JURNAL BISNIS DAN AKUNTANSI
Vol. 27, No. 2, December 2025, Page 375-392
Accreditation of Sinta 2 SK No. 72/E/KPT/2024

P-ISSN: 1410 – 9875
E-ISSN: 2656 – 9124
http://jurnaltsm.id/index.php/JBA

INVESTMENT COMPONENTS EMBEDDED IN SG&A EXPENSES: COST STICKINESS AND MARKET REACTIONS

JEMS ARISON ZACHARIAS*
HERRY APRILIA MANUBULU
CHRISTIAN AGUSTINUS BESI

Universitas Kristen Artha Wacana, Jl. Adisucipto, Kupang, Indonesia
jemszacharias@gmail.com

Received: January 15, 2026; Revised: March 4, 2026; Accepted: April 7, 2026

Abstract**:** *This study examines differences in the degree of cost stickiness between investment and operating selling, general, and administrative (SG&A) expenses, together with market reactions to each component among Indonesian technology firms. The sample consists of 167 firm-year observations over the 2020–2024 period. The hypotheses are tested by multiple linear regression following Anderson's cost stickiness model and Weiss' market reaction model. The results indicate that SG&A expenses exhibit cost stickiness, implying that costs adjust more slowly when revenues decline than when they increase. Furthermore, investment SG&A demonstrates a significantly higher degree of cost stickiness than operating SG&A. In addition, cost stickiness arising from investment SG&A significantly moderates the relationship between earnings forecast errors and market reactions. In contrast, cost stickiness associated with operating SG&A does not exhibit a significant moderating effect. The findings suggest that although the market partially recognizes the investment component of SG&A as intangible assets, information limitations reduce market responsiveness to the long-term implications of investment cost stickiness. The study offers insights for investors and analysts in evaluating the performance of technology-based firms in Indonesia.*

Keywords**:** Cost Stickiness, Intangible Assets, Investment SG&A, Market Reaction, Technology Firms

INTRODUCTION

Technology firms must be highly adaptive to rapid technological change and evolving consumer preferences in business environments marked by disruptive innovation. Disruptive innovation refers to simple and affordable innovations that initially target underserved or overlooked market segments and subsequently evolve to enable new entrants to displace incumbent firms' dominance through imitation strategies and continuous innovation (Chang et al. 2024; Liu et al. 2025; Si and Chen 2020). Numerous latecomer firms, such as Samsung and Huawei, have successfully outcompeted established incumbents such as Motorola, with individual-level expertise and knowledge being pivotal in the technological catch-up process (Mengis 2021). The expertise and knowledge possessed by researchers and managers can be classified as intangible strategic assets (D'Oria et al. 2021). Unlike generic assets such as property and inventories, strategic assets are less imitable and more capable of generating sustained competitive advantage.

The evaluation of sustained competitive advantage must encompass not only traditional accounting information but also the management of strategic assets, such as information technology (IT), brands, global relationships, and unique business processes, in creating long-term value. For example, Dell reported revenue and profit growth until 2005; however, the imitation of the competitive

advantage of its built-to-order model by competitors resulted in delayed recognition of its diminishing competitiveness by investors, leading to a sharp decline in its stock price during the 2005–2006 period (Lev 2017). Financial performance remains an important determinant of stock price movements and investor reactions (Deitiana 2011). However, in firms that rely heavily on intangible investments, revenues reported on the income statement often fail to capture the underlying activities that generate future cash flows, while SG&A expenses are not matched to current revenues. As a result, reported losses increasingly lose their economic informational relevance for investors and analysts (Srivastava 2023).

Table 1 displays total revenues and SG&A expenses for technology firms listed on the Indonesia Stock Exchange (IDX) from 2020 to 2024. The data reveal that while SG&A expenses increased continuously over the period, revenues declined in 2023–2024. This pattern is an early indication of sticky cost behavior among technology firms on the IDX. Costs are sticky when they rise with increasing revenues, but do not fall correspondingly when revenues fall. This asymmetric cost behavior might provide bias in earnings estimates due to the disproportionate cost response to changes in revenue (Weiss 2010). To mitigate this bias, this study uses the investment component of SG&A (investment SG&A) as a key variable to investigate sticky cost behavior and earnings surprises in technology-sector enterprises.

Investment SG&A represents a component of operating SG&A expenses aimed at developing intangible assets and generating future revenues. This component is fundamentally distinct from maintenance SG&A which aims to sustain daily operations and current revenues. According to Enache and Srivastava (2018), the commingling of these two components within operating SG&A leads to distortions in reported earnings and performance evaluation. Consequently, separating the investment component from routine operating costs embedded in operating SG&A can improve the predictive ability of earnings and future cash flows. These findings are consistent with Iqbal et al. (2024), who demonstrate that capitalizing internally-generated intangible asset investments from SG&A expenses results in a more accurate and economically relevant measure of intangible capital in explaining firm performance and market value.

Liang et al. (2025) identify sticky cost behavior in IT investments in the United States, indicating that firms do not symmetrically adjust their IT investment levels in response to declines in revenue or demand. Meanwhile, using Indonesian data from 2019–2021, Zacharias (2023) documents that asset intensity moderates (strengthens) technology firms' sticky SG&A cost behavior. These findings indicate that technology firms that rely more on revenue-generating assets are more likely to retain SG&A expenditures when revenues decrease. Building on this evidence, our study further explores the role of such assets by focusing on internally-generated intangible assets, given their unique and strategic nature for technology firms, consistent with the resource-based theory (RBT) perspective.

