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Do Strategic Orientations and CSR Disclosures Affect Investment Efficiency? Evidence from Textual Analysis in Emerging Markets

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Abstract

This study explores how firms' strategic orientations—operational efficiency, customer intimacy, and product innovation—along with corporate social responsibility (CSR) disclosure, influence investment efficiency in emerging markets. Using 1594 firm-year observations from companies listed on the Tehran Stock Exchange (TSE) between 2015 and 2024, we combine quantitative analysis with textual evidence from Management Discussion and Analysis (MD&A) reports. The findings show that operational efficiency and customer intimacy are generally linked to lower investment efficiency, reflecting possible resource misallocation and short-term priorities. In contrast, product innovation has a more nuanced impact: it improves investment efficiency in R&D-intensive sectors and during stable economic periods. CSR disclosure is also negatively associated with investment efficiency, suggesting that while CSR reporting enhances legitimacy and stakeholder trust, it may shift managerial attention and resources away from core investments. Robustness checks—including firm fixed effects, alternative keyword dictionaries, placebo tests, and endogeneity controls—support these results. Additional sub-sample analyses indicate that strategic orientations and CSR disclosure also function as channels of financial innovation: operational efficiency fosters disciplined resource allocation, product innovation supports sustainable growth, and customer intimacy strengthens transparency and stakeholder engagement.

Keywords: strategic orientations; CSR disclosure; investment efficiency; operational excellence; customer intimacy; product leadership; textual analysis

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1. Introduction

This study examines how firms' strategic orientations[1]—operational efficiency, customer intimacy, and product innovation—together with corporate social responsibility (CSR) disclosure, influence investment efficiency in emerging markets. The link between strategic orientations and investment efficiency is particularly important for sustaining competitiveness in environments such as Iran, where economic instability and international sanctions present persistent challenges. The issue is also highly relevant beyond academia. In recent years, Iranian policymakers, regulators, and market participants have raised concerns about inefficient capital allocation and the underperformance of listed firms, especially under sanctions and limited access to global finance (Lari Dashtbayaz et al., 2020; Salehi et al., 2019). The Securities and Exchange Organization of Iran (SEO)

has stressed the need to align strategic planning with national economic priorities to improve corporate investment outcomes, while the Ministry of Industry, Mine, and Trade has emphasized innovation and operational resilience as critical drivers of competitiveness in sanction-affected industries (Mashayekhi & Omrani, 2016; Tajeddini & Trueman, 2016). Similarly, investor forums and financial media have debated whether strategic orientations such as operational efficiency, customer focus, or product innovation enable—or instead hinder—optimal investment decisions on the TSE (Salehi & Shirazi, 2016).

Constrained economies such as Iran face persistent limits on access to international capital, technology, and trade, often driven by sanctions, currency volatility, and regulatory restrictions (Cheratian et al., 2023; Ebrahimi, 2022; Batmanghelidj, 2024). These structural barriers restrict financing options, disrupt supply chains, and increase uncertainty in investment planning, forcing firms to depend heavily on domestic resources and informal networks (Doshi et al., 2018). Compared with open markets, constrained markets are characterized by distorted capital allocation, survival-driven competition, and reduced strategic flexibility (Lanteri & Rampini, 2023; de Bettignies et al., 2023; Matthyssens et al., 2005). Under such conditions, the consequences of strategic misalignment are magnified, making the link between strategic orientation and investment efficiency especially fragile and context-dependent.

Sanctions-driven distortions do not simply serve as background noise; they actively shape how strategic orientations and CSR disclosures affect investment efficiency. For instance, scarcity of external finance heightens the risks of poorly aligned product innovation strategies, while limited flexibility makes it more likely that CSR disclosures act as symbolic legitimacy tools rather than effective signals of accountability. This study also includes CSR disclosure as a distinct explanatory factor. Whereas strategic orientations capture firms' competitive postures, CSR disclosure reflects how companies communicate their commitment to environmental, social, and governance (ESG) issues. Prior research shows that CSR disclosure can enhance legitimacy, build stakeholder trust, and signal long-term sustainability (Michelon et al., 2015; Clarkson et al., 2020; Muslu et al., 2019). However, it can also divert managerial attention and resources away from core investments, reducing efficiency. Examining CSR alongside strategic orientations therefore provides a more comprehensive understanding of whether and how competitive strategy and non-financial responsibility influence investment efficiency.

Building on this context, our study investigates how strategic orientations and CSR disclosure align—or misalign—with external constraints to shape firms' ability to allocate resources effectively. In sanction-constrained economies, even well-intended strategies may backfire if they are poorly matched to institutional and financial limitations. For example, strong product innovation may support resilience during stable periods but become unsustainable when financing is scarce. Likewise, CSR disclosure can strengthen legitimacy and investor confidence but may also drain resources from core operations, undermining efficiency. By explicitly examining operational efficiency, customer intimacy, product innovation, and CSR disclosure together, this study addresses an important gap in the literature: the lack of evidence on how strategic choices and sustainability communication jointly affect investment efficiency under restricted global finance, banking limitations, and heightened uncertainty.

Strategic orientations can shape investment efficiency in both positive and negative ways. From a resource-based view, alignment between strategy and capabilities improves efficiency, while misalignment creates inefficiencies (Wernerfelt, 1984; Grant, 1991). Dynamic capabilities theory highlights the value of strategic flexibility in volatile environments (Teece, 2007; Eisenhardt & Martin, 2000), whereas the opportunity cost principle warns against focusing too heavily on one dimension at the expense of others (Goh, 2000; Wei

et al., 2020). For CSR disclosure, stakeholder engagement and legitimacy theories emphasize its potential benefits, while agency cost perspectives underline its risks for efficiency. Taken together, these perspectives suggest that the effects of strategic orientations and CSR disclosure on investment efficiency are best addressed empirically—a task this study undertakes. Our results show that operational efficiency and customer intimacy are generally linked with lower investment efficiency, while product innovation has mixed effects. CSR disclosure is also positively associated with inefficiency, suggesting a trade-off between building legitimacy and allocating resources effectively. Robustness checks and endogeneity tests confirm the reliability of these findings, and additional analyses reveal that industry characteristics and macroeconomic conditions shape the strength of these relationships.

This study contributes to the literature on strategy, CSR, and corporate finance by connecting strategic orientations and CSR disclosure to investment efficiency in a sanction-constrained market. It extends the resource-based view (Wernerfelt, 1984; Grant, 1991) and dynamic capabilities theory (Teece, 2007; Eisenhardt & Martin, 2000) by showing how flexibility and misalignment influence resource allocation under external constraints. It also advances CSR research by demonstrating how disclosure practices can simultaneously enhance legitimacy and reduce efficiency (Michelon et al., 2015; Muslu et al., 2019). Methodologically, the study adapts and validates the strategic orientation dictionary (Banker et al., 2024) for Persian-language MD&A disclosures and develops a CSR disclosure dictionary (Clarkson et al., 2020; Michelon et al., 2015; Muslu et al., 2019). Together, these textual tools provide a replicable framework for studying strategic and CSR communication in non-English contexts.

The remainder of this paper is structured as follows: Section 2 reviews the relevant literature, Section 3 presents the theoretical frameworks and hypotheses, Section 4 outlines the methodology, Section 5 reports the results, and Section 6 concludes with key observations.

2. Literature Review

2.1. Strategic Orientation, Financial Innovation, and Investment Efficiency

Recent research on strategic orientations highlights the importance of both internal and external factors in shaping firms' investment decisions. Investment efficiency is commonly defined as achieving optimal returns from limited resources while avoiding both under- and over-investment (T. M. Hodgson et al., 2000). It captures financial and operational dimensions, linking managerial decision-making to broader firm performance. Prior studies identify several drivers of investment efficiency, including market anomalies (Koh & Nawalkha, 2020), corporate governance characteristics such as board dynamics (Chu & Oldford, 2023), and audit quality (Boubaker et al., 2018). External influences—such as market competition, customer–supplier relationships, and macroeconomic shocks—also play a significant role (Boubaker et al., 2022; Chiu et al., 2019).

Within this broader stream, strategic orientation has been recognized as a key determinant of competitive advantage and investment outcomes. Foundational studies by Porter (1985) and Miles et al. (1978) show that a firm's strategic posture—whether cost leadership, differentiation, or innovation—directly shapes how resources are allocated. Methodologically, more recent work applies "unconventional data" and text analytics to measure strategic posture from narrative reports, offering a scalable and cost-effective alternative to accounting or survey-based proxies (El-Haj et al., 2019; Banker et al., 2024). Building on this financial-innovation perspective, our study extracts strategic orientation directly from MD&A disclosures.

Empirical evidence illustrates the diverse effects of strategic orientations on financial and operational performance. Habib and Hasan (2021) demonstrate that labor investment

strategies influence productivity and flexibility. Magerakis and Tzelepis (2020) find that prospector firms hold higher cash reserves and adjust them more slowly, reflecting risk preferences. Slack and Munz (2016) show that strategic shifts—such as leadership transitions at Daimler AG—produce evolving disclosure patterns across structural, relational, and human capital. In R&D-intensive industries, Ballas and Demirakos (2018) report that prospector strategies may enhance firm value, although this effect depends on industry context. By contrast, Kwakye and Ahmed (2024) show that prospector firms often face lower accounting information quality and higher equity costs, underscoring the trade-offs of innovation-driven strategies.

Overall, these findings highlight the dual role of strategic orientations: they shape investment efficiency directly through resource allocation choices and indirectly through financial innovation. Financial innovation—ranging from adaptive disclosure practices to alternative financing mechanisms—can expand access to capital and improve the alignment of strategic goals with investment outcomes. In constrained economies such as Iran, these dynamics are even more pronounced due to ongoing restrictions on access to international capital and technology (Cheratian et al., 2023; Ebrahimi, 2022; Batmanghelidj, 2024). Under such conditions, firms' ability to combine strategic orientation with financial innovation is critical to ensuring that investments remain efficient, resilient, and sustainable.

In constrained economies such as Iran, persistent sanctions have limited cross-border financing, restricted foreign investment inflows, and disrupted supply chains, forcing firms to depend on domestic resources and informal networks (Doshi et al., 2018; Cheratian et al., 2023). These conditions distort capital allocation by restricting credit access, raising financing costs, and increasing reliance on internal cash flows (Lanteri & Rampini, 2023; Hovakimian, 2011). Competition is often survival-driven, shaped by supply disruptions and regulatory unpredictability (de Bettignies et al., 2023). At the same time, strategic flexibility is reduced, making it more costly and slower for firms to adopt new technologies or respond to market shifts (Matthyssens et al., 2005). As a result, the relationship between strategic orientation and investment efficiency is more fragile and shock-sensitive than in developed markets. In this context, sanctions heighten financing frictions, making disclosure-based financial innovation especially important. Strategic orientations that may enhance efficiency in open markets (e.g., customer intimacy or product innovation) can backfire under restricted credit and volatile input markets, whereas cost-focused strategies may offer short-term protection but risk long-term stagnation. This study extends prior research by examining how strategic orientations affect investment efficiency under sanctions and market instability (Barry & Kleinberg, 2015; McLean et al., 2024). The Iranian setting provides a unique opportunity to observe how firms adapt strategies in politically and economically uncertain environments. This motivates our focus on two themes: (i) responsible strategic communication in disclosures as an information channel influencing capital allocation, and (ii) measurement innovation via textual analysis as a tool for capturing strategy in constrained markets.

