

Executive Pay Dispersion and Firm Innovation: Evidence from an Emerging Economy

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Abstract

This study examines the relationship between executive pay dispersion and firm innovation intensity among Indian firms listed in the BSE 500 index during 2013–2023. Drawing on Social Comparison Theory, Behavioral Agency Theory, and Upper Echelons Theory, the study argues that large compensation gaps between CEOs and other top executives may weaken collaboration, increase risk aversion, and discourage long-term innovation investments. Firm innovation is measured as research and development (R&D) expenditure relative to sales, while executive pay dispersion is measured as the difference between the natural logarithm of CEO compensation and the average compensation of non-CEO top management team members. Using a balanced panel of 295 non-financial firms and fixed-effects panel regression models with year controls, the findings reveal a significant negative association between executive pay dispersion and innovation intensity, suggesting that greater pay inequality at the top reduces firms' commitment to R&D activities. Among other variables, leverage, sales growth, firm performance, firm age, and CEO tenure are negatively associated with innovation, whereas board size exhibits a positive relationship. Firm size and CEO age do not show significant effects in the full model. Robustness tests using alternative measures of firm performance and firm size confirm the stability of the results. The study contributes to the executive compensation and innovation literature by providing evidence from an emerging economy and highlighting the importance of equitable executive compensation structures in fostering innovation.

Keywords: Executive Pay Dispersion, Firm Innovation Intensity, Corporate Governance, Top Management Team, Research and Development (R&D), Emerging Economy.

I. INTRODUCTION

Innovation is essential for firms seeking long-term growth, competitiveness, and survival (Katsamba, D., & Singh, P., 2022). Investments in research and development (R&D) enable firms to develop new products, improve processes, and respond to technological change (Taherdoost, H., 2024). However, innovation is uncertain, costly, and often takes years to generate returns. Because of this risk and long time horizon, decisions to invest in innovation are strongly influenced by managerial incentives and internal governance structures (Belloc, F., 2012). Among these, executive compensation plays a crucial role. While prior research has largely focused on how much executives are paid, far less attention has been given to how pay is distributed within the top management team and how such differences may shape strategic decisions like innovation (Fredrickson, J. W., Davis-Blake, A., & Sanders, W. G., 2010). Executive pay dispersion refers to the gap in compensation between the CEO and other top executives (Amore, M. D., & Failla, V., 2020). Traditional tournament theory argues that larger pay gaps can motivate competition among executives, potentially improving performance (Connelly, B. L., Tihanyi, L., Crook, T. R., & Gangloff, K. A., 2014). However, this logic may not hold in all settings, especially when teamwork and collaboration are essential. Innovation is a collective activity that requires coordination among executives from different functional areas, such as R&D, finance, and marketing. If compensation differences within the executive team are perceived as unfair or excessive, they may reduce trust, cooperation, and shared commitment (Vieito, J. P. T., 2012).

Social comparison theory suggests that individuals evaluate fairness by comparing their rewards with those of their peers. Large pay gaps between the CEO and other executives can create feelings of inequity, lowering morale and weakening team cohesion. From a behavioral agency perspective, executives who feel under-rewarded relative to the CEO may become more cautious and less willing to support risky, long-term investments like R&D. Instead, they may prefer safer, short-term projects that protect their own positions and performance evaluations. In this way, greater pay dispersion at the top may discourage the collective risk-taking and long-term orientation required for sustained innovation (O'Reilly III, C. A., Main, B. G., & Crystal, G. S., 1988).

At the same time, large pay gaps can also signal greater concentration of power in the hands of the CEO. When the CEO is significantly better paid than other executives, it may reflect a more centralized decision-making structure. If the CEO prioritizes short-term financial performance or is personally risk-averse, such power concentration can further reduce the firm's commitment to innovation investment (Shin, T., 2016). Despite these theoretical arguments, empirical evidence linking executive pay dispersion to innovation remains limited. Most compensation studies focus on CEO pay levels or pay-performance sensitivity, while innovation research often emphasizes ownership, boards, or external governance. This study brings these streams together by examining how inequality within executive compensation influences firm innovation intensity, measured as R&D expenditure relative to sales. This measure captures the firm's strategic commitment to innovation inputs rather than only observable outcomes.

In addition to executive pay dispersion, the study considers several firm-level and managerial factors known to influence innovation, including leverage, growth opportunities, firm performance, firm age, firm size, board size, and CEO characteristics such as age and tenure. Using panel data and fixed-effects models with year controls, the analysis focuses on how changes within firms over time are associated with changes in innovation intensity.

By highlighting the role of internal pay structures, this study contributes to a deeper understanding of how executive incentives shape long-term strategic investments. It shows that not only the level of executive pay, but also its distribution within the top team, can influence a firm's willingness to invest in innovation.