Table 1. Total Revenue and SG&A Expenses of the Technology Sector on the IDX

Year	Revenue (Million Rupiah)	SG&A Expenses (Million Rupiah)
2020	45,923,067	1,237,320
2021	55,397,899	1,638,477
2022	68,163,534	2,141,227
2023	66,902,604	2,444,965
2024	53,009,499	2,523,719

Source: Secondary data from financial statements of IDX-listed technology firms, processed by the authors.

This study employs investment SG&A as a novel contribution to examining cost stickiness among technology firms in Indonesia, given that research on cost stickiness in the technology sector, particularly in developing economies, remains relatively scarce. Most previous studies focus on total operating SG&A expenses, without distinguishing between investment and maintenance components, thereby limiting their ability to capture the intangible asset–based cost characteristics that dominate technology firms. By using investment SG&A as a proxy for organizational capital or intangible assets embedded in operating SG&A, this study addresses the limitations of conventional accounting in measuring internally-generated intangible assets (Enache and Srivastava 2018). This approach is further supported by Rajgopal et al. (2024), who demonstrate that capitalizing the investment component of operating SG&A enhances earnings persistence and renders the earnings-to-price ratio a more reliable value signal for investors. Accordingly, separating investment SG&A is expected to provide a more accurate understanding of cost stickiness behavior in Indonesian technology firms.

Adjustment Cost Theory (ACT)

Adjustment cost theory (ACT) was introduced by Lucas (1967); it posits that firms respond to changes in market demand by gradually and asymmetrically adjusting their resource inputs due to adjustment costs. One such cost is the severance pay that firms incur during layoffs in response to declining sales, when substantial lump-sum payments can increase fixed costs and potentially disrupt firm operations. Consequently, managers tend to delay layoff decisions until conditions become critical and adjustment costs are unavoidable (Cooper and Haltiwanger 2006). Under certain conditions, firms therefore face the risk of additional costs, prompting more cautious adjustments of input capacity that do not always respond immediately to changes in market demand (Lucas and Prescott 1971).

Onel (2018) identifies four primary types of firm inputs: capital, labor, energy, and intermediate materials, each with different levels of adjustment costs. Gupta and Ma (2025) demonstrate that variation in these adjustment cost levels explains differences in growth patterns across firms, particularly under fluctuating economic conditions and in managerial decisions related to capital capacity expansion. Furthermore, Liao et al. (2024) find that firms with higher capital adjustment costs tend to rely more heavily on internal cash flows to finance investments. Conversely, those with lower adjustment costs respond more quickly to changes in market demand, adjust their capital capacity more flexibly, and access external financing more easily.

Higher adjustment costs lead to cost stickiness, a phenomenon in which selling, general, and administrative (SG&A) expenses and earnings increase proportionately when revenue rises by 1%. However, when revenue falls by 1%, SG&A expenses remain high and do not decrease proportionately, resulting in earnings declining by more than 1% (Anderson et al. 2003; Banker and Byzalov 2014). Weiss (2010) demonstrates that this cost asymmetry has significant economic consequences, making it difficult for investors and analysts to predict future earnings accurately. Eroded accuracy in investors' earnings estimation leads to market reactions, such as greater information risks and stock price volatility (Li and Sun 2023).

Resources-Based Theory (RBT).

Resource-based theory (RBT), introduced by Wernerfelt (1984), proposes that a firm's competitive advantage and long-term profitability are determined not only by its product-market position, but also by the ownership and effective management of strategic resources. Barney (1991) subsequently expanded this perspective by arguing that only resources that are valuable, rare, difficult to imitate, and non-substitutable (VRIN) can generate sustained competitive advantage. Such strategic assets may include reputation, employee expertise, organizational routines, IT, and other intangibles that arise from long-term accumulation and cannot be acquired instantaneously. As a result, these resources are less replicable and constitute the primary

source of a firm's sustained competitive advantage (Dierickx and Cool 1989).

Powell and Dent-Micallef (1997) demonstrate that IT alone cannot generate sustained competitive advantage; instead, it must be integrated with organizational capabilities such as a collaborative culture, employee commitment, and managerial flexibility. In this context, IT serves as an enabler, while the unique combination of physical assets, human resources, and managerial processes constitutes inimitable resources. Zahra (2021) underscores this view by emphasizing that resources should not only be understood as strategic assets that meet the VRIN criteria, but also be managed creatively to generate value. Collins (2021) adds that human capital lies at the core of organizational capital and the intangible assets that underpin a firm's competitive advantage. Combining human resources with processes, technology, culture, and organizational routines enhances unique, non-replicable organizational capabilities.

Sticky Cost of SG&A Expenses

Anderson et al. (2003) were the first to formally introduce the concept of sticky costs, derived from adjustment cost theory, which indicates that SG&A expenses do not always change symmetrically with changes in activity levels. They found that SG&A expenses increased by approximately 0.55% when revenue rose by 1%, but decreased by only 0.35% when revenue declined by 1%. This asymmetry reflects managerial decisions in adjusting resource capacity based on current sales conditions and expectations about future sales (Banker et al. 2018). Firms with greater adjustment costs which anticipate a recovery in demand tend to delay resource reductions, causing costs to decline disproportionally when revenues fall, a characteristic of sticky cost behavior (Banker and Byzalov 2014). This phenomenon has been documented across various countries and industrial sectors, establishing sticky cost as a critical concept for understanding cost behavior and managerial decision-making (Ibrahim et al. 2022).

Operational, Maintenance, and Investment SG&A

Unlike intangible assets acquired through transactions at fair value and measured reliably, most internally-generated intangible assets cannot be recognized on the balance sheet under IFRS because they are difficult to identify separately and do not meet adequate measurement criteria (Bagna et al. 2021). While IAS 38 permits the capitalization of internally generated intangible assets under specific criteria, most of these investments, such as human capital development and organizational processes, do not meet these criteria and are therefore expensed as incurred. Such assets contribute to the accumulation of organizational knowledge and firm capabilities; however, they are typically embedded in "operating" costs and reported under SG&A expenses (Banker et al. 2011; Eisfeldt and Papanikolaou 2013).