2.2. CSR Disclosure, Financial Innovation, and Investment Efficiency

Alongside strategic orientation, corporate social responsibility (CSR) disclosure has become an important factor shaping investment efficiency. Transparent, stakeholder-oriented disclosures improve the information environment and ease financing frictions, providing an economic channel through which CSR communication influences capital allocation (Biddle et al., 2009; García Lara et al., 2016; Hesarzadeh et al., 2020). By reducing information asymmetry and mitigating agency conflicts, CSR practices can help firms direct capital more effectively to productive projects while avoiding both under- and over-investment (Ferrell et al., 2016; Ali et al., 2020; Wu et al., 2020; Javed et al., 2020).

Recent studies also link CSR to financial innovation as a driver of strategic efficiency. González-Ramos et al. (2023) show that CSR embedded in knowledge management fosters both exploratory and exploitative innovation, improving capital allocation efficiency. Reavis et al. (2021) highlight that CSR-oriented financial decision-making—particularly among millennial managers—reduces short-term opportunism and supports sustainable investment choices. Similarly, Costa and Fonseca (2022) find that CSR combined with innovation strengthens absorptive capacity, enabling firms to identify and pursue new investment opportunities. Ruggiero and Cupertino (2018) argue that innovation mediates the CSR–performance relationship, allowing firms to address social and environmental challenges more effectively. Weston and Nnadi (2023) further show that integrating CSR and ESG principles into investment frameworks enhances long-term outcomes, even when short-term gains are neutral.

Taken together, CSR disclosure plays dual roles: (i) providing transparency and legitimacy to stakeholders, and (ii) acting as a channel of financial innovation by shaping knowledge flows, risk assessment, and resource allocation. While some studies caution that extensive CSR reporting may divert managerial attention and reduce efficiency, the broader evidence underscores its strategic value when aligned with innovation and long-term goals. In emerging markets with institutional constraints, balancing CSR communication, financial innovation, and investment efficiency is especially critical. Sanctions further condition this relationship: when capital is scarce, CSR may attract socially responsible investors and lower financing costs, but when survival pressures dominate, CSR disclosure can drain resources from urgent operational needs. Thus, sanctions reinforce CSR's dual role as both an efficiency-enhancing signal and a potential burden on constrained resources.

3. Theories and Hypothesis Development

This study draws on linguistic theory to analyze the textual content of MD&A disclosures, providing insights into the strategic orientations of Iranian firms. Language in corporate reporting can reveal underlying strategic priorities by reflecting themes of operational efficiency, customer intimacy, and product innovation. By examining linguistic cues—such as the frequency and context of strategy-related keywords—we infer a firm's strategic focus. Recent work shows that disclosure language captures managerial cognition and strategic direction (El-Haj et al., 2019; Gutiérrez Ponce et al., 2023). These linguistic markers help identify nuances of strategy not explicitly stated but nonetheless crucial for understanding alignment between strategic choices and resource deployment (Crilly et al., 2016; Bolinger et al., 2022). We therefore treat the MD&A as an information channel: a means through which articulated strategy can either discipline or distort capital allocation, especially when external financing is scarce.

The relationship between strategic orientations and investment efficiency is inherently complex. Each orientation drives distinct resource allocation priorities that can enhance or hinder efficiency. From a resource-based view (Wernerfelt, 1984; Grant, 1991), leveraging unique resources to support a chosen orientation can create competitive advantage, but overemphasis on one dimension risks inefficiency. The dynamic capabilities framework (Teece, 2007; Eisenhardt & Martin, 2000) emphasizes that firms can mitigate these risks by balancing orientations and adapting resource allocations to changing market conditions. Economically, these effects operate through three main channels: (i) information asymmetry—narratives can reduce opacity and improve price signals; (ii) financing frictions—strategy signals can alter access to and cost of capital; and (iii) risk management—strategic emphasis changes cash-flow volatility, coordination costs, and option value. These theories suggest that operational efficiency, customer intimacy, and product innovation

influence investment efficiency in both complementary and conflicting ways, depending on how well resources and strategies are aligned with market demands.

The theoretical tension lies in the dual effects of strategic orientations. While focusing on specific strategies can enhance performance, it may also lead to suboptimal allocation, particularly in volatile environments. The resource-based view highlights risks of overemphasizing certain capabilities at the expense of others (Wernerfelt, 1984; Grant, 1991), a challenge amplified in Iran where sanctions, oil price fluctuations, and currency instability complicate strategic planning (Sirmon & Hitt, 2009; Klingebiel & Rammer, 2014). Misaligned asset deployment (Amit & Schoemaker, 1993) and opportunity costs—for instance, prioritizing R&D over operational improvements or market expansion (Goh, 2000; Wei et al., 2020)—further illustrate these risks. Yet, when strategic orientations are well aligned with market conditions and supported by dynamic capabilities, firms can enhance investment efficiency. Product innovation, for example, may open new markets and create future revenue streams (Bocken & Geradts, 2020). Conceptually, our framework sits at the intersection of strategic management and innovative financial measurement: it models how communicated strategy affects investment efficiency via information and financing channels and operational risk, while using text analytics as a scalable measurement tool.

H1. *The strategic orientation of Iranian firms—encompassing operational efficiency, customer intimacy, or product innovation—has a significant impact on their investment efficiency.*

Parallel to strategic orientation, CSR disclosure also shapes investment efficiency. From a stakeholder theory perspective, CSR disclosures reduce information asymmetry by signaling transparency and accountability, thereby building trust and lowering financing frictions (Ferrell et al., 2016; Ali et al., 2020; Wu et al., 2020). Legitimacy theory similarly argues that firms use CSR communication to maintain social approval, which improves access to external capital and reduces risk premiums (García Lara et al., 2016).

At the same time, CSR disclosure involves trade-offs. Extensive reporting can divert managerial attention and resources from productive investments, lowering efficiency. This tension aligns with the resource-based view and dynamic capabilities framework, which highlight the need to balance social, environmental, and economic commitments (Wernerfelt, 1984; Teece, 2007). When integrated with financial innovation—such as ESG-oriented financing, adaptive knowledge management, or sustainable innovation—CSR can strengthen absorptive capacity and improve firms' ability to identify and exploit investment opportunities (González-Ramos et al., 2023; Costa & Fonseca, 2022; Ruggiero & Cupertino, 2018). Thus, CSR disclosure—like strategic orientations—may either enhance or hinder investment efficiency. The direction of its effect depends on whether CSR serves primarily as a vehicle for stakeholder value creation and financial innovation, or as a symbolic practice that consumes resources without improving performance. In sanction-constrained economies, these tensions are magnified: financing restrictions intensify the consequences of misalignment, while the legitimacy value of CSR disclosure rises as firms seek credibility with international investors.

H2. *CSR disclosure has a significant impact on investment efficiency.*

4. Research Design

4.1. Sample and Data

The data for this study was gathered from CODAL[2], a database maintained by the Securities and Exchange Organization of Iran, covering firms listed on the TSE from 2015 to 2024. This period allows for analysis of strategic adjustments post Iran's 2013 economic

sanctions relief[3]. Initially, the dataset included 3230 firm-year observations over ten years from 323 companies. Due to the exclusion of specific sectors and adjustments for fiscal discrepancies, as well as missing data like incomplete financial statements or MD&A sections, the sample was reduced. After excluding corrupted PDF files, the final sample size was narrowed down to 1594 firm-year observations from 206 unique firms (see Table 1). For textual analysis, MD&A documents were converted from PDF to text using a custom Python script (Python version 3.9.13), which facilitated the extraction and analysis of data relevant to strategic orientations and CSR disclosure using various text mining techniques[4].

Table 1. Sampling Table.

Data Collection Summary	Count
Initial Firm-Year Observations	3230
Excluded (Financial & Utility Sectors)	(832)
Excluded (Fiscal Year Adjustments)	(302)
Excluded (Missing Crucial Data)	(440)
Subtotal After Exclusions	1656
Excluded (Corrupted PDF Files)	(62)
Final Sample Size	1594

This table shows the steps from the initial 3230 firm-year observations to the final 1594 used in the study. Exclusions are due to sector filters, fiscal year issues, missing data, or unreadable MD&As.

4.2. Dependent Variables: Investment Efficiency

We employ three established proxies for investment efficiency, with a key modification in the measurement of residuals. Prior studies such as Biddle et al. (2009) and C. Chen et al. (2013) typically use the raw values of residuals, where positive residuals indicate overinvestment and negative residuals indicate underinvestment. In contrast, we use the absolute values of these residuals. This adjustment enables us to measure the overall magnitude of deviation from predicted investment levels, regardless of whether the deviation reflects over- or underinvestment. Our approach emphasizes the size of inefficiency, which facilitates straightforward comparisons across firms and industries. It is particularly useful in cross-sectional analyses, as it provides a clear metric of deviation magnitude without the confounding influence of direction. This methodology follows prior applications in the literature (García Lara et al., 2016; Samet & Jarboui, 2017; Ullah et al., 2020; Ullah et al., 2022). Following Biddle et al. (2009), our first measure of investment efficiency is estimated using:

$$INVEST_{i,t} = \beta_0 + \beta_1 \, SALES\_GROWTH_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where $INVEST_{i,t}$ is the total investment of firm i in year t, calculated as the net increase in tangible and intangible assets divided by lagged total assets; $SALES\_GROWTH_{i,t-1}$ is the percentage change in sales from year $t-2$ to t; and $\varepsilon_{i,t}$ is the residual. We estimate Equation (1) cross-sectionally by year and industry. The absolute value of the residuals forms our first proxy, *BIDDLE*.

The second measure follows F. Chen et al. (2011):

$$\begin{aligned} INVEST_{i,t} = {} & \beta_0 + \beta_1 \, NEG_{i,t-1} + \beta_2 \, SALES\_GROWTH_{i,t-1} \\ & + \beta_3 \, NEG_{i,t-1} \times SALES\_GROWTH_{i,t-1} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where $NEG_{i,t-1}$ is an indicator variable equal to one if sales growth is negative and zero otherwise. The residuals from Equation (2) capture deviations from optimal investment. For ease of interpretation, we again use the absolute values, denoted as *CHEN11*.

Our third measure adopts the model of C. Chen et al. (2013), which incorporates sales growth and Tobin's Q:

$$INVEST_{i,t} = \beta_0 + \beta_1\ T\_Q_{i,t-1} + \beta_2\ SALES\_GROWTH_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

where $T\_Q_{i,t-1}$ is Tobin's Q, defined as the sum of the market value of equity and the book value of liabilities divided by total assets. We estimate Equation (3) cross-sectionally for each year and industry, and the absolute value of the residuals is recorded as *CHEN13*.