A. Contribution of the Study

This study makes several meaningful contributions to the literature on executive compensation, corporate governance, and innovation.

First, it expands the geographic focus of research by examining firms in India, a major emerging economy. Most prior studies on executive pay and innovation are based on data from developed countries, particularly the United States. Institutional conditions in developing economies differ in ownership structures, regulatory environments, and governance practices. By providing evidence from India, this study tests the applicability of existing theories in a different institutional setting and enhances the global relevance of research on executive incentives and innovation. Second, the study adopts a context-specific definition of the top management team (TMT) based on the Companies Act, 2013. Unlike many studies that rely on US-centric executive classifications, this research includes Chief Financial Officers (CFOs) and Company Secretaries (CSs) as part of the executive team because they are legally recognized as Key Managerial Personnel in India. This broader and legally grounded definition offers a more accurate representation of strategic leadership and improves the measurement of executive pay dispersion in the Indian context. Third, the study shifts attention from executive pay levels to executive pay dispersion. Rather than focusing only on how much executives are paid, it examines how pay is distributed within the top management team, specifically the gap between CEO compensation and that of other executives. This approach

aligns with theories of social comparison, behavioral agency, and team dynamics, and provides deeper insight into how internal pay inequality influences strategic decision-making. Fourth, by linking executive pay dispersion to firm innovation intensity, measured through R&D spending, the study connects executive incentives to a long-term, high-risk strategic outcome rather than short-term financial performance. Finally, the use of panel data with firm fixed effects and year controls strengthens the study's empirical rigor by accounting for unobserved firm-specific and time-related factors.

II. THEORY AND HYPOTHESES

A. Theoretical Development

Innovation is vital for firms operating in dynamic and competitive environments, but R&D investments are uncertain, costly, and long-term in nature. Therefore, innovation decisions depend not only on market conditions but also on internal organizational factors, particularly executive incentives. This study focuses on executive pay dispersion as a key governance mechanism affecting innovation intensity. Moving beyond pay levels, it examines how pay differences within the executive team influence behavior and strategic choices. The theoretical foundation draws on social comparison theory, behavioral agency theory, and upper echelons theory.

From the perspective of social comparison theory, individuals evaluate their outcomes relative to those of comparable others (Mumford, M. D., 1983). In executive teams, large pay differences between the CEO and other top managers may be interpreted as unfair or unjustified, especially when responsibilities overlap in strategic decision-making. Such perceptions can reduce morale, trust, and willingness to collaborate. Innovation activities typically require cross-functional coordination and information sharing among executives responsible for finance, operations, marketing, and R&D. If pay dispersion undermines cohesion within the executive team, it may weaken the collective orientation necessary for committing resources to complex and uncertain innovation projects (Paredes, T. A., 2004). Thus, greater executive pay inequality may reduce the firm's strategic focus on innovation.

Behavioral agency theory further explains how compensation structures influence managerial risk-taking. Executives evaluate decisions not only based on expected financial returns but also on potential personal gains and losses. When the CEO receives disproportionately higher compensation than other executives, the latter may perceive limited upside relative to risk. This imbalance can increase their loss aversion and reduce their willingness to support risky, long-term investments such as R&D. Instead, they may prefer safer projects that yield short-term, more predictable outcomes (Pepper, A., & Gore, J., 2015). In this way, high pay dispersion may shift executive preferences away from exploratory innovation and toward exploitation of existing capabilities.

Additionally, large pay gaps may reflect or reinforce power concentration within the firm (Hultin, M., & Szulkin, R., 2003). A highly paid CEO relative to other executives may possess greater influence over strategic decisions, reducing

the role of collective deliberation within the TMT (Papadakis, V. M., & Barwise, P., 2002). According to upper echelons theory, organizational outcomes are partially shaped by the values and risk preferences of dominant executives (Hambrick, D. C., 2016). If decision-making becomes centralized and less inclusive, the firm's innovation strategy may depend heavily on the CEO's individual orientation toward risk and long-term investment. In cases where the CEO is conservative or focused on short-term performance metrics, high pay dispersion may indirectly suppress innovation spending.

In summary, executive pay dispersion represents an internal governance mechanism with significant behavioral implications for strategic investment. Theoretical perspectives suggest that high pay inequality within the top management team can reduce collaboration, increase risk aversion among non-CEO executives, and concentrate decision-making power. These effects are likely to diminish firms' commitment to innovation investment. By linking compensation structure to innovation intensity, this study advances understanding of how internal incentive arrangements shape long-term strategic outcomes.

B. Firm Innovation as a Dispersion-Contested governance outcome

Firm innovation is a contested governance outcome because it depends on how internal incentives and power dynamics shape executives' willingness to support risky, long-term investments. Executive pay dispersion can influence collaboration and risk-taking within the top team, thereby affecting the firm's commitment to innovation.