To address the information loss caused by this accounting treatment, Enache and Srivastava (2018) proposed a methodology to decompose operating SG&A into maintenance SG&A and investment SG&A. This approach does not seek to supplant formal accounting recognition, but rather serves as a proxy to identify the economic value of expensed intangible investments that remain invisible in traditional financial statements. By focusing on the residual portion of SG&A not tied to current-period maintenance, the measure provides a more comprehensive view of a firm's organizational capital, including work culture and innovative capacity, which are rarely captured under standard accounting rules.

Maintenance SG&A comprises routine expenditures aimed at sustaining day-to-day operations without generating long-term economic benefits, whereas investment SG&A reflects strategic expenditures that have the potential to create internally-generated intangible assets, such as costs related to the recruitment and training of highly skilled labor (Enache and Srivastava 2018). Investment SG&A can be measured by capitalizing a portion of operating SG&A, with the resulting value serving as a proxy for a firm's organizational capital (Banker et al. 2019; Peters and Taylor 2017). Organizational capital refers to intangible

assets embedded within a firm, such as work culture, internal policy structures, innovative capacity, and IT systems (Yildirim and Allen 2021). Hence, decomposing operating SG&A into investment SG&A and maintenance SG&A enables a more accurate identification of intangible assets, thereby improving the precision of firm performance evaluation in knowledge-based sectors such as the technology industry.

Hypothesis Development

Degree of Cost Stickiness between Investment and Operational SG&A

The technology sector exhibits distinctive operational characteristics compared to other sectors, as its core activities focus on the provision of IT-based services that generate nonphysical or intangible outputs (Palazzi et al. 2020; Qureshi and Siddiqui 2021). Examples of such intangible assets include digital marketing platforms and technology-based financial services, which contribute significantly to firms' profitability in this sector, despite lacking a physical form. In this context, managers of technology firms tend to allocate investments toward intangible assets with high return potentials and relatively low risk, with investment SG&A serving as a proxy for organizational capital that embodies these characteristics.

Investment SG&A, as a proxy for organizational capital, is positively associated with firms' operational growth, cost efficiency, profitability, and future stock returns (Lev et al. 2009). Consistent with this view, Li et al. (2018) demonstrate that firms with high levels of organizational capital earn larger abnormal returns around the time of merger announcements and exhibit stronger post-merger operating performance than firms with low organizational capital. Furthermore, Liang et al. (2025) indicate that IT investment exhibits sticky behavior, and that the degree of such stickiness serves as an important indicator of future IT workforce growth and subsequent sales growth. This occurs because IT complements human capital, business processes, and other intangible assets, making significant reductions in investment not only costly and time-consuming but also risky, potentially undermining firms' core capabilities. Consequently, firms that maintain IT investments during business downturns tend to be better positioned to capture future growth opportunities and achieve higher sales in subsequent periods.

In knowledge- and technology-based firms, investment SG&A has advantages over aggregate operating SG&A because it more effectively captures the intrinsic value of internally-generated intangible assets (Enache and Srivastava 2018). Accounting practices combine many expenditures related to intangible investments, such as employee training and internally developed software, with operating SG&A. Consequently, these intangible investments are not identified as assets, despite their potential to enhance a firm's long-term performance (Iqbal et al. 2024). While these costs are treated as expenses in financial statements, managers recognize their role as long-term strategic investments because, under the RBT framework, such expenditures are not merely costs, but are fundamental to establishing VRIN (valuable, rare, inimitable, and non-substitutable) resources.

In technology-driven sectors, the knowledge embedded in human capital and proprietary digital processes constitutes a core competency that provides a sustainable competitive advantage. Consequently, reducing these expenditures during volatile periods saves costs, but can also undermine the firm's core strengths, which are difficult and expensive to rebuild. Furthermore, drawing on ACT, the specialized nature of these intangible investments implies highly asymmetric adjustment costs. Unlike physical assets that can be liquidated, the tacit knowledge and organizational routines created by investment SG&A are deeply embedded in technology firms' operations. Consequently, managers perceive the investment component of SG&A as a strategic asset, because the loss of strategic capabilities is considered more costly than the short-term benefits of cost savings. Therefore, the first hypothesis is formulated as follows:

H_1: The degree of cost stickiness associated with investment SG&A is greater than that associated with operating SG&A in Indonesian technology firms.

Market Reactions to Cost Stickiness from Investment and Operational SG&A

Earnings prediction fundamentally relies on the relationship between revenues and costs. Banker and Chen (2006) demonstrate that incorporating cost behavior, particularly cost variability and cost stickiness, improves earnings prediction models. However, sticky costs undermine the cost–revenue relationship, making earnings less predictable. Previous studies document that cost stickiness increases earnings volatility and reduces earnings predictability and informativeness (Ciftci et al. 2016; Li and Sun 2023). Consequently, sticky costs may increase forecast errors and create greater uncertainty about reported earnings (Weiss 2010), which can influence how investors react to earnings announcements. Recent evidence further shows that cost stickiness affects forecast accuracy and reduces the extent to which stock prices reflect earnings information (Agarwal 2024; Costa and Habib 2023; Tang et al. 2022).