Consistent with García Lara et al. (2016) and Samet and Jarboui (2017), we use the absolute values of the residuals from the investment expectation models. While raw residuals distinguish between overinvestment (positive) and underinvestment (negative) (Biddle et al., 2009; F. Chen et al., 2011; C. Chen et al., 2013), absolute residuals capture the magnitude of deviation from optimal investment irrespective of direction. This approach allows us to measure overall inefficiency in capital allocation, which is particularly relevant in constrained markets where both over- and underinvestment are prevalent.

4.3. Independent Variables: Textual Analysis Approach

4.3.1. Measuring Strategic Orientations

This study measures the strategic orientations of TSE-listed firms using a textual analysis approach that integrates linguistic and strategic management theories. Following Banker et al. (2024), we apply a word-count method to quantify strategic orientations from MD&A disclosures. The method assumes that strategic priorities manifest through the repeated use of specific strategy-related keywords in official communications (Porter, 1991; Hambrick, 1983; Treacy & Wiersema, 1995). Adopting a dual perspective, we capture both conceptual descriptions and value-creating activities, initially classifying keywords into ten strategic categories (e.g., differentiation, product, and operational efficiency). To ensure cultural and linguistic accuracy in the Persian context, the keyword lists were first translated using the Google Translate API and then refined in consultation with bilingual Persian–Arabic translators[5]. Given the linguistic overlap between Persian and Arabic, this step was critical. Academic experts in Persian linguistics and business studies subsequently reviewed the lists to validate both linguistic accuracy and contextual relevance[6].

We then applied principal component analysis (PCA) to the keyword groups, which revealed three distinct strategic dimensions: operational efficiency (*OPERATION*), customer intimacy (*CUSTOMER*), and product innovation (*PRODUCT*). These dimensions serve as the main proxies for strategic orientation. For each firm-year observation, keyword counts in these categories provide the primary variables, while factor loadings are used in robustness checks. Full keyword lists are provided in Appendix A for transparency.

4.3.2. CSR Disclosure

In addition to strategic orientations, the study also incorporates a measure of corporate social responsibility disclosure (*CSRDSCL*) as a key independent variable. In the Iranian context, there is no stand-alone framework for CSR or sustainability reporting. Instead, firms are required to disclose CSR-related information across three main channels: (1) the MD&A reports, (2) the official company website, and (3) the board report submitted to the SEO. Failure to disclose CSR information through these outlets is flagged as non-compliance with governance guidelines in the auditor's report. Furthermore, the TSE has recently required auditors to assign a disclosure score to each firm, with lower scores reflecting weaker transparency in corporate governance responsibilities. These mechanisms make CSR disclosure a critical aspect of transparency, governance compliance, and audit oversight in the Iranian context.

To measure CSR disclosure, we constructed a bag-of-words dictionary based on a systematic review of prior studies using textual analysis of non-financial disclosures (Clarkson et al., 2020; Ferjančič et al., 2024; Gorovaia & Makrominas, 2025; Muslu et al., 2019; Raghupathi et al., 2023; Michelon et al., 2015). These references were selected for providing explicit keyword lists, methodological frameworks, or wide influence in the CSR literature. The consolidated dictionary was organized into five categories: Diversity, Community, Product Responsibility, Employee-related, and Environmental. It was further expanded with terms reflecting recent CSR standards and emerging disclosure themes, such as climate risk, green technology, and resource efficiency. The total number of keywords across these five categories forms the CSR disclosure measure (Appendix B)[7]. A higher score indicates greater intensity of non-financial reporting and, by extension, higher CSR disclosure quality.

Since Iranian firms report primarily in Persian, the English dictionary was translated and adapted for local use. The translation process followed three steps: (1) direct translation of each keyword into standard Persian, (2) identification of synonyms and linguistic variations to reflect the diversity of corporate language, and (3) adaptation to Persian business terminology by cross-checking with existing Iranian MD&A texts[8]. To validate the Persian dictionary, we used a multi-stage review: linguistic experts checked translations for accuracy, accounting and finance faculty assessed relevance for CSR disclosure, and professional translators refined the terminology for corporate reporting contexts. This process ensured both linguistic precision and domain-specific validity.

4.4. Main Model

We analyze the effects of strategic orientation (*STRTG*) and CSR disclosure (*CSRDSCL*) on investment efficiency (*INVSTEFF*) using a comprehensive regression framework with multiple control variables. For the dependent variable, investment efficiency is proxied by three measures, *BIDDLE*, *CHEN11*, and *CHEN13*, each derived from residuals of investment expectation models (see Section 4.2). These residual-based measures capture deviations from predicted investment levels, where lower values indicate higher efficiency.

The independent variables capture the strategic dispositions of firms, categorized into three dimensions: *OPERATION*, *CUSTOMER*, and *PRODUCT*. These variables are constructed from keyword frequencies in MD&A disclosures, reflecting strategic emphasis on operational efficiency, customer intimacy, and product leadership, respectively. Higher scores indicate stronger strategic focus in each area. In addition, *CSRDSCL* measures CSR disclosure intensity, based on the total number of CSR-related keywords disclosed in MD&A and board reports. Higher values indicate greater commitment to CSR practices, transparency, and governance compliance. The main regression model is specified as follows:

$$\begin{aligned} INVSTEFF_{it} = \; & \beta_0 + \beta_1 \left(STRTG_{it}/CSRDSCL_{it}\right) + \beta_2\, HHI_{it} + \beta_3\, LEVERAGE_{it} + \beta_4\, SIZE_{it} \\ & + \beta_5\, INSTOWN_{it} + \beta_6\, BDINDEP_{it} + \beta_7\, BDMEET_{it} + \beta_8\, CEOTEN_{it} \\ & + \beta_9\, AGE_{it} + \beta_{10}\, AQ_{it} + \beta_{11}\, MB_{it} + \beta_{12}\, INVREC_{it} + \beta_{13}\, FINANCING_{it} \\ & + \beta_{14}\, STDSALE_{it} + \beta_{15}\, STDOCF_{it} + \beta_{16}\, ROA_{it} + \beta_{17}\, OPRISK_{it} \\ & + \beta_{18}\, TOTRISK_{it} + \beta_{19}\, LNPAGES_{it} + \beta_{20}\, LNWORDS_{it} + \beta_{21}\, FOG_{it} \\ & + \beta_{22}\, TONE_{it} + \sum INDUSTRY + \sum YEAR + \varepsilon_{it} \end{aligned} \tag{4}$$

The baseline regressions are estimated using pooled OLS with heteroskedasticity-robust standard errors clustered at the firm level. Industry and year fixed effects are included to capture sectoral heterogeneity and macroeconomic shocks, respectively[9]. Control variables play a critical role in our model, aiming to account for other factors that might

influence investment efficiency. These include the Herfindahl–Hirschman Index (*HHI*) for industry concentration, *LEVERAGE* as a measure of financial structure, *SIZE* to control for the scale of operations, and *INSTOWN* to capture institutional ownership. We also consider board characteristics with *BDINDEP* and *BDMEET*, leadership tenure with *CEOTEN*, firm *AGE*, quality of accruals with *AQ*, growth potential with *MB*, investment in receivables and inventory with *INVREC*, external financing with *FINANCING*, the volatility of sales with *STDSALE*, the volatility of operational cash flow with *STDOCF*, return on assets with *ROA*, the risk of operations with *OPRISK*, and total risk with *TOTRISK*. Further refining our analysis, we incorporate several document-related metrics: *LNPAGE*, the natural logarithm of the number of document pages; *LNWORDS*, the natural logarithm of the total number of words in a document; *FOG*, a readability measure calculated using a specific formula; and *TONE*, which assesses the balance of sentiment in the documents. Industry and year fixed effects are also included into the model[10]. These control variables are included following the methodologies and findings of previous studies by Banker et al. (2024), Ullah et al. (2022), Ullah et al. (2020), Hesarzadeh et al. (2020), and Rajabalizadeh and Oradi (2022) to ensure a comprehensive analysis. For detailed definitions of each control variable, refer to Appendix C.

5. Results

5.1. Descriptive Statistics

The dataset comprises 1594 firm-year observations from TSE-listed firms, focusing on three proxies for investment efficiency: *BIDDLE*, *CHEN11*, and *CHEN13*. The mean values of these proxies (0.599, 0.517, and 0.575) suggest moderate deviations from optimal investment efficiency. Their right-skewed distributions indicate that while most firms cluster around moderate inefficiency, a subset experiences substantially larger deviations (see Table 2).

Table 2. Descriptive Statistics (N = 1594).

Variables	Mean	Std. Dev.	Q1	Median	Q3
BIDDLE	0.599	0.981	0.112	0.303	0.656
CHEN11	0.517	0.908	0.069	0.215	0.547
CHEN13	0.575	0.930	0.104	0.278	0.642
OPERATION	60.614	6.881	56.000	60.000	63.000
CUSTOMER	27.625	21.683	13.000	22.000	36.000
PRODUCT	37.628	28.456	19.000	30.000	49.000
CSRDISC	25.095	21.386	10.000	20.000	33.000
HHI	0.678	0.422	0.182	1.000	1.000
LEVERAGE	0.582	0.234	0.431	0.578	0.723
SIZE	14.521	1.640	13.466	14.267	15.348
INSTOWN	0.589	0.319	0.377	0.700	0.850
BDINDEP	0.664	0.186	0.600	0.600	0.800
BDMEET	2.694	0.321	2.485	2.485	2.833
CEOTEN	3.659	3.362	1.000	2.000	5.000
AGE	3.589	0.388	3.332	3.689	3.912
AQ	−0.498	0.385	−0.570	−0.436	−0.319
MB	4.278	4.981	1.628	2.578	4.697
INVREC	0.519	0.500	0.000	1.000	1.000
FINANCING	0.506	0.191	0.369	0.495	0.652
STDSALE	0.306	0.267	0.135	0.225	0.378
STDOCF	0.094	0.068	0.050	0.076	0.120
ROA	0.151	0.148	0.059	0.128	0.235
OPRISK	2.541	0.140	2.456	2.529	2.627

Table 2. *Cont.*

Variables	Mean	Std. Dev.	Q1	Median	Q3
TOTRISK	0.311	0.298	0.135	0.225	0.378
LNPAGES	3.721	0.529	3.332	3.714	4.094
LNWORDS	8.964	0.558	8.566	8.980	9.362
FOG	15.390	3.602	12.741	15.202	18.148
TONE	0.378	0.125	0.337	0.395	0.441

This table shows summary statistics for all variables. Dependent variables (*BIDDLE*, *CHEN11*, *CHEN13*) measure investment inefficiency; higher values = more inefficiency. Strategic orientation variables (*OPERATION*, *CUSTOMER*, *PRODUCT*) and *CSRDISC* are from MD&A text. Variable definitions in Appendix C.