Executive Pay dispersion and Firm Innovation: Executive pay dispersion reflects inequality between the CEO and other top executives. Drawing on social comparison theory and behavioral agency theory, large pay gaps can reduce cooperation and increase risk aversion among non-CEO executives. (Amore, M. D., & Failla, V., 2020) examined the relationship between executive pay dispersion and firm innovation and discovered that executive pay dispersion acts as a double-edged sword. On the one hand, the higher the dispersion in variable pay, the higher the innovation. On the other hand, the larger the dispersion in fixed pay, the lower the innovation. Similarly, (Jiang, X., He, L., & Zhuo, X., 2026) empirically investigated the relationship between executive inequity aversion and corporate innovation through the lens of behavioral agency theory. Utilizing a sample of Chinese listed companies from 2007 to 2020, they found that executive inequity aversion negatively impacts corporate innovation. (Yanadori, Y., & Cui, V., 2013) also argued that the innovation requires collective decision-making and tolerance for uncertain outcomes, both of which may decline when compensation differences are perceived as unfair. The study examined the relationship between pay dispersion in R&D groups and firm innovation using employee-level compensation data in US high-technology firms. The results showed that pay dispersion in R&D groups is negatively related to firm innovation and this negative relationship is alleviated in firms with greater financial slack. In the same vein, (Liu, M., Zhao, J., & Liu, H., 2025) on a sample of 960 listed enterprises tried to explore the impact of remuneration gap of returnee executives on the innovation ability of the

enterprise. It was found that when the returnee executives' pay gap was lower than 2.5 times and higher than 4 times, it had a negative impact on the performance of enterprise innovation ability. Thus, higher executive pay dispersion is expected to weaken the firm's commitment to long-term R&D investment.

H1: Executive pay dispersion is negatively associated with firm innovation intensity.

Leverage and Firm Innovation: Leverage increases financial obligations and monitoring pressure from creditors, which can constrain managerial discretion. Because innovation investments are risky and have uncertain payoffs, highly leveraged firms may avoid committing resources to R&D to preserve cash flow stability and meet debt commitments. In order to test this, (Kerr, W. R., & Nanda, R., 2015) examined how different sources of finance (equity, debt, and intermediaries) influence the rate and nature of firm-level innovation. It was observed that financial constraints shape both the level and type of innovation. Equity supports but may reduce novelty due to short-term pressures, debt is more relevant than expected, and venture capital enables experimentation. Overall, financing decisions significantly influence whether firms pursue radical or incremental innovation. Additionally, (Kerr, W. R., & Nanda, R., 2015) discovered that capital structure plays a central role in the outcome of innovations. Bank finance is an important source of finance, particularly for larger firms with tangible and intangible assets to pledge as collateral. Alternatively, public markets provide deep pockets but pose a set of agency costs that may be particularly harmful for firms engaged in exploration and novel innovations. This financial risk pressure reduces the firm's willingness to pursue exploratory, long-term innovation strategies.

H2: Leverage is negatively associated with firm innovation intensity.

Growth Opportunities and Firm Innovation: Firms experiencing rapid sales growth may prioritize scaling existing products and operations rather than investing in uncertain new technologies. According to the exploration–exploitation framework, high-growth firms may focus on exploiting current market success instead of exploring innovative opportunities. As a result, strong short-term growth can crowd out long-term R&D investments. (Bhattacharya, M., & Bloch, H., 2004) investigated how firm size, profitability, growth, R&D intensity, and market structure influence innovation in small and medium Australian manufacturing firms on a sample of 1,213 firms from the Business Longitudinal Survey. Results showed innovation increases with firm size (at a decreasing rate) and R&D intensity. Market concentration and trade exposure also promote innovation, especially in high-tech industries. Profitability matters only in low-tech sectors, while growth was largely insignificant.

H3: Sales growth is negatively associated with firm innovation intensity.

Firm Performance and Firm Innovation: Firms with higher return on assets (ROA) may exhibit lower innovation

intensity because managers in highly profitable firms often prioritize efficiency, stability, and short-term financial performance over risky long-term innovation investments. Innovation activities require substantial upfront expenditures in R&D, experimentation, and capability development, which can reduce current profitability and create uncertain returns (Lev & Sougiannis, 1996). Consequently, firms with strong accounting performance may avoid intensive innovation to protect existing profit margins and operational routines (He & Wong, 2004). Moreover, established profitable firms may become more exploitative than exploratory, reducing their willingness to invest aggressively in innovative activities (March, 1991).

H4: Firm performance (ROA) is negatively associated with firm innovation intensity.