One potential explanation for lower earnings predictability is the accounting treatment of internally-generated intangible assets. Numerous such assets, such as organizational capital, are expensed rather than capitalized, leaving them unrecognized on the balance sheet and causing book values to fall below market values, particularly for knowledge-based firms (Barker et al. 2022; Iqbal et al. 2024). This treatment further amplifies earnings volatility because long-term investments are recognized as current-period expenses, causing reported earnings to deviate from sustainable economic performance (Lev 2018). Consequently, financial statements may fail to capture the long-term value creation of knowledge-based firms, reducing their informational relevance for investors (Xie and Zhang 2023). This is consistent with Indonesian evidence that intangible assets are not fully reflected in firm value (Stephanie and Agustina 2019).

Enache and Srivastava (2018) indicate that separating investment SG&A from operating SG&A enhances the relevance of financial statements, enabling investors and analysts to assess the future earnings potential of knowledge-based firms more accurately. Consistent with this evidence, Rajgopal et al. (2024) demonstrate that when internally generated intangible assets are capitalized rather than immediately expensed, earnings quality improves because expenses are better matched with revenues, earnings volatility declines, and the earnings-to-price ratio becomes a more reliable signal for investors. Furthermore, Li (2025) documents that for firms with high intangible asset intensity, intangible investments predict stock returns more strongly than traditional indicators such as the market-to-book ratio and profitability. These findings are reinforced by Demers et al. (2021), who reveal that firms with high levels of intangible investment generated significantly superior stock returns during the COVID-19 crisis, both during the market shock period (Q1 2020) and throughout 2020.

Although the use of the investment component of SG&A is more appropriate than aggregate operating SG&A for predicting future earnings in technology-based firms, firm value is not yet fully reflected in the market due to high information asymmetry surrounding intangible assets. Weiss (2010) shows that analysts and investors do not fully incorporate asymmetric cost behavior in their assessments, causing cost stickiness to generate systematic bias in earnings forecasts, particularly when sales decline. Consistent with this evidence, Costa and Habib (2023) document a negative relationship between cost stickiness and firm value, indicating that higher levels of stickiness are associated with lower market valuations. Accordingly, although the market partially recognizes SG&A components as intangible investments because of their contributions to organizational capabilities, business processes, and human capital, Banker et al. (2019) find that mispricing persists for these components due to earnings forecast errors arising from the

difficulty of identifying the long-term economic benefits of investment SG&A.

RBT emphasizes that investment SG&A plays a critical role in building valuable and inimitable intangible resources. However, the economic benefits of such expenditures typically materialize gradually and are less reliably observable. As a result, investment-related SG&A tends to create greater information asymmetry than operating SG&A components in technology firms. When the future benefits of these expenditures are uncertain and less verifiable, investors may struggle to distinguish whether persistent investment SG&A reflects inefficient cost management or long-term value creation. This ambiguity increases uncertainty surrounding earnings and reduces the informational clarity of cost changes.

Adjustment cost theory (ACT) further suggests that investment SG&A exhibits greater and less flexible adjustment costs associated with capacity, labor and business processes than operating SG&A components. These higher adjustment costs make investment-related expenditures more difficult to reduce when activity declines, resulting in greater cost stickiness that is harder for the market to predict. When cost stickiness arises from expenditures with less observable future benefits and more costly adjustments, investors may perceive earnings information to be less informative. Consequently, the market reaction to cost stickiness originating from investment SG&A is likely to be weaker than the reaction to that arising from operating SG&A. Accordingly, in the second hypothesis it is proposed that:

H_2: Cost stickiness originating from investment SG&A is associated with weaker market reactions to earnings announcements than cost stickiness originating from operating SG&A in Indonesian technology firms.

METHOD

Sample

The study was based on population of all technology-sector firms listed on the Indonesia Stock Exchange (IDX), a total of 47. The sample was selected using purposive sampling based on the criterion that the technology firms consistently published annual and quarterly financial statements on their official websites and on the IDX during the observation period from 2020 to 2024. The data were analyzed using multiple linear regression with SPSS version 23. Initially, classical assumption tests (normality, autocorrelation, multicollinearity and heteroskedasticity) were conducted to mitigate potential statistical bias. Table 2 presents the sample selection process.

Hypothesis Testing

Models 1a and 1b measure cost stickiness in SG&A expenses following the framework proposed by Anderson et al. (2003).

Model 1a)

$$\text{Log}\left[\frac{\text{OpSG\&A}_{i,t}}{\text{OpSG\&A}_{i,t-1}}\right]=\beta_0+\beta_1\text{Log}\left[\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right]+\beta_2*\text{DECRDUM}_{i,t}*\text{Log}\left[\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right]+\varepsilon$$

Model 1b)

$$\text{Log}\left[\frac{\text{InvSG\&A}_{i,t}}{\text{InvSG\&A}_{i,t-1}}\right]=\beta_0+\beta_1\text{Log}\left[\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right]+\beta_2*\text{DECRDUM}_{i,t}*\text{Log}\left[\frac{\text{Rev}_{i,t}}{\text{Rev}_{i,t-1}}\right]+\varepsilon$$

Description:

- Op = Operational
- Rev = Revenue
- Inv = Investment

Table 2. Sample Selection

Variable	Firm-year observations
Population of technology-sector firms (2020–2024)	235
Firms with incomplete financial reporting	(68)
Final sample	167

Model 1 tests H1. Costs are sticky when $\beta_1>0$, $\beta_2<0$, and $\beta_1>\beta_1+\beta_2$. H1 is supported if the coefficient β_2 in Model 1b is statistically significant and smaller in magnitude than the corresponding β_2 in Model 1a. A Chow test was conducted as a robustness check to further examine whether the regression coefficients differed significantly between the operational SG&A and investment SG&A models. The Chow test compares the residual sum of squares from the pooled regression (RSS_{pooled}) with those from the separate regressions for operational SG&A (RSS_{SGA}) and investment SG&A (RSS_{iSGA}). The test statistic is calculated as:

$$F = \frac{\left(RSS_{pooled}-(RSS_{SGA}+RSS_{iSGA})\right)/k}{(RSS_{SGA}+RSS_{iSGA})/(n_1+n_2-2k)}$$

where k denotes the number of estimated parameters and n_1 and n_2 represent the number of observations in the operational and investment SG&A samples, respectively. A significant Chow test indicates that the regression structures differ between the two models.

