The Role of Collective Pay-for-Performance in Incentivizing Top Management Teams

Paula M.G. Dirks
p.m.g.dirks@rug.nl
University of Groningen

Sebastian Firk
sebastian.firk@uni-due.de
University of Duisburg-Essen

Melissa A. Martin
mamarti@uic.edu
University of Illinois – Chicago

Alexander C.A. van Slooten*
a.c.a.van.slooten@rug.nl
University of Groningen

This version: June 2025

* Corresponding author. We thank Markus Arnold, David Bedford, Pablo Casas Arce, Ewelina Forker, Jan Hennig, Martin Holzhacker, Sasan Mansouri, Michal Matějka, Alexandra van den Abbeele, Sally Widener and seminar participants at Michigan State University, the University of Groningen, the Empirical Research in Management Accounting Conference 2023, the Annual Conference of Management Accounting Research 2024, the Annual Congress of the European Accounting Association (Doctoral Colloquium) 2024, the Dutch Accounting Research Conference 2024, and the American Accounting Association Management Accounting Section Midyear Meeting 2025 for their helpful comments and suggestions.

The Role of Collective Pay-for-Performance in Incentivizing Top Management Teams

ABSTRACT

Providing incentives to functionally diverse top management teams (TMTs) is complex as the importance of knowledge sharing and integration among the TMT members requires going beyond contracting focused on incentivizing individual effort. We examine whether and how boards use collective pay-for-performance (PFP) to harness collaborative synergies within functionally diverse TMTs. We identify collective PFP by measuring the degree to which individual cash bonus contracts of TMT members use the same underlying performance metrics. We hypothesize, and find, a positive association between TMT functional diversity and collective PFP. We also find that the alignment of TMT functional diversity and collective PFP is associated with improved firm performance. Supporting the proposed knowledge-sharing mechanism, additional tests show that collective PFP is associated with more collaborative language in conference calls, greater innovation output, and increased strategic variety and that our results are more pronounced for firms that rely on a knowledge-based business model.

Keywords: Executive compensation, Collective pay-for-performance; performance metrics, top management team (TMT); TMT functional diversity

JEL: M12; M41

Data Availability: All data is obtained from commercially available databases.

"It's not just who's in the room—it's how they behave together."
—LeStage, Nilsson DeHanas, and Gerend (2024, 56)

I. Introduction

Firms are governed by executives who, rather than operating as isolated individuals, work together as members of the top management team (TMT). As a result, the TMT holds potential for collaborative synergies that emerge when action by one executive enhances the marginal productivity of another executive (Glover and Kim 2021; Milgrom and Roberts 1995). The TMT's functional diversity—the array of knowledge and experiences of TMT members in different functional domains (Zhang 2019)—is a primary source of these synergies because it brings together non-overlapping knowledge bases and diverse perspectives that can enhance decision quality (e.g., Boone and Hendriks 2009; Certo, Lester, Dalton, and Dalton 2006). However, at the same time, functional diversity can hinder the realization of collaborative synergies as it may lead to team fragmentation and communication issues, obstructing the necessary knowledge exchange and integration (Bunderson and Sutcliffe 2002). If the potential for collaborative synergies is not fully realized, TMTs may underperform. Configuring executive compensation contracts in a way that encourages knowledge exchange and integration may help boards in addressing this control problem. Accordingly, this study addresses the important yet understudied question of how boards can effectively incentivize the TMT to harness collaborative synergies.

The executive compensation literature has traditionally focused on the incentives of individual executives as a response to the agency conflict between shareholders and individual managers (for a review, see Edmans, Gabaix, and Jenter 2017). Central to this single-agent perspective is individual pay-for-performance (PFP), where the selection of and contractual weight on performance metrics are determined by the informativeness of the metric with respect to the agent's individual effort (Holmström 1979). This emphasis on individual PFP implies that

maximizing shareholder value is achieved by independently optimizing each executive's individual incentive contract. However, this single-agent perspective overlooks the potential for collaborative synergies, underestimating the complexity of the control problem that boards face in incentivizing the TMT as a whole. Boards must design incentive contracts that not only encourage individual effort but also foster knowledge exchange and integration among executives to leverage synergies. Simply enhancing individual PFP may increase individual effort, but focusing on individually tailored performance metrics could motivate information hoarding and fragmentation, hindering the realization of collaborative synergies (Kelly 2010; Van Alstyne 2005).

Insights from the team literature suggest that collective PFP, defined as pay that is contingent on collective outcomes, encourages effective knowledge exchange and integration through increased reward interdependence among team members (e.g., Haesebrouck, Cools, and Van den Abbeele 2018; Hwang, Erkens, and Evans 2009). The benefits of collective PFP documented in the team literature are likely to be particularly relevant for functionally diverse TMTs, where the heightened potential of collaborative synergies creates a need to promote the exchange and integration of the TMTs' diverse knowledge. In designing TMT incentive contracts, boards have to make a trade-off between using collective PFP to exploit potential collaborative synergies within the team and individualized metrics that better reflect individual effort.