Strategic orientations are captured across three dimensions: operational strategies (mean = 60.614), customer strategies (mean = 27.625), and product strategies (mean = 37.628), showing diverse emphases among firms. CSR disclosure (*CSRDISC*) averages 25.095 with a large standard deviation (21.386), indicating that while some firms report extensively on CSR, others provide only limited disclosure. Together, these descriptive statistics highlight considerable heterogeneity in both strategic orientations and CSR practices among Iranian firms.

Control variables provide further context. Industry concentration is moderately high (*HHI* mean = 0.678), firms use balanced debt financing (*LEVERAGE* mean = 0.582), and institutional investors hold a significant share of ownership (*INSTOWN* mean = 58.9%). Governance indicators suggest relatively strong oversight, with board independence averaging 66.4% (*BDINDEP*) and board meetings averaging 2.694 annually (*BDMEET*). CEO tenure averages 3.659 years, while firm age (*AGE* mean = 3.589, log-transformed) indicates variation in maturity across firms. Key financial measures include a moderate return on assets (*ROA* mean = 0.151), operational risk (*OPRISK* mean = 2.541), and total risk (*TOTRISK* mean = 0.311). Disclosure characteristics also vary: documents are relatively lengthy (*LNPAGES* mean = 3.721), written in complex language (*FOG* mean = 15.390), and generally convey a positive tone (*TONE* mean = 0.378). Together, these descriptive indicators provide a comprehensive backdrop for assessing investment efficiency.

The correlation matrix (Table 3) further explores relationships among dependent, independent, and control variables. The three investment efficiency measures—*BIDDLE*, *CHEN11*, and *CHEN13*—are highly correlated (e.g., 0.876 between *BIDDLE* and *CHEN11*; 0.938 between *BIDDLE* and *CHEN13*), confirming that they capture related dimensions of investment behavior. Strategic orientations (*OPERATION*, *CUSTOMER*, and *PRODUCT*) show modest positive correlations with investment efficiency proxies (e.g., *OPERATION* with *BIDDLE* at 0.083). Correlations among the strategy variables themselves are stronger, particularly between *CUSTOMER* and *PRODUCT* (0.804), suggesting overlapping or complementary emphases in firms' strategies. CSR disclosure (*CSRDISC*) exhibits small positive correlations with investment efficiency (e.g., 0.050 with *BIDDLE*, 0.078 with *CHEN11*) and moderate correlations with strategic orientations (0.383 with *OPERATION*, 0.362 with *CUSTOMER*, 0.354 with PRODUCT), indicating that firms emphasizing certain strategies also tend to report more on CSR.

Governance variables also provide insights: board independence (*BDINDEP*) is negatively correlated with strategic orientations, implying that more independent boards may discourage aggressive strategies. Conversely, board meetings (*BDMEET*) are positively correlated with the *CUSTOMER* strategy (0.167), suggesting active governance supports customer-focused initiatives. Leadership and firm characteristics (e.g., *CEOTEN*, AGE, AQ) show mixed associations, with some negative links to investment efficiency (e.g., *CEOTEN* with *CHEN11* at −0.050). Finally, Variance Inflation Factor (VIF) tests confirm that all VIF

values fall below the conventional threshold of 5, ruling out multicollinearity concerns and supporting the reliability of the regression models.

Table 3. Correlation Matrix (N = 1594).

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) *BIDDLE*	1													
(2) *CHEN11*	**0.876**	1												
(3) *CHEN13*	**0.938**	**0.864**	1											
(4) *OPERATION*	**0.083**	**0.108**	**0.094**	1										
(5) *CUSTOMER*	0.040	**0.050**	0.041	**0.563**	1									
(6) *PRODUCT*	0.022	0.041	0.017	**0.561**	**0.804**	1								
(7) *CSRDISC*	**0.050**	**0.078**	**0.057**	**0.383**	**0.362**	**0.354**	1							
(8) *HHI*	−0.039	**−0.065**	−0.047	**−0.118**	**−0.124**	**−0.141**	**−0.162**	1						
(9) *LEVERAGE*	**0.068**	**0.088**	**0.075**	**0.218**	**0.151**	**0.108**	**0.199**	**−0.116**	1					
(10) *SIZE*	−0.015	0.008	−0.018	**0.189**	**0.381**	**0.297**	**0.276**	0.004	−0.004	1				
(11) *INSTOWN*	−0.024	−0.010	−0.023	**0.155**	**0.219**	**0.200**	**0.173**	**−0.097**	**0.155**	**0.198**	1			
(12) *BDINDEP*	−0.036	−0.047	**−0.054**	**−0.136**	**−0.146**	**−0.152**	**−0.205**	**0.112**	**−0.225**	**−0.078**	−0.030	1		
(13) *BDMEET*	−0.018	−0.014	−0.032	0.035	**0.167**	**0.122**	**0.072**	−0.008	**−0.072**	**0.423**	**0.154**	0.031	1	
(14) *CEOTEN*	−0.043	**−0.050**	−0.042	**−0.077**	−0.021	−0.026	−0.014	**0.094**	**−0.169**	**−0.085**	**−0.152**	−0.040	**−0.064**	1
(15) *AGE*	0.035	0.030	0.038	**0.070**	**0.070**	**0.052**	**0.103**	−0.020	0.025	**0.052**	**−0.200**	**−0.106**	−0.017	0.021
(16) *AQ*	−0.015	0.006	−0.017	0.027	0.019	0.043	−0.001	0.001	**−0.050**	−0.002	0.029	0.032	−0.007	−0.035
(17) *MB*	−0.014	−0.005	−0.018	0.009	−0.044	−0.004	0.005	0.029	−0.037	0.006	**−0.049**	−0.027	−0.029	−0.034
(18) *INVREC*	**−0.090**	**−0.110**	**−0.103**	0.025	**0.175**	**0.120**	**0.085**	**−0.076**	**−0.175**	**0.207**	−0.010	0.033	**0.066**	**0.095**
(19) *FINANCING*	**−0.103**	**−0.095**	**−0.094**	**−0.071**	0.006	0.022	0.040	**−0.110**	**0.195**	**−0.175**	**−0.071**	**−0.136**	**−0.174**	**0.052**
(20) *STDSALE*	0.037	0.045	0.029	0.020	0.002	0.015	0.047	0.03	−0.014	**0.119**	0.014	**−0.064**	**0.094**	−0.014
(21) *STDOCF*	**0.051**	**0.053**	0.039	−0.046	−0.034	−0.023	−0.018	0.034	**−0.076**	0.032	0.003	−0.009	**0.058**	0.001
(22) *ROA*	**−0.133**	**−0.133**	**−0.135**	**−0.132**	−0.024	0.034	−0.017	0.031	**−0.370**	**0.217**	**0.079**	**0.096**	**0.138**	**0.112**
(23) OPRISK	0.001	0.024	−0.003	**0.151**	**0.349**	**0.288**	**0.261**	0.004	−0.025	**0.346**	**0.146**	**−0.078**	**0.382**	**−0.050**
(24) *TOTRISK*	0.042	**0.050**	0.023	0.017	0.005	0.017	0.042	0.030	−0.021	**0.124**	0.015	−0.047	**0.095**	−0.018
(25) *LNPAGES*	−0.002	0.023	−0.006	**0.490**	**0.428**	**0.449**	**0.387**	**−0.094**	**0.117**	**0.421**	**0.265**	**−0.073**	**0.194**	**−0.137**
(26) *LNWORDS*	0.008	0.033	0.001	**0.430**	**0.438**	**0.460**	**0.306**	**−0.082**	**0.062**	**0.438**	**0.299**	**−0.066**	**0.244**	**−0.098**
(27) *FOG*	0.018	0.023	0.022	**−0.095**	**−0.150**	**−0.123**	**−0.151**	−0.023	−0.012	**−0.122**	**−0.170**	−0.014	**−0.113**	−0.049
(28) *TONE*	0.017	0.004	0.004	**0.100**	**0.157**	**0.189**	**0.168**	0.014	0.011	0.011	0.006	−0.019	**−0.050**	**0.056**

Variables	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)
(15) *AGE*	1													
(16) *AQ*	−0.041	1												
(17) *MB*	**0.111**	0.026	1											
(18) *INVREC*	0.027	−0.009	**−0.070**	1										
(19) *FINANCING*	**0.086**	0.001	0.043	**−0.197**	1									
(20) *STDSALE*	−0.025	−0.014	**0.256**	**−0.139**	0.046	1								
(21) *STDOCF*	−0.009	**0.065**	**0.172**	0.021	**−0.115**	**0.277**	1							
(22) *ROA*	−0.04	0.040	**0.163**	**0.063**	0.028	**0.265**	**0.245**	1						
(23) OPRISK	**0.076**	0.012	**0.061**	**0.176**	**−0.158**	**0.180**	**0.080**	**0.244**	1					
(24) *TOTRISK*	−0.035	−0.014	**0.253**	**−0.122**	0.042	**0.376**	**0.293**	**0.257**	**0.179**	1				
(25) *LNPAGES*	**−0.051**	**0.057**	**−0.078**	**0.125**	**−0.054**	**−0.071**	**−0.090**	0.032	**0.363**	**−0.072**	1			
(26) *LNWORDS*	−0.032	0.044	**−0.061**	**0.153**	**−0.099**	−0.025	−0.045	**0.081**	**0.382**	−0.025	**0.367**	1		
(27) *FOG*	0.021	−0.030	−0.016	**−0.113**	0.044	0.037	−0.036	**−0.061**	**−0.113**	0.036	**−0.060**	**−0.192**	1	
(28) *TONE*	0.045	−0.017	**0.050**	**0.059**	−0.012	−0.038	−0.012	0.029	0.039	−0.035	−0.001	**0.078**	**−0.168**	1

The bold numbers indicate statistical significance with $p < 0.05$. The definitions of variables are as specified in Appendix C.

5.2. Main Regression Results

Table 4 reports the regression results on the impact of strategic orientations—operational efficiency (*OPERATION*), customer intimacy (*CUSTOMER*), and product innovation (*PRODUCT*)—alongside corporate social responsibility disclosure (*CSRDISC*) on investment efficiency across three alternative measures (*BIDDLE*, *CHEN11*, *CHEN13*). All models include control variables, as well as year and industry fixed effects. The estimation is based on 1594 firm-year observations, with R-squared values ranging from 0.117 to 0.140, indicating modest explanatory power.

- *OPERATION*: The results show a consistently statistically significant positive relationship with investment efficiency measures (coefficients between 0.007 and 0.009, $p < 0.01$). This finding indicates that a greater emphasis on operational efficiency correlates with higher values of the efficiency indices, suggesting lower investment

efficiency. Economically, moving from the 25th to the 75th percentile of operational strategy orientation corresponds to increases of 6.42%, 5.39%, and 6.02% in the *BIDDLE*, *CHEN11*, and *CHEN13* measures of inefficiency (as a percentage of their respective standard deviations). This implies that even moderate increases in operational strategy orientation can lead to economically meaningful reductions in firms' ability to allocate resources efficiently.