Firm age and Firm Innovation: Firm age may negatively influence firm innovation intensity because older firms often become more bureaucratic, rigid, and path-dependent over time, reducing their flexibility to pursue innovative activities. Established firms tend to rely on existing routines, legacy systems, and proven business models, which can discourage experimentation and risk-taking (Hannan & Freeman, 1984). As firms mature, organizational inertia increases, making adaptation to new technologies and market changes more difficult (Sorensen & Stuart, 2000). Older firms may also prioritize operational efficiency and stability over exploratory investments in innovation. Consequently, increasing firm age can reduce a firm's willingness and ability to invest intensively in innovative activities and R&D initiatives.

H5: Firm age is negatively associated with firm innovation intensity.

Firm Size and Firm Innovation: The relationship between firm size and innovation intensity remains theoretically ambiguous, suggesting no systematic association between the two. Large firms possess greater financial resources, economies of scale, and technological capabilities that can support innovation activities (Schumpeter, 1942). However, larger firms may also suffer from bureaucratic rigidities, slower decision-making, and organizational inertia that constrain innovative behavior (Hannan & Freeman, 1984). In contrast, smaller firms are often more flexible and entrepreneurial but may face financial and resource limitations in pursuing innovation. Because both advantages and disadvantages coexist across firm sizes, prior research reports mixed empirical findings, indicating that firm size does not consistently determine firm innovation intensity (Cohen & Klepper, 1996).

H6: Firm size has no systematic association with firm innovation intensity.

Board Size and Firm Innovation: Board size may positively influence firm innovation intensity because larger boards provide greater diversity of expertise, knowledge, and external linkages that support strategic decision-making related to innovation. A broader board composition enhances access to valuable information, technological insights, and stakeholder networks, which can improve firms' ability to identify and support innovative opportunities (Hillman & Dalziel, 2003). Larger boards also strengthen advisory

capacity and resource dependence functions, enabling firms to secure critical resources for R&D and innovation activities (Pfeffer & Salancik, 1978). Additionally, diverse perspectives within larger boards may encourage more comprehensive evaluation of risky innovation projects, thereby promoting greater innovation intensity.

H7: Board size is positively associated with firm innovation intensity.

TABLE 1: SAMPLE DESCRIPTION

Particulars	2013-23
Total	500
Financial Firms	(94)
Firm not reporting on 31 st March	(34)
Incorporated after 1 st April 2013	(18)
Missing Data	(59)
Total	295

CEO Age and Firm Innovation: CEO age may negatively influence firm innovation intensity because older CEOs are generally more risk-averse and less inclined toward uncertain long-term investments such as innovation and R&D activities. Upper Echelons Theory suggests that executives' demographic characteristics shape strategic choices and organizational outcomes (Hambrick & Mason, 1984). Older CEOs often prefer stability, operational efficiency, and preservation of existing firm performance over exploratory initiatives with uncertain payoffs (Serfling, 2014). In contrast, innovation activities involve high uncertainty, delayed returns, and significant resource commitments. Consequently, older CEOs may avoid aggressive innovation strategies to minimize strategic and career-related risks, leading to lower firm innovation intensity.

H8: CEO age is negatively associated with firm innovation intensity.

CEO tenure and Firm Innovation: CEO tenure may negatively influence firm innovation intensity because long-tenured CEOs often become increasingly committed to existing strategies, routines, and organizational practices over time. Upper Echelons Theory suggests that executives' experiences shape their strategic preferences and decision-making behavior (Hambrick & Mason, 1984). As CEO tenure increases, executives may develop greater attachment to established business models and become less receptive to risky or disruptive innovation initiatives (Miller, 1991). Long-tenured CEOs may also prioritize maintaining past success and organizational stability rather than pursuing uncertain exploratory investments. Consequently, extended CEO tenure can reduce managerial willingness to undertake intensive innovation and R&D activities within the firm.

H9: CEO tenure is negatively associated with firm innovation intensity.

III. RESEARCH DESIGN

A. Sample and Data Sources

The study begins with all 500 firms listed in the BSE 500 index for each year from 2013–14 to 2022–23. Financial sector firms (94 each year) are excluded due to their distinct regulatory and accounting structures. Firms with financial years not ending on 31 March (34 annually) are removed to maintain reporting consistency. Companies incorporated after 1 April 2013 (18 each year) are excluded to ensure adequate historical data. After dropping firms with missing financial or governance data (59 annually), the final balanced panel consists of 295 firms observed over 10 years.

Data on executive compensation, board characteristics, and firm financials were obtained from CMIE Prowess database and annual reports of the companies. All variables were constructed using consistent definitions across firms and years to enhance comparability. Table 1 consists of sample description.