The calculation of investment SG&A is illustrated as follows:

$$\widehat{InvestmentSG\&A}_{i,t} = \text{Operational SG\&A}_{i,t} - \widehat{MaintenanceSG\&A}_{i,t}$$

Investment SG&A was calculated as the difference between operational SG&A and maintenance SG&A. Consistent with Enache and Srivastava (2018), operational SG&A in this study is equivalent to the main SG&A defined in their framework. Operational SG&A is defined as SG&A expenses excluding R&D and advertising expenditures. Investment SG&A is calculated as the difference between operational SG&A and maintenance SG&A. To obtain investment SG&A, maintenance SG&A was first estimated. For firm i in year t it was computed as the product of the estimated coefficient $\widehat{\beta_1}$ obtained from the operational SG&A regression and firm revenue, following Enache and Srivastava (2018).

$$\widehat{MaintenanceSG\&A}_{i,t} = \hat{\beta}_{1,Ind,t}Revenue_{i,t}$$

The operational SG&A regression model specifies SG&A expenses as a function of revenues, a dummy variable capturing revenue decreases (DECRUM), and a loss dummy (D_Loss) (Enache and Srivastava 2018).

$$OperationalSG\&A_{i,t} = \alpha_{Ind,t} + \beta_{1,Ind,t}Revenue_{i,t} + \beta_{2,Ind,t}DECRDUM_{i,t} + \beta_{3,Ind,t}D\_Loss_{i,t} + \varepsilon$$

Subsequently, models 2a and 2b examine the market reaction to the degree of cost stickiness in SG&A expenses, following the framework developed by Weiss (2010):

Table 3. Operational Definitions of Variables

Variable	Measurement
$\text{Log}\left[\frac{OperationalSG\&A_{i,t}}{OperationalSG\&A_{i,t-1}}\right]$	The logarithm of the ratio of operational SG&A in period t to operational SG&A in period t−1 for firm i (Anderson et al. 2003).
$\text{Log}\left[\frac{InvestmentSG\&A_{i,t}}{InvestmentSG\&A_{i,t-1}}\right]$	The logarithm of the ratio of investment SG&A in period t to investment SG&A in period t−1 for firm i (Anderson et al. 2003; Enache and Srivastava 2018).
$\text{Log}\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]$	The logarithm of the ratio of firm i's revenue in period t to its revenue in period t−1 (Anderson et al. 2003).
$DECRDUM_{i,t} * \text{Log}\left[\frac{Revenue_{i,t}}{Revenue_{i,t-1}}\right]$	The interaction between the revenue-decrease dummy variable and the logarithmic function of the ratio of firm i's revenue in period t to its revenue in the previous period (t−1). The dummy variable takes a value of 0 if firm i's revenue increases and 1 if it decreases in period t (Anderson et al. 2003).
CAR_{it}	Cumulative abnormal return (CAR), defined as the sum of abnormal returns (AR) over the three trading days surrounding the earnings

Variable	Measurement
	announcement date of firm i in year t. $CAR = \sum_{t=-1}^{+1} AR_{i,t}$ (Beaver et al. 1979; Weiss 2010).
$FE_{i,t}$	Earnings forecast error (FE), defined as the difference between firm i's actual earnings in year t and its predicted earnings. $FE_{i,t} = Earnings_{i,t} - \widehat{Earnings}_{i,t}$ (Banker and Chen 2006; Weiss 2010).
FE_{it}*$STICKY_{it}$	An interaction term between FE and operational SG&A cost stickiness as defined by the Weiss framework (Weiss 2010).
FE_{it}*$iSTICKY_{it}$	An interaction term between FE and investment SG&A cost stickiness as defined by the Weiss framework (Enache and Srivastava 2018; Weiss 2010).
DISP	The level of market uncertainty, measured by the dispersion across earnings forecasts $\frac{Standard\ deviation\left(\widehat{Earnings}_{i,t}\right)}{\left\lvert Mean\ \widehat{Earnings}_{i,t}\right\rvert}$ (Weiss 2010).

Model 2a)

$$CAR_{it}=\beta_0+\beta_1 FE_{it}+\beta_2 FE_{it}*STICKY_{it}+\beta_3 DISP_{it}+\varepsilon$$

Model 2b)

$$CAR_{it}=\beta_0+\beta_1 FE_{it}+\beta_2 FE_{it}*iSTICKY_{it}+\beta_3 DISP_{it}+\varepsilon$$

where CAR denotes cumulative abnormal return surrounding the earnings announcement; FE represents forecast error as a proxy for earnings news; STICKY captures cost stickiness originating from operational SG&A; iSTICKY captures cost stickiness originating from investment SG&A; and DISP represents analyst forecast dispersion. STICKY and iSTICKY are included only as interaction terms with FE because our analysis focuses on whether cost stickiness affects market reactions to earnings news rather than the level of returns. Therefore, the interaction term FE*STICKY captures how cost stickiness moderates market reactions to earnings news.