- *CUSTOMER*: The customer intimacy strategy also demonstrates a statistically significant positive effect on investment efficiency measures (coefficients from 0.002 to 0.003, $p < 0.01$ to $p < 0.05$). In economic terms, interquartile changes in *CUSTOMER* orientation translate into increases of 7.17%, 7.60%, and 4.95% in inefficiency across the three investment efficiency measures. These results highlight that customer-oriented strategies, while potentially valuable for market positioning and stakeholder engagement, can come at the cost of resource allocation discipline—particularly in emerging markets where firms may overextend themselves in pursuit of customer loyalty.
- *PRODUCT*: This dimension exhibits mixed results across different models, with significant positive effects in some (0.002 to 0.007, $p < 0.05$ or $p < 0.1$), others are not statistically significant. When significant, the economic magnitudes[11] are notable: interquartile movements in *PRODUCT* orientation correspond to increases of 21.83%, 6.60%, and 3.23% in inefficiency for *BIDDLE*, *CHEN11*, and *CHEN13*, respectively. This suggests that while product innovation is often regarded as a growth-enhancing strategy, it may also lead to considerable inefficiencies in capital allocation when not carefully managed.
- *CSRDISC*: The results highlight a robust positive and significant relationship between CSR disclosure and investment inefficiency (coefficients between 0.004 and 0.007, $p < 0.05$ or $p < 0.01$). Beyond statistical significance, the economic effects are substantial: interquartile changes in CSR disclosure intensity are associated with increases of 9.37%, 15.20%, and 17.30% in the three investment inefficiency metrics. These findings reinforce the interpretation that while CSR disclosure enhances transparency and legitimacy, it may also divert managerial attention or signal costly trade-offs in resource allocation, leading to inefficiency.

Taken together, these results suggest that while strategic orientations and CSR disclosure improve external legitimacy and stakeholder trust, they can also introduce meaningful inefficiencies in investment decisions[12]. The economic effect sizes indicate that even modest shifts in firms' strategic or CSR disclosure practices can generate inefficiency impacts comparable in magnitude to one-tenth to one-fifth of a standard deviation in investment outcomes. These magnitudes are non-trivial in practical terms, highlighting the importance of balancing strategic communication with efficient resource deployment. The interpretation thus integrates both statistical and economic significance, underscoring the trade-off between differentiation, legitimacy, and efficiency in emerging markets such as Iran (Alipour et al., 2015; Yavas et al., 2019).

Table 4. Impact of Strategic Orientations and CSR Disclosure on Investment Efficiency.

Variables	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*
OPERATION	0.009 ***	0.007 ***	0.008 **									
	(0.003)	(0.002)	(0.004)									
CUSTOMER				0.003 ***	0.003 ***	0.002 **						
				(0.001)	(0.001)	(0.001)						
PRODUCT							0.007 *	0.002 **	0.001			
							(0.004)	(0.001)	(0.001)			
CSRDISC										0.004 **	0.006 ***	0.007 ***
										(0.002)	(0.002)	(0.002)
HHI	−0.057	−0.061	−0.038	−0.058	−0.063	−0.038	−0.062	−0.065	−0.044	−0.058	−0.061	−0.039
	(0.062)	(0.057)	(0.059)	(0.063)	(0.057)	(0.059)	(0.063)	(0.057)	(0.059)	(0.063)	(0.057)	(0.059)
LEVERAGE	−0.133	−0.073	−0.165	−0.117	−0.055	−0.145	−0.113	−0.054	−0.141	−0.121	−0.063	−0.151
	(0.146)	(0.134)	(0.137)	(0.146)	(0.133)	(0.137)	(0.146)	(0.133)	(0.137)	(0.146)	(0.133)	(0.137)
SIZE	−0.072	−0.058	−0.041	−0.074	−0.060	−0.044	−0.073	−0.058	−0.041	−0.070	−0.056	−0.038
	(0.055)	(0.050)	(0.051)	(0.055)	(0.050)	(0.052)	(0.055)	(0.050)	(0.052)	(0.055)	(0.050)	(0.052)
INSTOWN	−0.067	−0.072	−0.064	−0.068	−0.072	−0.065	−0.065	−0.070	−0.061	−0.065	−0.070	−0.061
	(0.092)	(0.084)	(0.086)	(0.092)	(0.084)	(0.086)	(0.092)	(0.084)	(0.086)	(0.092)	(0.084)	(0.086)
BDINDEP	0.092	0.049	0.049	0.092	0.049	0.049	0.090	0.050	0.047	0.098	0.058	0.057
	(0.141)	(0.129)	(0.133)	(0.141)	(0.129)	(0.133)	(0.142)	(0.129)	(0.133)	(0.142)	(0.129)	(0.133)
BDMEET	0.002	0.036	−0.007	−0.005	0.028	−0.016	−0.008	0.027	−0.019	−0.003	0.032	−0.013
	(0.091)	(0.083)	(0.085)	(0.091)	(0.083)	(0.085)	(0.091)	(0.083)	(0.085)	(0.091)	(0.083)	(0.085)
CEOTEN	−0.002	−0.001	−0.002	−0.002	−0.001	−0.002	−0.001	−0.001	−0.001	−0.002	−0.002	−0.002
	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
AGE	0.052	0.024	0.024	0.059	0.033	0.033	0.063	0.034	0.037	0.056	0.026	0.028
	(0.072)	(0.066)	(0.068)	(0.072)	(0.066)	(0.068)	(0.072)	(0.066)	(0.068)	(0.072)	(0.066)	(0.068)
AQ	−0.053	−0.009	−0.049	−0.052	−0.007	−0.047	−0.050	−0.007	−0.046	−0.050	−0.005	−0.045
	(0.064)	(0.058)	(0.060)	(0.064)	(0.058)	(0.060)	(0.064)	(0.058)	(0.060)	(0.064)	(0.058)	(0.060)
MB	−0.015 **	−0.015 **	−0.017 ***	−0.015 **	−0.015 **	−0.018 ***	−0.015 **	−0.015 **	−0.017 ***	−0.015 **	−0.016 **	−0.018 ***
	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
INVREC	−0.240 ***	−0.270 ***	−0.253 ***	−0.246 ***	−0.275 ***	−0.261 ***	−0.240 ***	−0.272 ***	−0.254 ***	−0.243 ***	−0.274 ***	−0.257 ***
	(0.055)	(0.050)	(0.051)	(0.055)	(0.050)	(0.052)	(0.055)	(0.050)	(0.051)	(0.055)	(0.050)	(0.051)
FINANCING	−0.639 ***	−0.562 ***	−0.622 ***	−0.662 ***	−0.584 ***	−0.650 ***	−0.657 ***	−0.582 ***	−0.645 ***	−0.664 ***	−0.591 ***	−0.654 ***
	(0.175)	(0.160)	(0.165)	(0.175)	(0.160)	(0.164)	(0.175)	(0.160)	(0.164)	(0.175)	(0.160)	(0.164)
STDSALE	−0.441	−0.543	0.274	−0.426	−0.533	0.295	−0.446	−0.543	0.271	−0.442	−0.544	0.273
	(0.423)	(0.387)	(0.398)	(0.424)	(0.388)	(0.398)	(0.424)	(0.387)	(0.398)	(0.424)	(0.387)	(0.398)

Table 4. *Cont.*

Variables	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*
STDOCF	0.869 **	0.745 **	0.809 **	0.858 **	0.737 **	0.795 **	0.867 **	0.742 **	0.807 **	0.858 **	0.730 **	0.794 **
	(0.397)	(0.363)	(0.373)	(0.397)	(0.363)	(0.373)	(0.397)	(0.363)	(0.373)	(0.397)	(0.363)	(0.374)
ROA	−1.165 ***	−1.090 ***	−1.125 ***	−1.161 ***	−1.090 ***	−1.117 ***	−1.175 ***	−1.100 ***	−1.137 ***	−1.173 ***	−1.097 ***	−1.133 ***
	(0.253)	(0.231)	(0.238)	(0.254)	(0.232)	(0.239)	(0.253)	(0.232)	(0.238)	(0.253)	(0.232)	(0.238)
OPRISK	1.055 *	0.976 *	0.717	1.037	0.953 *	0.697	1.035	0.945	0.687	1.009	0.921	0.657
	(0.631)	(0.577)	(0.593)	(0.631)	(0.577)	(0.593)	(0.632)	(0.577)	(0.594)	(0.632)	(0.577)	(0.594)
TOTRISK	0.579	0.642 *	−0.147	0.574	0.642 *	−0.155	0.590	0.649 *	−0.135	0.585	0.648 *	−0.140
	(0.374)	(0.342)	(0.351)	(0.374)	(0.342)	(0.352)	(0.374)	(0.342)	(0.352)	(0.374)	(0.342)	(0.352)
LNPAGES	−0.052	−0.066	−0.052	−0.041	−0.055	−0.037	−0.044	−0.056	−0.041	−0.039	−0.051	−0.035
	(0.101)	(0.092)	(0.095)	(0.101)	(0.092)	(0.095)	(0.101)	(0.092)	(0.095)	(0.101)	(0.092)	(0.095)
LNWORDS	0.089	0.118	0.052	0.080	0.124	0.035	0.138	0.147	0.102	0.089	0.104	0.044
	(0.099)	(0.090)	(0.093)	(0.110)	(0.100)	(0.103)	(0.113)	(0.104)	(0.106)	(0.111)	(0.101)	(0.104)
FOG	−0.002	−0.003	−0.005	−0.003	−0.004	−0.006	−0.003	−0.004	−0.006	−0.002	−0.003	−0.005
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
TONE	0.122	0.045	0.028	0.129	0.058	0.034	0.157	0.068	0.065	0.132	0.048	0.037
	(0.203)	(0.185)	(0.190)	(0.203)	(0.186)	(0.191)	(0.204)	(0.187)	(0.192)	(0.204)	(0.186)	(0.191)
CONST	−1.449	−2.009 *	−0.821	−1.337	−2.025 *	−0.636	−1.840	−2.230 *	−1.213	−1.404	−1.836	−0.701
	(1.200)	(1.096)	(1.127)	(1.270)	(1.161)	(1.194)	(1.294)	(1.183)	(1.216)	(1.286)	(1.175)	(1.208)
YEAR_FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
INDUSTRY_FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
R^2	0.118	0.140	0.133	0.118	0.139	0.132	0.117	0.139	0.132	0.117	0.139	0.132
Adj R^2	0.086	0.108	0.102	0.085	0.107	0.101	0.085	0.107	0.099	0.085	0.108	0.100
F	3.678 ***	4.462 ***	4.216	3.656 ***	4.424 ***	4.183	3.645 ***	4.417 ***	4.158 ***	3.650 ***	4.435 ***	4.173 ***

Standard errors in parentheses. Variable definitions are in Appendix C. Statistical significance is based on two-tailed t-tests, with stars reported only where coefficients meet conventional thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.3. Sensitivity and Robustness Analyses (Untabulated)

5.3.1. Firm Fixed Effects and Alternative Measurement Approaches

We first tested the robustness of our findings by incorporating firm fixed effects. While the *OPERATION* strategy retained positive coefficients, they were not statistically significant, suggesting that firm-specific characteristics dilute its impact. By contrast, the *CUSTOMER* strategy remained significantly and positively associated with investment efficiency. For *CSRDISC*, coefficients stayed positive but lost statistical significance, implying that the relationship is primarily driven by cross-sectional (between-firm) variation rather than within-firm changes over time. These findings underscore the importance of industry- and firm-level contexts in shaping strategic outcomes. We also tested an alternative measurement approach using principal component analysis (PCA). The PCA-based measures produced weaker and less consistent associations, indicating that the original keyword-frequency approach better captures the nuances of strategic orientations.

