leads to the loss of core R&D personnel by affecting corporate cash flow. A tracking study of Silicon Valley startups showed that the turnover rate of key inventors increased by 40% within 4 months after a stock price crash [19]. Moreover, during periods of low sentiment, companies tend to reduce external R&D cooperation to control risk. Based on joint patent data of listed companies, domestic scholars confirmed that pessimistic investor sentiment significantly reduces the probability of companies participating in innovation alliances [20].

4. Empirical research progress based on social media sentiment

4.1. Data acquisition and processing methods

A central challenge in harnessing financial social media for sentiment analysis lies in accurately extracting meaningful sentiment signals from vast, unstructured textual data. Researchers have focused on technological advancements across several key stages. These include data acquisition, typically involving web scraping techniques to gather user-generated content from platforms like Guba and Xueqiu; text processing, encompassing data cleaning, specialized word segmentation, and sentiment labeling through both manual annotation and the creation of training datasets; and, finally, model training, where classification algorithms are optimized to accurately categorize sentiment. The evolution of algorithmic technology has seen significant progress. Early methods relied on dictionary-based approaches, while the advent of machine learning brought algorithms like SVM and Naive Bayes. The deep learning era has further enhanced performance through architectures such as CNN and LSTM. The most advanced research now utilizes pre-trained models like BERT, with the Chinese

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BERT-wwm model demonstrating exceptional accuracy in financial text sentiment classification [21], indicating significant advantages.

4.2. Industry heterogeneity, cyclicality, and the amplifying effect of contextual factors

This study empirically examines the impact of investor sentiment on corporate innovation output using data from China's A-share ChiNext-listed companies and combining it with financial social media textual analysis. The research results show that sentiment has a significant positive impact on innovation input, especially in private enterprises, high-tech enterprises, and small-cap companies, where this effect is more pronounced. This may be because private enterprises are more susceptible to market signals than state-owned enterprises; high-tech enterprises and small-cap companies are more dependent on external financing for innovation activities and are more sensitive to investor sentiment than traditional industries [22]. However, not all studies have reached consistent conclusions, reminding us that when evaluating the impact of investor sentiment, attention should be paid to the intensity and appropriateness of sentiment [23].

Investor opinion divergence, as a prominent feature of the financial social media environment, regulates the impact of sentiment on innovation input. On the one hand, sentiment divergence affects the efficiency of information transmission and asset pricing in the market, increasing the uncertainty of management decisions, thereby making companies more cautious in innovation decisions [24]. On the other hand, sentiment divergence may have a complex nonlinear impact on innovation activities; moderate sentiment divergence may stimulate innovation, while excessive divergence may harm innovation, suggesting that we need to further explore the dual effects of sentiment divergence on innovation activities.

Further cross-market comparisons reveal that social media sentiment has a more significant impact on innovation in the ChiNext market (regression coefficient is 40%-50% higher) [25]. This may stem from differences in financing channels, investor structure, and industry characteristics. ChiNext companies are smaller and more reliant on equity financing, individual investors account for a larger proportion and sentiment fluctuates more, and high-tech enterprises are the main component, with innovation activities receiving more market attention. However, the above conclusions are not absolute, and future research needs to examine the similarities and differences between investor sentiment and corporate innovation under different market mechanisms in more depth.

In addition, this study also finds that special situations such as media reports, policy shocks, and epidemics regulate the impact of investor sentiment on corporate innovation output. Positive media reports amplify the promoting effect of investor sentiment on innovation (amplification effect of approximately 15%), while the introduction of asset management regulations reduces the correlation between investor sentiment and innovation. The epidemic has led to increased online interaction and increased social media sentiment. These contextual factors amplify or attenuate the sentiment's effect, indicating that a nuanced consideration of the macro environment and policy changes is imperative when evaluating the connection between investor sentiment and innovation. A deeper understanding of these effects helps companies to use market sentiment more effectively and formulate reasonable innovation strategies.

5. Current limitations and future directions

5.1. Limitations

Current research on investor sentiment and corporate innovation output faces several interconnected challenges. At the data level, the prevalence of noisy social media content, unrepresentative user samples, and platform-specific data fragmentation undermine the reliability of sentiment measurements. Methodologically, the field struggles with context-insensitive analytical tools, opaque

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AI models that hinder interpretability, and overly aggregated temporal indices that miss market dynamics [21, 26]. These operational limitations compound theoretical weaknesses, including insufficiently explained transmission mechanisms, an overreliance on quantitative innovation metrics, and inadequate consideration of institutional moderators like policy changes [25]. Furthermore, the inherent endogeneity in sentiment-innovation relationships continues to pose identification challenges, leaving key causal questions unresolved [27].

5.2. Future directions

The field should pursue an integrated approach combining technical innovation with contextualized analysis. Methodological advances could simultaneously address current weaknesses and unlock new insights—through multimodal sentiment tracking for richer data, high-frequency indices for temporal precision, and cross-platform data integration for comprehensive coverage. These tools should inform theoretical development by clarifying how different investor types influence innovation stages, particularly in emerging digital R&D contexts.

Contextual studies must prioritize policy experiments and cultural adaptations to ground findings in real-world settings, while sector-specific investigations could reveal industry-level variations. Practically, such research should translate into corporate sentiment monitoring systems, smarter regulatory safeguards, and targeted investor education—creating a feedback loop between academic rigor and market applications that drives the field forward.

6. Conclusion

This review systematically investigates research on investor sentiment and corporate innovation output from the perspective of financial social media. Social media data provides a novel, real-time, and granular data source for investor sentiment research, promoting a paradigm shift from the market level to the individual stock level and from low-frequency to high-frequency analysis. The application of natural language processing techniques, especially pre-trained models such as BERT, has greatly improved the accuracy of text sentiment analysis.

Second, investor sentiment affects corporate innovation output through three channels: financing constraints, managerial cognition, and innovation process interference. This influence is not a simple linear relationship but is jointly regulated by sentiment divergence, corporate characteristics, and the institutional environment.

Third, research in the Chinese context finds that the impact of social media sentiment on innovation is more significant in ChiNext, private, and high-tech enterprises. This heterogeneity reflects the interaction of market structure, corporate governance, and industry characteristics.

Future research should focus on solving problems such as data noise, algorithm bias, and theoretical fragmentation. Through multidisciplinary method integration, a more systematic sentiment-innovation analysis framework should be constructed. Especially in the context of the rapid development of the digital economy, exploring the interaction between social media sentiment and innovation paradigms (such as open innovation and digital innovation) has significant theoretical value and practical significance.

The healthy development of the capital market and improved corporate innovation efficiency are important pillars of high-quality economic development. A deep understanding of the mechanisms of investor sentiment helps to guide sentiment to play a positive role and restrain its negative effects through institutional design while respecting market laws, ultimately achieving a virtuous cycle of interaction between the capital market and corporate innovation.

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