B. Measures

i. Firm Innovation

Firm innovation is measured using innovation intensity, defined as the ratio of a firm's total research and development (R&D) expenditure to its total sales. This measure captures the extent to which a firm commits financial resources toward developing new products, processes, and technologies relative to its scale of operations. By standardizing R&D spending with sales, the metric allows comparison across firms of different sizes.

ii. Executive Pay Dispersion

Executive pay dispersion is operationalized as the difference between the natural logarithm of CEO compensation and the natural logarithm of average compensation of non-CEO members of the top management team. The TMT includes executive directors as well as legally designated key managerial personnel, specifically the Chief Financial Officer and Company Secretary, consistent with statutory definitions under the Companies Act, 2013. This relative measure captures vertical inequality within the executive hierarchy while accounting for firm-level scale effects (Henderson, A. D., & Fredrickson, J. W., 2001).

iii. Corporate Governance

Leverage (LEV) is measured as the ratio of total debt to total assets, capturing the firm's financial obligations relative to its asset base. Growth opportunities (GRTH) are calculated as the percentage change in sales from the previous year, reflecting expansion prospects. Firm performance is measured using Return on Assets (ROA), defined as net income divided by total assets. Firm age (Fage) is the number of years since incorporation, indicating organizational maturity. Firm size (LogTA) is measured as the natural logarithm of total assets. Board size (BS) represents the number of directors on the board. CEO age (CAge) is measured in years, and CEO tenure (CTenure) is the number

of years the individual has served as CEO. Table 2 provides a summary of each variable used in the study.

TABLE 2: VARIABLE DEFINITION

Variables	Acronym	Measurement
Firm Innovation Intensity	FI	Ratio of total R&D expenditure to total sales
Executive Pay Dispersion	EPD	Difference between natural log of CEO pay and Average executive pay
Leverage	LEV	Proportion of Total debt to Total assets
Growth Opportunities	GRTH	Ration of difference of current year sales and previous year sales to previous year sales
Firm Performance	ROA	Proportion of Net Income to Total Assets
Firm Age	Fage	Number of years since the firm's incorporation
Firm Size	LogTA	Natural Log of Total Assets of the firm
Board Size	BS	Number of directors serving the Board
CEO Age	CAge	CEO's age in years
CEO Tenure	CTenure	Number of years the executive has served as CEO

C. Econometric Specifications

Given the panel structure of the data, this study employs panel regression techniques to examine the relationship between executive pay dispersion and firm innovation. The use of ordinary least squares (OLS) on panel data may lead to biased and inconsistent estimates due to unobserved firm-level heterogeneity and correlated error terms. Panel regression allows the analysis to control for time-invariant firm-specific characteristics that may influence executive pay structures.

We estimate the following baseline panel regression model:

$$FI_{i,t} = \alpha + \beta_1 EPD_{i,t} + \beta_2 LEV_{i,t} + \beta_3 GRTH_{i,t} + \beta_4 ROA_{i,t} + \beta_5 Fage_{i,t} + \beta_6 LogTA_{i,t} + \beta_7 BS_{i,t} + \beta_8 CAge_{i,t} + \beta_9 CTenure_{i,t} + \epsilon_{i,t}$$

Where, FI denotes Firm Innovation for firm i in year t. EPD denotes Executive Pay Dispersion. LEV represents Leverage, GRTH denotes Growth Opportunities, ROA captures firm Performance, Fage denotes age of the firm, LogTA captures Firm Size, BS represents Board Size, CAge denotes age of CEO, and lastly CTenure represents CEO tenure.

IV. EMPIRICAL RESULTS

A. Descriptive Statistics

The descriptive statistics indicate substantial variation across firms in both innovation and governance characteristics. Firm Innovation Intensity (FI) has a mean of 1.57, suggesting that on average firms invest a modest proportion of sales in R&D, though the wide range (0 to 22.93) shows that some firms invest heavily while others spend nothing on R&D. Executive

Pay Dispersion (EPD) averages 1.05, indicating noticeable inequality in compensation between CEOs and other executives. Leverage (LEV) shows considerable spread, with some firms carrying very high debt levels, which may affect their ability to fund innovation. Sales growth (GRTH) exhibits extreme variability, reflecting differences in firm expansion patterns and possible volatility in revenues. Average profitability (ROA) is positive, though the range indicates that some firms experience significant losses. Firms in the sample are relatively mature, with an average age of nearly 49 years, and vary considerably in size, as reflected in LogTA. Boards consist of about 11 directors on average, suggesting moderately sized governance structures. CEOs are typically in their late fifties, and average CEO tenure is over 10 years, indicating experienced leadership but also potential for managerial entrenchment. Table 3 provides a summary of descriptive statistics.