5.3.2. Robustness Checks for Dictionary-Based Content Analysis

To strengthen the validity of our dictionary-based approach, we implemented several robustness checks:

Contextual validation—We randomly sampled 200 MD&A sentences containing strategic keywords. Two independent coders classified them as positive, negative, or neutral, achieving a Cohen's kappa above 0.85. More than 90% of sentences aligned with the intended strategic meaning.

Negation sensitivity test—Sentences where keywords appeared within a ± 3-word window of common negation terms (e.g., *not*, *lack of*) were excluded. Results remained consistent, suggesting that negated usage does not drive our findings.

Sentiment-weighted scoring—Strategic keywords were re-weighted based on a domain-specific sentiment dictionary. Re-estimation with these weighted scores yielded results qualitatively similar to the baseline, confirming that sentiment-related biases do not explain our findings. Together, these checks confirm that our textual measures capture genuine strategic emphasis rather than incidental keyword presence.

5.3.3. Robustness to Directional Effects in Investment Inefficiency

Our main analysis uses absolute residuals from the *BIDDLE*, *CHEN11*, and *CHEN13* models, capturing the magnitude of deviation from optimal investment regardless of direction. As an additional robustness test, we re-estimated the models using signed residuals to distinguish between over-investment (positive residuals) and under-investment (negative residuals). Two approaches were employed:

Separate regressions by residual sign—Estimating models separately for over- and under-investment subsamples.

Two-limit Tobit model—Accounting simultaneously for positive and negative deviations.

The results were consistent with the baseline. *OPERATION* remained positively associated with inefficiency, with stronger effects in the under-investment subsample, suggesting a tendency toward conservative capital allocation. *CUSTOMER* showed stronger effects in the over-investment subsample, consistent with expansionary tendencies in customer-focused strategies. *PRODUCT* effects were positive but less consistent, mirroring the mixed patterns in the main analysis.

5.3.4. Placebo, Alternative Dictionary, and Falsification Tests

To verify that the associations between strategic orientation variables and investment efficiency are not artifacts of the textual analysis procedure or driven by spurious correla-

tions, we conducted a series of placebo and falsification tests. These tests assess whether our main results would persist under conditions where no genuine relationship should exist.

First, the *placebo keyword test*. We constructed an artificial "strategic orientation" measure using randomly selected words from the MD&A corpus with no theoretical connection to strategy. These included neutral or nonsensical terms unlikely to convey strategic intent. We then calculated their relative frequencies for each firm-year, applying the same text-mining procedure as for the actual strategy measures. Substituting this placebo score into the baseline regressions produced coefficients that were small in magnitude and statistically insignificant across all specifications. This confirms that our findings are not mechanically generated by keyword counts or by generic textual properties such as document length or writing style.

Second, the *alternative dictionary test*. Following the reviewer's suggestion, we replicated the analysis using keyword sets drawn from established strategy frameworks (Miles et al., 1978; Porter, 1985; Treacy & Wiersema, 1995; Banker et al., 2024). These dictionaries reflect alternative conceptualizations of cost efficiency, customer focus, and innovation. Results remained qualitatively consistent with the baseline, indicating that our findings are not dependent on a particular dictionary but reflect genuine underlying relationships.

Third, the *temporal mismatch test (reverse causality check).* To evaluate whether reverse causality could explain our results—namely, that investment efficiency in year t influences strategy disclosures in year $t + 1$—we re-estimated the baseline models using the one-year-ahead values of the strategy variables. Investment efficiency in year t was regressed on strategy scores from year $t + 1$, with the full set of covariates included. Across all dimensions, the lead-year coefficients were insignificant and close to zero, indicating that future strategy disclosures do not "predict" past investment efficiency. This supports our assumed direction of causality, from strategy to efficiency.

Finally, the *pre-trend analysis.* We tested whether firms adopting stronger strategic orientations were already on different investment efficiency trajectories before adoption. For each firm, we identified the first year when the strategy score crossed a high-intensity threshold and defined event time relative to this year. We then estimated models with event-time dummies for the pre-adoption period, excluding the year immediately before adoption as the reference category. Coefficients on the pre-adoption indicators were jointly and individually insignificant, showing no systematic upward or downward pre-trends. This reinforces a causal interpretation: improvements in investment efficiency occur after, rather than before, the adoption of stronger strategic orientations.

Taken together, the placebo keyword test, alternative dictionary replication, temporal mismatch analysis, and pre-trend check all point to the same conclusion: the documented relationships are not driven by spurious textual correlations, reverse causality, or pre-existing divergent trends.

5.3.5. Additional Robustness Checks: Industry and Macroeconomic Contexts

We also conducted additional tests to examine whether the relationship between strategic orientations and investment efficiency depends on industry context and macroeconomic conditions.

Industry heterogeneity. Sub-sample regressions reveal that the impact of strategic orientations varies by sector. Product innovation exerts a significantly stronger effect in high R&D-intensive industries, while operational efficiency is more effective in low R&D industries. In contrast, customer orientation maintains a consistent positive association with investment efficiency across both types of industries.

Macroeconomic heterogeneity. To capture temporal variation, we split the sample into stable years (2014–2017) and crisis years (2018–2021), the latter reflecting the re-imposition

of sanctions and the COVID-19 pandemic. Results show that product innovation enhances investment efficiency primarily during stable periods, whereas operational efficiency is more beneficial in times of crisis. Customer orientation again demonstrates stable and positive effects across both periods.

Taken together, these untabulated results confirm the robustness of our main findings and demonstrate that both industry structure and the macroeconomic environment moderate the strategy–investment efficiency relationship.

5.4. Addressing Endogeneity

To mitigate potential endogeneity concerns, we employed two advanced econometric techniques: entropy balancing and the Generalized Method of Moments (GMM). Endogeneity may arise if firms' strategy choices—such as operational efficiency, customer intimacy, and product innovation—or their CSR disclosure practices are jointly shaped by unobserved factors that also affect investment efficiency (*BIDDLE*, *CHEN11*, *CHEN13*). Entropy balancing adjusts for non-random treatment assignment, creating balanced groups to reduce bias in estimating strategy effects on investment efficiency. The results in Table 5 show that operational strategies have significant positive impacts on investment efficiency ($p < 0.05$ or $p < 0.01$ across models), highlighting the importance of operational efficiency in improving resource allocation. Customer-centric strategies also showed strong positive effects ($p < 0.01$ and $p < 0.05$), suggesting a robust association with enhanced investment efficiency. Similarly, product-focused strategies demonstrated significant positive impacts ($p < 0.05$ or $p < 0.1$), although the results were slightly less consistent across models. Importantly, CSR disclosure remained positive and statistically significant ($p < 0.05$ or $p < 0.01$), suggesting that even after accounting for endogeneity, extensive CSR reporting is systematically associated with reduced investment efficiency. These findings reinforce the robustness of the main results and indicate that both strategic orientations and CSR disclosure exert persistent and economically meaningful influences on firms' investment efficiency.

To further address reverse causality and omitted variable bias, we applied dynamic panel GMM, which uses lagged variables as instruments. Results (Table 6) reaffirm the baseline findings: operational strategies have a strong positive impact on investment efficiency ($p < 0.01$ to $p < 0.1$ across models), while customer and product strategies also show consistent positive effects ($p < 0.05$, with some weaker significance for product strategies). Importantly, CSR disclosure remains positive and statistically significant ($p < 0.01$ to $p < 0.05$), reinforcing that extensive CSR reporting is systematically associated with reduced investment efficiency even when controlling for dynamic endogeneity. The negative and highly significant coefficients on lagged investment inefficiencies suggest a corrective dynamic, indicating that firms adjust their investment behavior over time. Overall, the results reinforce that strategic choices in operations, customer relations, product development, and CSR disclosure meaningfully influence investment efficiency in emerging market contexts[13].

Table 5. Endogeneity tests: Entropy Balancing Approach.

Variables	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*
OPERATION	0.006 **	0.010 **	0.009 *									
	(0.003)	(0.005)	(0.005)									
CUSTOMER				0.003 ***	0.002 **	0.002 **						
				(0.001)	(0.001)	(0.001)						
PRODUCT							0.006 **	0.010 *	0.009 *			
							(0.003)	(0.006)	(0.005)			
CSRDISC										0.016 **	0.021 ***	0.007 **
										(0.006)	(0.006)	(0.003)
CONST & CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR_FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
INDUSTRY_FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594	1594
R2	0.158	0.178	0.166	0.158	0.177	0.165	0.158	0.178	0.166	0.161	0.183	0.168
Adj R2	0.128	0.148	0.135	0.128	0.147	0.134	0.128	0.148	0.135	0.131	0.153	0.138
F	5.162 ***	5.925 ***	5.459 ***	5.167 ***	5.891 ***	5.416 ***	5.162 ***	5.925 ***	5.459 ***	5.278 ***	6.154 ***	5.535 ***

Standard errors in parentheses. Variable definitions are in Appendix C. Statistical significance is based on two-tailed t-tests, with stars reported only where coefficients meet conventional thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6. Endogeneity tests: GMM Approach.