The key distinction between this study and that of Weiss (2010) lies in the measurement of the iSTICKY variable in Model 2b, which is operationalized by the change (Δ) in investment SG&A. Model 2 tests hypothesis 2. The hypothesis is supported if the coefficient β_2 in Model 2b is statistically significant and exhibits a smaller magnitude than the corresponding β_2 in Model 2a. In addition, consistent with the approach in Model 1, we ran a Chow test as a robustness check to examine whether the regression coefficients differed significantly between the operational SG&A and investment SG&A specifications.

Table 4. Descriptive Statistics

	N	Min	Max	Mean	Std. Deviation
LogSG&A	167	-0.389	1.180	0.062	0.173
LogI_SG&A	167	-2.548	2.503	0.091	0.762
LogREV	167	-0.946	1.275	0.039	0.333
Decrdum*LogREV	167	-0.946	0.000	-0.064	0.152
CAR	167	-20.071	32.853	-0.146	7.788
FE	167	-3,316.026	5,523.006	15.198	854.983
FE*STICKY	167	-1,639.703	1,451.257	19.534	368.552
FE*iSTICKY	167	-786.882	832.365	-24.037	269.480
DISP	167	-1,559.037	1,284.502	-35.928	366.012

The computation of STICKY and iSTICKY variables based on Weiss (2010) is presented as follows:

$$STICKY_{i,t} = \log\left(\frac{\Delta\ OperationalSG\&A}{\Delta\ Revenue}\right)_{i,\underline{\tau}} - \log\left(\frac{\Delta\ Operational\ SG\&A}{\Delta\ Revenue}\right)_{i,\bar{\tau}} \quad \underline{\tau}, \bar{\tau} \in \{t,...,t-3\}$$

$$iSTICKY_{i,t} = \log\left(\frac{\Delta\ InvestmentSG\&A}{\Delta\ Revenue}\right)_{i,\underline{\tau}} - \log\left(\frac{\Delta\ InvestmentSG\&A}{\Delta\ Revenue}\right)_{i,\bar{\tau}} \quad \underline{\tau}, \bar{\tau} \in \{t,...,t-3\}$$

where $\underline{\tau}$ denotes the most recent quarter among the four preceding quarters in which revenue declined, and $\bar{\tau}$ denotes the most recent quarter among the four preceding quarters in which revenue increased. Table 3 presents the definitions and measurements of each variable employed in Models 1a, 1b, 2a, and 2b.

RESULTS

Descriptive Statistics

Table 4 presents the descriptive statistics of the analyzed sample data in this study. The positive mean values of LogSG&A, LogI_SG&A, and LogREV indicate that over the observation period, operational SG&A, investment SG&A and firm revenues tended to increase more frequently than to decrease. In contrast, the negative mean of CAR suggests that stock prices of the technology-sector firms declined around earnings announcement dates. In addition, the negative mean of the interaction variable FE*iSTICKY indicates that earnings forecast errors became more negative when investment SG&A exhibited stickiness. This implies that when investment SG&A does not decrease despite a fall in current sales (i.e., is sticky), forecast future earnings tend to exceed realized current earnings.

Classical Assumption Tests

Table 5 shows the results of the classical assumption tests. The Asymp. Sig. (2-tailed) values in Table 5, 0.200 and 0.082, which exceed the 0.05 threshold, suggest that the data are normally distributed. Furthermore, the Durbin–Watson d statistics reported in Table 5 are 1.698, 1.710, 1.952 and 1.948, indicating that the data are free from autocorrelation, as both d and (4 - d) exceed the upper critical value (dU) of 1.670 for Model 1 and 1.720 for Model 2. The multicollinearity test results in Table 5 indicate that the tolerance values for all independent variables exceed 0.10 and the corresponding variance inflation factor (VIF) values are below 10.00, suggesting the absence of multicollinearity.

Table 5. Classical Assumption Tests

Type of Classical Assumption Test		Results				Decision
		Model 1a	Model 1b	Model 2a	Model 2b	
Normality (*Kolmogorov-Smirnov*) Sig > 0.050		0.200*	0.082	0.200*	0.200*	Data are normally distributed
Autocorrelation (*Durbin-Watson*) d > dU and (4-d) > dU		1.698	1.710	1.952	1.948	No autocorrelation is detected
Multicollinearity (tolerance value) Tolerance > 0,1	LogREV	0.301	0.301			No multicollinearity is detected.
	Decrdum*LogREV	0.301	0.301			
	FE			0.393	0.393	
	FE*STICKY			0.951		
	FE*iSTICKY				0.959	
	DISP			0.391	0.392	
Multicollinearity (VIF value)	LogREV	3.326	3.326			
	Decrdum*LogREV	3.326	3.326			
	FE			2.544	2.543	

VIF < 10	FE*STICKY			1.052	1.042	No
	FE*iSTICKY				2.554	multicollinearity
	DISP			2.558		is detected.
Heteroskeda	LogREV	0.089	0.963			
sticity.	Decrdum*LogREV	0.086	0.224			No
(Geljser test)	FE			0.780	0.290	heteroskedastici
Sig > 0,050	FE*STICKY			0.092	0.756	ty is detected
	FE*iSTICKY				0.224	
	DISP			0.778		

**0.200 represents the maximum asymptotic significance value reported by SPSS for the Kolmogorov-Smirnov test*

Finally, the heteroskedasticity test using the Glejser method, reported in Table 5, indicates that the significance values for all independent variables with respect to the absolute residuals (Abs_RES) exceed 0.05, suggesting that heteroskedasticity is not present.