TABLE 3 : DESCRIPTIVE STATISTICS

Variable	Mean	Std. Dev.	Min	Max	N
FI (Firm Innovation Intensity)	1.57	3.00	0.00	22.93	3,245
EPD (Executive Pay Dispersion)	1.05	0.67	0.00	3.48	3,245
LEV (Leverage)	0.61	1.74	-0.65	35.34	3,245
GRTH (Sales Growth %)	5.00	69.21	-1600.39	94.25	2,950
ROA (Return on Assets %)	9.95	8.62	-47.12	55.18	3,465
Fage (Firm Age, years)	48.69	27.11	6	122	3,245
LogTA (Firm Size, log total assets)	9.91	1.77	-4.64	13.79	3,245
BS (Board Size)	11.05	2.54	4	22	3,245
CEOage (CEO Age, years)	57.02	7.93	32	90	3,245
CEOTenure (CEO Tenure, years)	10.77	12.23	0.01	55	3,245

B. Correlation Matrix

Table 4 presents the pairwise correlations among the variables used in the study. Overall, the correlations are moderate in magnitude, suggesting that multicollinearity is unlikely to be a concern. Also all the VIF values were found to be less than 10.

C. Year-wise Firm Innovation

Table 5 shows that firm innovation intensity varies over time but remains relatively modest on average. Mean FI rises steadily from 1.35 in 2014 to a peak of 1.98 in 2017, suggesting a period of increasing commitment to R&D investment. After 2017, average innovation intensity declines, reaching 1.32 by 2024, indicating a gradual reduction in R&D spending relative to sales in recent years. The standard deviation is consistently high across years, especially in 2017, showing wide differences in innovation investment across firms. The minimum value is zero every year, meaning many firms report no R&D expenditure. The

maximum values vary substantially, with 2017 showing the highest innovation intensity (22.93), indicating that a few firms invest heavily in R&D. Overall, the pattern suggests cyclical changes in innovation spending, with considerable heterogeneity across firms throughout the sample period.

D. Regression Analysis and Discussions

The present study examines the influence of executive pay dispersion on firm innovation intensity among BSE 500 listed Indian firms over the period 2013–14 to 2023–24. In addition to the primary variable of interest, the analysis incorporates key financial, organizational, governance, and CEO-level control variables to better understand how internal incentive structures shape firms' commitment to innovation. Using a panel data regression framework with firm fixed effects and year controls, the findings indicate that executive pay dispersion has a significant negative association with firm innovation intensity. This suggests that greater inequality within the top management team weakens collaborative decision-making and reduces support for long-term, risky R&D investments. Among the control variables, leverage, firm age, and CEO tenure also show significant negative effects on innovation, while board size is positively related to innovation intensity. In contrast, firm size and CEO age do not exhibit a consistent independent influence once other factors are considered. Overall, the results highlight that internal governance structures, particularly compensation inequality at the top, play a crucial role in shaping firms' innovation strategies.

H1: Executive pay dispersion is negatively associated with firm innovation intensity.

When examined individually, executive pay dispersion shows a negative and significant association with firm innovation intensity, suggesting that larger pay gaps between the CEO and other executives reduce R&D investment. This negative relationship remains strong and significant in the full model, indicating that the effect is robust and not driven by other firm or CEO characteristics. The result supports social comparison and behavioral agency perspectives, which argue that large compensation inequalities weaken team cohesion, reduce cooperation, and increase risk aversion among non-CEO executives. Since innovation requires collective decision-making and tolerance for uncertainty, pay dispersion undermines the collaborative environment necessary for sustained innovation investment.

TABLE 4: PAIRWISE CORRELATION

Variable	FI	EPD	LEV	GRTH	ROA	Fage	LogTA	BS	CEOage	CEOTenure
FI	1.000									
EPD	-0.086	1.000								
LEV	-0.117	-0.046	1.000							
GRTH	-0.101	0.008	-0.068	1.000						
ROA	-0.021	0.036	0.013	0.015	1.000					
Fage	0.005	0.022	-0.120	0.038	0.059	1.000				
LogTA	0.010	-0.168	0.019	0.035	0.030	0.171	1.000			
BS	-0.074	0.029	-0.188	0.042	0.063	0.171	0.254	1.000		
CEOage	-0.068	0.095	0.111	0.030	0.019	0.006	0.153	0.025	1.000	
CEOTenure	0.144	0.129	-0.088	0.021	-0.078	-0.155	-0.026	0.063	0.436	1.000

H2: Leverage is negatively associated with firm innovation intensity.

Leverage initially shows a weak or insignificant relationship with innovation, but in the full model it becomes strongly negative and significant. This change occurs because controlling for firm size, growth, and performance isolates the direct financial constraint effect of debt. The final result indicates that highly leveraged firms face greater pressure to maintain stable cash flows and meet fixed obligations, limiting managerial flexibility. Because R&D investments are uncertain and long-term, firms under financial pressure prioritize short-term stability over innovation, consistent with financial constraint theory.

H3: Growth Opportunities is negatively associated with firm innovation intensity.

Sales growth shows a negative and significant relationship with innovation both individually and in the full model, indicating a stable effect. Firms experiencing rapid growth may allocate resources toward expanding production and market reach rather than investing in uncertain R&D. This supports the exploration–exploitation framework, where high-growth firms focus on exploiting existing success rather than exploring new technologies. The consistency of the effect suggests that growth-related operational pressures systematically crowd out innovation investment.