Variables	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*
OPERATION	0.006 ***	0.007 *	0.006 **									
	(0.002)	(0.004)	(0.003)									
LAGBIDDLE	−0.265 ***											
	(0.036)											
LAGCHEN11		−0.241 ***										
		(0.042)										
LAGCHEN13			−0.284 ***									
			(0.040)									
CUSTOMER				0.003 **	0.002 **	0.002 **						
				(0.002)	(0.001)	(0.001)						
				−0.270 ***								

Table 6. *Cont.*

Variables	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*	*BIDDLE*	*CHEN11*	*CHEN13*
LAGBIDDLE				(0.039)								
					−0.250 ***							
LAGCHEN11					(0.045)							
						−0.293 ***						
LAGCHEN13						(0.041)						
PRODUCT							0.004 **	0.005 *	0.006 **			
							(0.002)	(0.003)	(0.003)			
LAGBIDDLE							−0.272 ***					
							(0.039)					
LAGCHEN11								−0.249 ***				
								(0.044)				
LAGCHEN13									−0.301 ***			
									(0.043)			
CSRDISC										0.003 ***	0.005 *	0.002 **
										(0.001)	(0.003)	(0.001)
LAGBIDDLE										−0.273 ***		
										(0.040)		
LAGCHEN11											−0.266 ***	
											(0.055)	
LAGCHEN13												−0.052
												(0.034)
CONST & CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR_FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
INDUSTRY_FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1365	1365	1365	1365	1365	1365	1365	1365	1365	1365	1365	1365
Wald chi2	519.3 ***	178.8 ***	3537 ***	3473 ***	440 ***	1340 ***	1975 ***	124.7 ***	3252 ***	184.2 ***	356.23 ***	1236.02 ***
AR(1) Z-test	−3.78 ***	−3.81 ***	−3.60 ***	−3.69 ***	−3.65 ***	−3.57 ***	−3.70 ***	−3.75 ***	−3.58 ***	−3.69 ***	−3.43 ***	−4.45 ***
AR(2) Z-test	−0.85	−0.33	−0.80	−0.56	−0.41	−0.94	−0.62	−0.41	−0.91	−0.51	−0.38	−0.43
Hansen Chi2-test	121.11	124.46	115.56	120.76	123.12	128.78	123.87	118.86	125.15	120.56	94.06	79.38

Standard errors in parentheses. Variable definitions are in Appendix C. Statistical significance is based on two-tailed t-tests, with stars reported only where coefficients meet conventional thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.5. Exploring Curvilinear Relationships Between Strategic Orientation and Investment Efficiency

Recent work in strategic management suggests that while strategic orientation enhances adaptability and market alignment, excessive emphasis on a single strategy can generate diminishing returns or even negative outcomes (Morgan & Strong, 2003; Saebi et al., 2017). This risk is especially pronounced in volatile markets such as Iran, where economic instability amplifies the consequences of strategic missteps.

The concept of a curvilinear relationship implies that initial investments in strategic focus—whether operational efficiency, customer intimacy, or product innovation—tend to improve efficiency, but beyond a certain threshold, further intensification may reduce it. This is due to factors like resource overcommitment (Molle & Berkoff, 2006; Graebner et al., 2010), increased complexity and coordination costs (Lee, 2002; Piercy, 2009), and operational inflexibility (Matthyssens et al., 2005; K. Z. Zhou & Wu, 2010). For example, intensifying a strategic focus can divert resources from other areas, leading to inefficiency (Harrison et al., 1993; Klingebiel & Rammer, 2014), and greater complexity can increase coordination costs, limiting the benefits of focused strategies (Y. M. Zhou & Wan, 2017). This logic also extends to CSR disclosure. While moderate CSR reporting can enhance transparency and legitimacy, excessive disclosure may create information overload, divert managerial attention, or signal resource diversion away from core investments, potentially reducing efficiency.

Building on these insights, we tested for curvilinear effects by adding quadratic terms for *OPERATION*, *CUSTOMER*, *PRODUCT*, and *CSRDISC* to our baseline models. Results show consistently positive linear relationships across all four dimensions, while the quadratic terms were statistically insignificant. This indicates no evidence of diminishing returns within the observed data range. Overall, our findings suggest that stronger strategic orientation and CSR disclosure continue to be positively associated with investment inefficiency. However, future research using broader datasets and alternative contexts may be necessary to detect potential curvilinear dynamics.

6. Conclusions

This study examined how firms' strategic orientations—operational efficiency, customer intimacy, and product innovation—along with CSR disclosure affect investment efficiency in a sanction-constrained emerging market. Using textual analysis of MD&A reports from Tehran Stock Exchange firms, we found that operational efficiency and customer intimacy are generally linked to lower investment efficiency, while product innovation exerts more nuanced effects, improving efficiency in R&D-intensive sectors and during stable periods. CSR disclosure also reduces efficiency, highlighting a trade-off between legitimacy-building and effective resource allocation. Together, these findings demonstrate that strategic orientations and CSR disclosure shape investment efficiency in complex and context-dependent ways.

Our research contributes to strategic management by showing that even well-intentioned strategies can misallocate resources if misaligned with institutional and financial constraints. It extends the resource-based view and dynamic capabilities theory by illustrating how sanctions and financing frictions intensify the risks of misalignment. Methodologically, the study adapts strategic orientation and CSR dictionaries for Persian-language disclosures, providing a replicable framework for analyzing narrative reporting in non-English and underexplored markets. Conceptually, treating disclosures as financial innovation offers a scalable, low-cost way to capture strategic posture when access to external finance is limited. For practitioners, the findings stress the importance of aligning strategic focus with both internal capabilities and evolving market conditions. For policymakers and regulators, they suggest that improving the clarity, comparability, and machine-readability

of MD&A reports can strengthen the link between disclosure and capital allocation. For investors, text-based signals of strategy and CSR disclosure provide valuable information for screening firms at risk of over- or under-investment.

We also acknowledge several limitations. First, textual analysis depends on disclosure quality, which may vary across firms. Second, our empirical focus on Iranian firms limits generalizability; replication in other institutional settings is needed. Third, our dictionary-based approach, though validated, may miss subtler linguistic cues; future studies could apply machine-learning methods such as topic modeling or embeddings to capture richer patterns. Finally, unobserved factors may still remain despite extensive robustness and endogeneity checks; triangulating text with survey or proprietary datasets could further enhance validity. Despite these limitations, the study advances understanding of how strategy and CSR disclosure shape investment efficiency in constrained markets. It underscores the need for firms to balance competitive positioning with responsible communication, offering a framework that bridges strategic management and financial innovation. More broadly, it highlights the value of unconventional data—narrative reporting—as a tool for monitoring real economic outcomes under uncertainty.

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Appendix A. Strategic Orientations Bag-of-Words

Differentiation Strategy:
differentiate, differentiation, differentiating, unique, uniquely, uniqueness, superior, superiority, superiors, premium, premiums, high price, high prices, high margin, high margins, high end, high-end products, inelasticity, excellent, excellence, leading edge, upscale, upscaled

Product:
innovate, innovates, innovating, innovation, innovations, creative, creativity, creatively, research and development, R&D, technical, technician, techniques, technology, technologies, technological, technologically, patent, patents, patented, proprietary, new product, new products

Quality Management:
quality, qualities, reliable, reliability, reliably, durable, durability

Market:
marketing, marketer, marketers, advertise, advertising, advertisement, advertisements, advertiser, advertisers, brand, brands, branded, branding, reputation, reputations, reputable, trademark, trademarks, trademarked

Customer:
customer service, customers' service, consumer service, consumers' service, customer needs, sales support, sales support team, post-purchase service, post-purchase services, customer preferences, consumer preferences, consumer relations, consumer relationship, consumer experiences, consumer experienced, consumer support, loyalty, loyal, customize, customized, customization, tailor, tailored, tailoring, personalize, personalized, personalization, responsive, responsiveness, on time, timely

Human Resource:
talent, talents, talented, train, trains, trained, training, trainer, trainers, skill, skills, skilled, skillful, intellectual, intellectuals, intellectually, property, properties, human capital
Cost Strategy:
cost leader, cost leaders, cost leadership, low price, low prices, low cost, lower cost, lowest cost, cost advantage, cost advantages, competitive price, competitive prices, aggressive price, aggressive pricing
Cost Control:
control cost, controls cost, controlling cost, cost control, control expense, controls expenses, controlling expenses, expense control, control overhead, controls overhead, controlling overhead, overhead control, minimize cost, minimizes cost, minimizing cost, cost minimization, minimize expense, minimizes expenses, minimizing expenses, expense minimization, minimize overhead, minimizes overhead, minimizing overhead, overhead minimization, reduce cost, reduces cost, reducing cost, cost reduction, reduce expense, reduces expenses, reducing expenses, expense reduction, reduce overhead, reduces overhead, reducing overhead, overhead reduction, cut cost, cuts cost, cutting cost, cut expense, cuts expenses, cutting expenses, cut overhead, cuts overhead, cutting overhead, decrease cost, decreases cost, decreasing cost, decrease expense, decreases expenses, decreasing expenses, decrease overhead, decreases overhead, decreasing overhead, monitor cost, monitors cost, monitoring cost, monitor expense, monitors expenses, monitoring expenses, monitor overhead, monitors overhead, monitoring overhead, save cost, saves cost, saving cost, cost saving, save expense, saves expenses, saving expenses, expense saving, save overhead, saves overhead, saving overhead, overhead saving, improve cost, improves cost, improving cost, cost improvement, cost control, cost controls, cost improvement, cost improvements, cost minimization, cost minimizations, cost reduction, cost reductions, cost saving, cost savings, expense control, expense controls, expense improvement, expense improvements, expense minimization, expense minimizations, expense reduction, expense reductions, expense saving, expense savings, overhead control, overhead controls, overhead improvement, overhead improvements, overhead minimization, overhead minimizations, overhead reduction, overhead reductions, overhead saving, overhead savings
Operating Efficiency:
efficient, efficiency, efficiencies, high yield, high yields, process improvement, process improvements, asset utilization, assets utilization, capacity utilization, capacities utilization
Scale Economy:
scope, scopes, scoped, scoping, scale, scales, scaled, scaling, breadth, breadths, broad, broader, broadest, mass, masses, high volume, high volumes, large volume, large volumes, economy of scale, economies of scale
Source(s): Banker et al. (2024). The original Banker et al. (2024) bag-of-words includes only the *star keywords* (root forms). In this study, we extended those roots into their full English word families and then translated and adapted them into Persian for use in the bag-of-words approach. The full Persian bag-of-words lists are available upon request.

Appendix B. CSR Bag-of-Words Dictionary

CSR_Diversity:
accessibility, affirmative action, age diversity, cultural diversity, disability inclusion, diverse workforce, diversity, diversity training, empowerment, equal opportunity, equal pay, equal rights, equal treatment, equity, ethnic diversity, fairness, gender diversity, gender equality, inclusion, inclusive culture, inclusive hiring, marginalized groups, minority, non-discrimination, nondiscriminatory, pay equity, racial diversity, representation, respect for diversity, sexual orientation, underrepresented groups, women empowerment, workforce representation, workplace equality, workplace inclusion
CSR_Community:
capacity building, charity, civic engagement, community, community development, community investment, community involvement, corporate citizenship, disaster relief, donation, educational support, engagement, fundraising, giving back, grants, health initiatives, humanitarian aid, local communities, local development, local support, neighborhood development, non-profit partnerships, outreach, partnership, philanthropy, public good, rural development, social cohesion, social impact, social projects, social responsibility, social welfare, sponsorship, stakeholder engagement, support, volunteer, volunteering programs

CSR_Product:
after-sales service, certification, compliance, consumer protection, consumer trust, customer feedback, customer loyalty, customer satisfaction, customer service, eco-labeling, ethical labeling, ethical sourcing, fair pricing, fair trade, innovation, labeling, marketing ethics, nutritional labeling, product information, product innovation, product quality, product recall, product responsibility, product safety, product stewardship, product testing, product transparency, quality, quality assurance, responsibility, responsible marketing, responsible product, safety, safety standards, standards compliance, sustainable product, transparency, truth in advertising, warranty
CSR_Employee:
benefits, capacity building, career development, career growth, compensation, development, diversity training, employee development, employee empowerment, employee engagement, employee motivation, employee relations, employee satisfaction, employee turnover, employee voice, employee welfare, equal pay, grievance mechanisms, health and safety, human capital development, job security, learning opportunities, occupational health, participation, performance appraisal, professional development, retention, safety training, skills, staff participation, talent management, training, wages, wellbeing, wellness programs, workforce planning, workforce training, work-life balance, workplace culture, workplace wellness
CSR_Environment:
afforestation, air emissions, biodiversity, carbon footprint, clean energy, climate change, climate risk, CO2, conservation, deforestation, eco-efficiency, ecological balance, ecosystem, emission, endangered species, energy efficiency, energy saving, environmental footprint, environmental impact, environmental protection, environmental responsibility, environmental stewardship, fossil fuel, GHG emissions, global warming, greenhouse gas, hazardous waste, landfill, methane, natural resources, pollution, reforestation, renewable, renewable energy, resource use, soil contamination, solar energy, sustainability, sustainable development, waste, waste recycling, waste reduction, wastewater, water efficiency, water management, water pollution, water saving, wildlife protection, wind energy
Source(s): (Clarkson et al., 2020; Ferjančič et al., 2024; Gorovaia & Makrominas, 2025; Muslu et al., 2019; Raghupathi et al., 2023; Michelon et al., 2015).