Degree of Cost Stickiness between Investment and Operational SG&A

The regression results shown in Table 6 demonstrate that in Model 1a, the estimated coefficients β_1 and β_2 are 0.318 and -0.203 respectively, and both are statistically significant. These findings suggest that when revenues increase by 1%, operating SG&A expenses rise by 0.318%. In contrast, when revenues decrease by 1%, SG&A expenses decline by only 0.115% (0.318 - 0.203). The asymmetric adjustment in costs indicates SG&A cost stickiness among Indonesian technology firms, whereby costs respond more strongly to revenue increases than to decreases. This evidence enriches the empirical literature on cost stickiness in Indonesia and is consistent with previous studies, including those of Meythi et al. (2023) on the banking sector; Eltivia et al. (2019) on the consumer goods sector; Kartikasari et al. (2018) on the agricultural sector; Fakhroni and Aliza (2023) on the manufacturing sector; and Jati et al. (2025) and Purnamasari and Umiyati (2019) on non-financial firms.

Table 6. Regression Results

Variable	Coefficients (Std. error)			
	Model 1a	**Model 1b**	**Model 2a**	**Model 2b**
LogREV	0.318**	0.430*		
	(0.074)	(0.185)		
Decrdum*LogREV	-0.203*	-0.899*		
	(0.099)	(0.406)		
FE			-0.002	-0.002
			(0.001)	(0.001)
FE*STICKY			-0.007	
			(0.110)	
FE*iSTICKY				-0.008**
				(0.002)
DISP			0.007*	0.007*
			(0.003)	(0.003)
R-squared	0.141	0.044	0.030	0.100
F-test	13.438	3.256	4.846	6.011
Prob > F	0.000	0.041	0.003	0.001
RSS $_{\text{operational SG\&A}}$	5.485		10,118.300	

Variable	Coefficients (Std. error)			
	Model 1a	Model 1b	Model 2a	Model 2b
RSS $_{investment\ SG\&A}$		67.936		9,065.466
RSS $_{pooled}$	75.181		19,884.512	
F (Chow test)	2.662*		2.977*	

*** significant at p < 0.001; * significant at p < 0.05*

In Model 1b, the estimated coefficients β_1 and β_2 are 0.430 and -0.899 respectively, and both are statistically significant. These results indicate that when revenues increase by 1%, investment SG&A expenses increase by 0.430%. In contrast, when revenues decrease by 1%, investment SG&A expenses increase by 0.469% (0.430-0.899). The asymmetric cost adjustment indicates cost stickiness in investment SG&A as a proxy for organizational capital (OC), as reflected in the conditions $\beta_1>0$, $\beta_2<0$, and $\beta1>\beta_1+\beta_2$. This finding is consistent with Hosomi and Ge (2025) for Japan and Venieris et al. (2015) for the United States, who demonstrate that firms with higher levels of organizational capital exhibit stronger cost stickiness. Such firms tend to have longer cost adjustment periods, and their managers are generally more optimistic about future revenue prospects (Chen et al. 2019). Consequently, when sales decline, managers in firms with higher OC are more likely to maintain SG&A expenditures due to their long-term orientation, which ultimately gives rise to cost stickiness (Venieris et al. 2015).

The lower value of β_2 in Model 1b compared to Model 1a indicates that investment SG&A exhibits greater cost stickiness than operational SG&A, thereby supporting H1. The Chow test also yields a significant result ($F = 2.662$, $p < 0.05$), confirming that the regression structures differ significantly between the two models. This higher level of stickiness suggests that managers of technology firms perceive a portion of SG&A expenditures as long-term investments, particularly those related to human resource development and information technology. It is also more and more dominated by intangible capital, whose formation relies heavily on specialized labor. In modern economies, capital is increasingly dominated by intangible assets that depend on firm-specific human capital, making them difficult to adjust, and rendering capital supply relatively inelastic (Eisfeldt and Papanikolaou 2013). Therefore, firms that rely on intangible resources arguably exhibit greater cost stickiness, as the strategic nature and unique characteristics of these assets, which are less imitable by competitors, constrain managerial flexibility in reducing SG&A expenditures when firm activity declines (Sallehu et al. 2023).

These findings are consistent with Li and Vo (2024) and Adarov et al. (2022), who document that firms focusing on human resource development and information and communication technology tend to increase investment in intangible assets, which, in turn, contribute positively and significantly to labor productivity growth. Ballas et al. (2022) further reinforce this consistency by revealing that firms adopting a prospector strategy, which emphasizes innovation and long-term value creation through investments in intangibles, exhibit higher and stickier SG&A expenses than defender firms, which are primarily oriented toward cost efficiency. Accordingly, the high degree of cost stickiness observed in investment SG&A reflects technology firms' long-term orientation in maintaining strategic investments despite contemporaneous declines in revenue.

Market Reactions to Cost Stickiness Arising from Investment and Operational SG&A

The regression coefficients for earnings forecast error (FE) in Models 2a and 2b are statistically insignificant, suggesting that earnings news alone does not generate a significant market reaction in this specification. In contrast, market uncertainty (DISP) exhibits a positive and statistically significant coefficient of 0.007. These findings suggest that higher levels of DISP are associated with higher CAR, which may be interpreted as the market's perception of greater dispersion in earnings forecasts as a signal of uncertainty in the technology industry,

creating opportunities for speculative gains. In the context of an emerging market such as Indonesia, this result underscores investors' reactive and opportunistic behavior, whereby information volatility is often exploited to generate abnormal returns.

The weak predictive power of current earnings (FE) and the high level of market uncertainty in the technology sector (DISP) are evidenced by the significant percentage of firms reporting negative earnings, constituting 31% of the sample. Negative earnings are less relevant for forecasting future earnings due to their lack of persistence; instead, book value is more informative in predicting the future performance of firms that invest intensively in intangible assets (Kumari and Mishra 2023; Zacharias et al. 2025). These findings are consistent with Mohrschladt and Siedhoff (2024), who document that negative earnings have limited informational content, leading loss-making firms to rely more heavily on value-based indicators, such as the book-to-market ratio, in market valuation, particularly when earnings uncertainty is high, thereby increasing their susceptibility to mispricing.