H4: Firm performance (ROA) is negatively associated with firm innovation intensity.

Return on Assets is negatively related to innovation when examined individually, and this relationship remains negative in the full model, although slightly weaker. Part of ROA's effect overlaps with growth and leverage, but its independent influence persists. The result aligns with performance feedback theory, which suggests that highly profitable firms become conservative and focus on protecting existing success. Managers in such firms may avoid risky R&D projects that could disrupt stable earnings, leading to lower innovation intensity.

TABLE 6: REGRESSION ANALYSIS

Variable	(1) RE	(2) FE	(3) RE	(4) RE	(5) FE	(6) RE	(7) FE	(8) RE	(9) FE	(10) FE
EPD	-.1671** *									-.1879***
LEV		-.0041								-.0256***
GRTH			-.0049** *							-.0050***
ROA				-.0055**						-.0060*
Fage					-.0035					-.0232***

Log TA						-.0185**				-.0046
BS							.0330*			.0423**
CE Oage								-.0108** *		-.0016
CE Otenure									-.0098** *	-.0095***
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3245	3245	2950	3245	3245	3245	3245	3245	3245	2950
Hausman (p-value)	0.29	0.00	0.45	0.93	0.00	0.47	0.02	0.50	0.00	0.00
Wit hin R ²	0.06	0.05	0.20	0.05	0.05	0.05	0.06	0.06	0.06	0.22

Notes -*** p < 0.01, ** p < 0.05, * p < 0.10.

H5: Firm age is negatively associated with firm innovation intensity.

Firm age shows a negative association with innovation in individual models, and the effect becomes stronger and more significant in the full model. Once financial and governance variables are controlled for, the structural impact of organizational maturity becomes clearer. Older firms tend to develop rigid routines, legacy systems, and resistance to change, which limit adaptability. This organizational inertia reduces willingness to invest in new knowledge creation, leading to lower R&D intensity.

H6: Firm size has no systematic association with firm innovation intensity.

Firm size initially appears negatively related to innovation, but the relationship becomes insignificant in the full model. This change occurs because firm size captures overlapping effects of financial structure and organizational maturity. Larger firms possess greater resources that could support R&D, but they also face bureaucratic complexity and slower decision-making. Once leverage and firm age are controlled for, these opposing forces offset each other, resulting in no systematic relationship between size and innovation intensity.

H7: Board size is positively associated with firm innovation intensity.

Board size shows a positive and significant relationship with innovation both individually and in the full model, indicating a stable governance effect. Larger boards may provide greater expertise, diversity of perspectives, and stronger monitoring of managerial decisions. These characteristics support long-term strategic thinking and reduce managerial short-termism, encouraging investment in R&D. The persistence of this effect suggests that board composition independently shapes innovation strategy.

H8: CEO age is weakly and negatively associated with firm innovation intensity.

CEO age shows a negative relationship with innovation in individual models but becomes insignificant in the full model. This change suggests that the initial effect was partly capturing related factors such as CEO tenure and firm age. While older CEOs may be more risk-averse due to shorter career horizons, their experience may also provide strategic insight. Once other governance and organizational factors are controlled, CEO age alone does not independently influence innovation intensity.

H9: CEO tenure is negatively associated with firm innovation intensity.

CEO tenure is negatively associated with innovation both individually and in the full model, indicating a robust effect. Long-tenured CEOs may become entrenched and prefer strategic stability over disruptive change. Over time, they develop strong influence and may resist risky innovation that threatens established routines or their legacy. This entrenchment reduces firms' willingness to commit resources to uncertain R&D investments.

E. Additional Analysis

To assess the robustness of the findings, an additional analysis was conducted. Firstly, firm performance was alternatively measured using return on equity (ROE) in place of ROA to ensure that results are not driven by a specific accounting-based performance metric. Second, firm size was alternatively measured using number of employees in the organization to ensure results remain unaffected by changing the measurement of variables. This alternative measure is algebraically equivalent to the main specification and tests the stability of the results to functional-form representation. The substantive conclusions remain consistent across these alternative specifications. Thus, the results of the study are robust and reliable.

Table : Alternative Analysis	
Variables	(11) FE
EPD	-.1852877***
LEV	-.0229566
GRTH	-.0050228***
ROE	.0000166
Fage	-.027453***
EMP	1.76e-06**
BS	.0400525**
CEOage	-.0021482
CEOtenure	-.0091699**
Year FE	Yes
Observations	2950
Hausman (p-value)	0.00
Within R ²	0.22

Notes -*** p < 0.01, ** p < 0.05, * p < 0.10.

V. IMPLICATIONS

The findings of this study carry important implications for corporate governance, executive compensation design, and innovation strategy, particularly in emerging market contexts.