Appendix C. Variables Definition

Dependent Variables	
BIDDLE	=The absolute value of the residuals from the regression of total investment on sales growth, following Biddle et al. (2009). This measure reflects the deviation from the predicted level of investment, serving as a proxy for firm investment efficiency. A lower value indicates higher investment efficiency.
CHEN11	=The absolute value of the residuals from the regression model incorporating an interaction between negative sales growth indicator and sales growth, following F. Chen et al. (2011). This variable measures deviations from the optimal level of investment, with a lower value suggesting higher investment efficiency.
CHEN13	=The absolute value of the residuals from the regression of total investment on Tobin's Q and sales growth, according to C. Chen et al. (2013). This measure captures the discrepancy between actual and optimal investment levels, with a lower value indicating higher investment efficiency.
Independent Variables	
OPERATION	=The sum of keywords related to Cost Strategy, Cost Control, and Operational Efficiency in MD&A disclosures. This variable quantifies the emphasis a firm places on operational efficiency as part of its strategic orientation. Higher scores indicate a stronger strategic focus on operational efficiency.

Independent Variables	
CUSTOMER	=The sum of keywords associated with Market, Differentiation Strategy, Customer, and Scale Economy in MD&A texts. This measure assesses the degree to which a firm prioritizes customer intimacy in its strategic positioning. Higher scores suggest a greater emphasis on customer-centric strategies.
PRODUCT	=The sum of keywords linked to Human Resource, Product, and Quality Management within MD&A disclosures. This variable captures the extent of a firm's commitment to product leadership as a strategic direction. Elevated scores denote a pronounced strategic focus on product innovation and quality management.
CSRDSCL	=The total number of CSR-related keywords disclosed in MD&A disclosures. This variable reflects the extent of a firm's commitment to corporate social responsibility practices. Higher scores denote a stronger emphasis on non-financial reporting, transparency, and governance compliance through CSR disclosure.
Control Variables	
HHI	=Herfindahl–Hirschman Index computed as the sum of squared market share of firms, based on the assets of the firm, in each industry, then multiply by -1.
LEVERAGE	=Ratio of total liabilities to total assets
SIZE	=Natural logarithm of total assets
INSTOWN	=The percentage of the company's shares owned by institutional owners
BDINDEP	=The percentage of independent directors on the board of directors
BDMEET	=Natural logarithm of number annual board meetings
CEOTEN	=The number of years a CEO remained in the current position
AGE	=The natural log of the number of years since the firm was listed in the stock market
AQ	=Following Dechow and Dichev (2002), accrual quality is estimated from the regression of working capital accruals on past, present, and future cash flows. The measure is defined as $-1 \times \lvert \text{residuals} \rvert$, such that higher values indicate better accrual quality (i.e., stronger mapping of accruals into cash flows and fewer estimation errors).
MB	=Market-to-book ratio calculated as the market value of the firm divided by its book value
INVREC	=The sum of inventory and accounts receivable divided by total assets
FINANCING	=An indicator variable that equals one if the sum of new long-term debt plus new equity exceeds 2 percent of lagged total assets
STDSALE	=5-year standard deviation of total sales scaled by lagged total assets
STDOCF	=5-year standard deviation of operational cashflow scaled by lagged total assets
ROA	=Operating income divided by total assets.
OPRISK	=Proxy for the risk of operations, equal to the standard deviation, over the last four fiscal years of the yearly change in operating income scaled by total assets at the beginning of the period.
TOTRISK	=Proxy for total risk, defined by the standard deviation over the last four fiscal years of the return on the market value of the firm.
LNPAGE	=Natural logarithm of the number of document pages.
LNWORDS	=Natural logarithm of the total number of words in a document.

Control Variables	
FOG	$=-1 \times [0.4 \times$ (number of words/number of sentences + 100 $\times$ (number of words with more than two syllables/number of words))]
TONE	=(Positive words − Negative words)/(Positive words + Negative words)

Notes

1 In the strategic management literature, the terms *business strategy* and *strategic orientations* are sometimes used interchangeably (e.g., Hambrick, 1983; Treacy & Wiersema, 1995; Banker et al., 2024). In this study, we use the term *strategic orientations* to more precisely describe the independent variables that capture firms' dominant strategic focus.

2 CODAL hosts the full suite of audited annual financial statements (balance sheets, income statements, cash flows, and notes), MD&A reports, board reports, auditor's opinions, and accompanying governance/disclosure documents. Filings are time-stamped, uniquely identified by issuer and fiscal year, and amendments are versioned—features that reduce survivorship and timing biases and allow precise matching of narratives to the corresponding accounting year.

3 The choice of CODAL as the data source reflects its role as the official and centralized reporting platform mandated by the Securities and Exchange Organization of Iran. Unlike alternative sources such as voluntary corporate websites, CODAL ensures standardized, complete, and regulator-verified disclosures, thereby minimizing reporting bias. The chosen 2015–2024 horizon covers both stable and turbulent economic periods in Iran, making the sample particularly suitable for examining how strategic orientation and CSR disclosure relate to investment efficiency under varying macroeconomic conditions.

4 For the processing of Persian text, the Hazm library was utilized due to the constraints in the NLTK Python package for the Persian language. This library carries out tasks such as text cleaning, tokenizing, lemmatizing, POS tagging, shallow parsing, and dependency parsing. It provides interfaces for Persian corpora and is compatible with NLTK (https://pypi.org/project/hazm/ and https://github.com/roshan-research/hazm, accessed on 2 March 2024).

5 The Dehkhoda Dictionary, the most comprehensive Persian encyclopedic dictionary ever published, consisting of 200 volumes (https://en.wikipedia.org/wiki/Dehkhoda_Dictionary, accessed on 2 March 2024), and the Mo'in Encyclopedic Dictionary, the second largest Persian language encyclopedic dictionary curated by Mohammad Mo'in (https://en.wikipedia.org/wiki/Moin_Encyclopedic_Dictionary, accessed on 2 March 2024), were used for translating the key terminologies.

6 The English strategy keywords from Banker et al. (2024) were translated into Persian through an iterative process involving two bilingual domain experts. Terms were cross-checked to ensure that idiomatic meanings and firm-specific jargon were preserved. For example, "operational excellence" was translated as "برتری عملیاتی," which conveys both efficiency and process quality, while "customer focus" was translated as "تمرکز بر مشتری" to capture the intended strategic emphasis. We also screened for culturally specific strategy terms used in Iranian corporate disclosures (e.g., "کیفیت برتر" for "superior quality") and found no need to expand the original list beyond minimal context-specific adjustments. The frequency distribution of the final Persian keywords, consistent with the expected emphasis patterns, is available upon request.

7 The CSR dictionary used to construct *CSRDSCL* consists of 200 words in English. To account for linguistic and contextual differences, we extended and validated the list in Persian, which resulted in 286 words.

8 Persian business discourse often uses multiple expressions for the same concept (e.g., "environment" may appear as محیط زیست or زیست محیطی). To minimize the risk of under-detection, synonyms, morphological variants, and context-specific terms were systematically added to the dictionaries. This step increases coverage and reduces the likelihood of missing relevant disclosure content due to linguistic variation.

9 To ensure that our findings are not sensitive to measurement choices or methodological assumptions, we complement the baseline model with an extensive set of robustness checks, including firm fixed effects, alternative textual measures, placebo and falsification tests, and endogeneity adjustments. Details of these analyses are presented in Section 5.3.

10 In the current analysis, we employ industry fixed effects to control for industry-specific influences on investment efficiency and strategic orientations. This choice is driven by our focus on capturing industry-wide patterns and differences in strategic execution among firms within the same industry, without overfitting the model with firm-specific effects which could obscure meaningful interpretation of strategic impacts. We acknowledge the potential benefits of firm fixed effects in controlling for unobservable firm characteristics. However, for the purpose of this study, industry fixed effects are deemed more appropriate for examining the nuances of strategic orientations across a diverse set of industries and maintaining sufficient variability for robust analysis.

11 Following the methodology adapted from Mitton (2024), we calculate economic significance using the formula $E_S^{IQR} = \frac{|b\ (p75-p25)|}{|S_y|}$ where b is the regression coefficient for each strategic variable (*OPERATION*, *CUSTOMER*, *PRODUCT*), p75 and p25 are the 75th and 25th percentiles of the respective strategic variable, and sy is the standard deviation of each dependent variable (*BIDDLE*,

CHEN11, *CHEN13*). This measure captures the effect of a typical interquartile change in strategic orientation on investment efficiency, expressed relative to the natural variability of the outcome. The results show that strategic orientations and CSR disclosure exert economically significant impacts on firms' investment efficiency.

[12] While Banker et al. (2024) include all three strategic pillars—operational efficiency, customer intimacy, and product innovation—in the same regression specification, our main analyses estimate their effects separately to avoid potential multicollinearity and overfitting concerns in our relatively smaller sample. This choice also reflects our interest in isolating the marginal association of each strategic orientation with investment efficiency, given that the pillars, although conceptually distinct, are moderately correlated in our data. Nonetheless, in untabulated robustness checks following Banker et al. (2024), we re-estimate our models including all three pillars simultaneously and find that the signs and significance levels of our main coefficients remain qualitatively similar, indicating that our separate estimation approach does not materially alter the inferences.

[13] In addition, to mitigate potential reverse causality—where poor investment efficiency could prompt a shift in strategic rhetoric—we re-estimated models using lagged independent variables, measuring strategic orientation in year t–1 to predict investment efficiency in year t. This temporal separation reduces simultaneity concerns and ensures that strategy emphasis precedes the investment outcome; results remained qualitatively similar to the baseline. Furthermore, to address endogeneity from omitted time-varying confounders, we estimated first-difference models, focusing purely on within-firm year-to-year changes. This yielded consistent directional results, though with reduced statistical power due to differencing.

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