When operational sticky costs are employed as a moderator of earnings forecast errors (FE*STICKY), the effect on market reactions remains statistically insignificant. However, when investment sticky costs are introduced as a moderator (FE*iSTICKY), the interaction term becomes statistically significant. This result indicates that higher levels of investment sticky costs weaken the market reaction to earnings forecast errors, as reflected in the negative coefficient of β_2 in Model 2b. Consistent with this finding, the coefficient of FE*iSTICKY in Model 2b is lower in magnitude than the corresponding interaction term in Model 2a, suggesting that cost stickiness originating from investment SG&A reduces market responsiveness to earnings news more strongly than cost stickiness originating from operational SG&A, thereby supporting H2. The Chow test also yielded a significant result ($F = 2.977$, $p < 0.05$), confirming that the regression structures between the two models differ significantly. The diminished association between earnings forecast errors and market reactions suggests that the market is less responsive to information about long-term investment costs, particularly the components embedded in SG&A expenses.

Although this study has found that the market is less responsive to the investment component embedded in SG&A expenses, the results remain consistent with Banker et al. (2019), who demonstrate that capital markets partially recognize this component as a source of long-term economic benefits for firms. Furthermore, Han et al. (2024) document that analysts tend to be more optimistic and selective in issuing long-term earnings growth forecasts for loss-making firms perceived to have strong long-term growth potential, particularly when investments in innovation and intangible assets drive that potential. This tendency is explained by Gu et al. (2023), who indicate that firms reporting losses attributable to investments in intangible assets exhibit superior future performance relative to other firms, including both loss-making and profitable firms, particularly in value creation through investments in technological innovation and human capital.

Our findings indicate that investors take into consideration cost stickiness arising from technology firms' investments in organizational capital, yet still face limitations in accurately valuing intangible assets, which may lead to mispricing in capital markets. Kim et al. (2021) find that firms with higher levels of organizational capital tend to experience greater information uncertainty and complexity because such capital is less precisely measurable and evaluable, leading to analysts' more biased and less accurate earnings forecasts. These findings are further reinforced by Ferrer et al. (2020), who indicate that higher intangible intensity increases financial reporting complexity, making it more difficult for analysts to evaluate the economic benefits of intangible assets, and reducing the accuracy of future earnings forecasts.

The inaccuracy of earnings forecasts may be further exacerbated by higher earnings volatility resulting from intensive investments in intangible assets. Elkemali (2024) found that investments in intangible assets were associated with greater earnings volatility,

reflecting higher uncertainty and risk in realizing their economic benefits than investments in tangible assets. Moreover, economic decisions are not solely driven by quantitative financial information, but are also influenced by behavioral factors, particularly trust (Faizal et al. 2017), implying that investors may not fully incorporate complex cost behavior, such as cost stickiness, into their earnings expectations. High earnings volatility, combined with low accuracy of future earnings forecasts in technology firms, may ultimately weaken market reactions to earnings forecast errors for firms with high levels of cost stickiness (Weiss 2010). Consistent with this view, Li and Sun (2023) found that higher cost stickiness was associated with less accurate earnings forecasts and less informative stock prices, as cost rigidity increases information complexity and makes it more difficult for both analysts and investors to project firms' future performance.

CONCLUSION

The study aimed to examine differences in the degree of cost stickiness between investment and operating SG&A expenses and to compare market reactions to cost stickiness arising from these two components. The empirical results indicate that SG&A expenses of Indonesian technology firms exhibit cost stickiness, whereby costs increase more when revenues rise than when they decrease when revenues decline. Furthermore, it has been found that the degree of cost stickiness associated with investment SG&A is higher than that associated with operating SG&A. These findings indicate that managers of technology firms tend to maintain long-term investment-oriented expenditures, such as investments in human capital development and information technology, even when current revenues decline. This is because reducing such expenditures may impair firms' strategic capabilities.

Moreover, the study has identified that higher levels of cost stickiness arising from investment SG&A weaken the association between earnings forecast errors and market reactions. This finding suggests that while the market partially recognizes investment SG&A as investments in intangible assets, greater information asymmetry and limited observability of the long-term economic benefits of such investments reduce market responsiveness to information on investment cost stickiness. Accordingly, the results indicate potential mispricing among technology firms with relatively high levels of investment cost stickiness. Overall, the study contributes empirically to the literature by demonstrating that separating the investment component of SG&A expenses results in a more accurate understanding of cost behavior and market reaction mechanisms in technology-based firms, particularly in emerging economies such as Indonesia.

The findings offer practical implications for investors and analysts, suggesting that distinguishing between operational and investment components of SG&A arguably improves the evaluation of firms' cost structures and the interpretation of earnings information. In addition, the results highlight the importance of managers' provision of clearer disclosure of investment-related SG&A activities to enhance market understanding of long-term investment decisions. Despite these contributions and practical implications, the study is subject to several limitations. First, investment SG&A is measured indirectly using an estimation approach, which may introduce measurement error. Second, the model assumes a strict split between investment and maintenance costs. In reality, some maintenance costs might also contribute to future benefits, and this overlap could affect the accuracy of the intangible capital measurement. In light of these limitations, we encourage future research to develop alternative measures of investment SG&A by incorporating non-financial data, such as human capital information and innovation indicators, to improve the accuracy of intangible asset measurement. Additionally, future studies could expand the sample to include cross-country comparisons, examining the robustness of the findings across different institutional settings and levels of capital market development.

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