First, the results suggest that internal pay structures at the top of the organization matter for long-term strategic outcomes. The negative association between executive pay dispersion and firm innovation intensity indicates that large compensation gaps between the CEO and other top executives may undermine collaboration and shared commitment within the top management team. Boards and compensation committees should therefore be cautious about creating highly unequal pay structures that concentrate rewards excessively at the top. A more balanced distribution of compensation may foster stronger team cohesion, encourage information sharing, and support collective risk-taking necessary for sustained innovation. Second, the study highlights the role of financial structure in shaping innovation behavior. The negative effect of leverage suggests that high debt levels constrain firms' ability to invest in R&D. This implies that firms seeking to pursue innovation-led growth strategies should carefully manage their capital structures to maintain financial flexibility. Creditors and lenders should also recognize that excessive financial pressure can discourage long-term innovative investment. Third, governance mechanisms beyond compensation also influence innovation. The positive relationship between board size and innovation suggests that diverse and well-resourced boards can support long-term strategic investments. Boards with broader expertise may be better equipped to evaluate and oversee complex innovation projects, reducing managerial short-termism. In contrast, the negative effect of CEO tenure indicates that prolonged leadership without renewal may lead to strategic rigidity. Periodic leadership refreshment and stronger board oversight may help prevent managerial entrenchment that stifles innovation. Finally, the study underscores that innovation is not solely a function of technological capability or market opportunity but is deeply shaped by internal governance arrangements. For policymakers and regulators in emerging economies, the findings suggest that encouraging transparent and balanced executive compensation practices may indirectly promote firm-level innovation. Overall, aligning executive incentives with long-term strategic goals is crucial for fostering an organizational environment conducive to innovation.

VI. CONCLUSION

This study set out to examine how executive pay dispersion influences firm innovation intensity among BSE 500 listed Indian firms over the period 2013–14 to 2023–24. By focusing on the distribution of pay within the top management team rather than only the level of executive compensation, the study provides new insight into how internal incentive structures shape long-term strategic decisions. Using a panel data framework with firm fixed effects and year controls, the findings reveal a robust and negative relationship between executive pay dispersion and firm innovation intensity. This suggests that greater inequality between the CEO and other top executives weakens collaboration and reduces support for risky, long-term R&D investments. The results also show that innovation is influenced by a broader set of financial, organizational, and governance factors. Higher leverage is associated with lower innovation, indicating that financial pressure and debt obligations constrain firms' ability to invest in uncertain projects. Firm age is negatively related to innovation, reflecting the role of organizational inertia and structural rigidity in limiting adaptability. CEO tenure also

shows a negative effect, suggesting that long-serving leaders may become entrenched and less inclined to pursue disruptive innovation. In contrast, board size is positively associated with innovation intensity, highlighting the supportive role of diverse and resourceful boards in encouraging long-term strategic investments. Firm size and CEO age, however, do not exhibit consistent independent effects once other factors are considered. Overall, the findings reinforce the view that innovation is not determined solely by technological opportunities or market conditions but is deeply shaped by internal governance arrangements. Executive pay dispersion emerges as a key internal governance factor that can either support or hinder innovation depending on how compensation is structured. By linking compensation inequality within the executive team to firms' innovation investment, this study contributes to a more nuanced understanding of the behavioral and governance foundations of corporate innovation, particularly in an emerging market context.

VII. LIMITATIONS AND FUTURE RESEARCH

While this study offers important insights into the relationship between executive pay dispersion and firm innovation, several limitations should be acknowledged. First, the measure of innovation is based on R&D intensity, which captures input-oriented innovation effort rather than innovation outcomes such as patents, new product launches, or technological breakthroughs. Although R&D intensity is a widely used proxy, it does not fully reflect the efficiency or success of innovation activities. Future research could complement this measure with output-based indicators to better understand how compensation structures influence both innovation effort and performance. Second, the study focuses on firms listed in the BSE 500, which represent large and relatively well-established companies. The findings may therefore not generalize to smaller firms, privately held firms, or startups, where governance structures and executive compensation practices may differ significantly. Future studies could examine whether the effects of executive pay dispersion on innovation vary across firm size, ownership structures, or industry characteristics. Third, although the panel framework controls for unobserved firm-specific effects, the possibility of endogeneity cannot be completely ruled out. For example, firms with declining innovation performance may restructure executive compensation, creating potential reverse causality. Future research could employ instrumental variable approaches or natural experiments to strengthen causal inference. Additionally, this study focuses primarily on vertical pay dispersion between the CEO and other executives. Future research could explore horizontal dispersion within the broader top management team or examine how different components of pay, such as equity incentives or long-term bonuses, interact with dispersion to influence innovation. Finally, cross-country comparative studies could investigate how institutional environments moderate the relationship between executive pay structures and innovation outcomes, further enriching our understanding of governance and strategic investment behavior.

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