To better understand boards' approach to this control problem, we study whether and how boards use collective PFP to harness collaborative synergies in the TMT. Boards likely recognize that functionally diverse TMTs possess heightened potential for collaborative synergies and that such synergies are particularly beneficial in the TMT. Thus, we expect that boards move beyond the single-agent perspective in executive contracting, employing more collective PFP in functionally more diverse TMTs. Next, given the important role of the TMT in addressing the firm's most complex problems and their significant impact on firm performance, we also expect

improved performance outcomes when collective PFP is employed in firms with more functionally diverse TMTs.

We examine the relation between TMT functional diversity, collective PFP, and firm performance in a longitudinal sample of 14,496 firm-years between 2006 and 2022. Consistent with our focus on non-overlapping knowledge bases and diverse perspectives, we measure functional diversity using information on the backgrounds of the executives in the TMT. We empirically identify collective PFP as the degree to which individual cash bonus contracts for TMT members use the same underlying performance metrics (i.e., performance metric overlap). As a result of greater performance metric overlap, the pay of executives becomes relatively more dependent on the collective output of the TMT rather than their individual input.

Our descriptive statistics show that performance metric overlap is common among TMTs with, on average, 75 percent of the performance metrics shared with at least one other member of the TMT. While 32 percent of our sample firm-years have complete overlap in performance metrics among TMT members, we also provide evidence that many firms employ completely individualized sets of metrics for some TMT members. In addition, our results reveal increasing performance metric overlap (16 percent) over our sample period. We further note that the total number of unique performance metrics also rose over the same period. This finding is consistent with increasing complexity of *individual* compensation contracts (Albuquerque, Carter, Guo, and Lynch 2024) but, combined with evidence of increasing overlap, also provides an indication of decreasing complexity from a *team* perspective.

Turning to our hypothesis tests, we document a positive association between TMT functional diversity and performance metric overlap. This finding identifies functional diversity as an important determinant of collective PFP and supports our expectation that boards employ collective PFP to leverage the benefits to collaborative synergies offered by functionally diverse

TMTs. Moreover, our study provides the first evidence that boards use collective PFP to harvest performance benefits of functionally diverse TMTs. Specifically, we find increased one year-ahead Tobin's Q for firms with functionally diverse TMTs and higher levels of performance metric overlap. These results are robust across various specifications of the measures of performance metric overlap, TMT functional diversity, and firm performance as well as to alternative estimation techniques—including a firm-fixed effects specification and two-stage control function approach.

Finally, we conduct two sets of additional analyses aimed at better understanding the interplay between TMT functional diversity and collective PFP. First, we investigate the premise that collective PFP acts through its effect on knowledge exchange and integration among functionally diverse TMT members. We use three proxies collectively reflecting knowledge sharing in the TMT—collaboration-oriented language during earnings conference calls (Fiordelisi and Ricci 2014), performance on innovation related tasks (Kogan, Papanikolaou, Seru, and Stoffman 2017), and the variety in executive's strategic actions (Feichter, Moers, and Timmermans 2022). Our results show that performance metric overlap contributes to increases in each of these metrics, underscoring the proposed knowledge exchange and integration mechanism. Second, we consider firm-level cross-sectional variation in the benefits to knowledge sharing among functionally diverse TMT members. Our findings suggest that for firms with a more knowledge-based business model, boards are more likely to use performance metric overlap to capitalize on TMT functional diversity, and the performance benefits of this pairing are greater. This finding further supports knowledge sharing as the mechanism underlying our main findings.

We conduct a series of robustness tests to ensure our inferences are not dependent on various empirical choices. While these tests help to alleviate concerns that an omitted correlated variable explains our results, we cannot completely rule out these concerns. However, we note that if a correlated omitted variable were driving our results, it would need to at a minimum (1) be

correlated with various dimensions of knowledge sharing; (2) differentially affect knowledge sharing conditional on the degree of functional diversity; and (3) differentially affect firms with varying degrees of knowledge-based business models. Such requirements should limit these concerns.

Our study contributes to the executive contracting literature by presenting a more complete view of the complex control problem faced by boards in incentivizing the performance of top management as a team. We challenge the assumption that independently optimizing individual compensation contracts maximizes collective TMT output. By unifying performance metrics across the TMT's bonus plans, boards not only elicit effort from individual executives but also harness the potential value of collaborative synergies arising between executives. Building on recent research that introduces the notion that executive bonuses can serve as team incentives (Guay, Kepler, and Tsui 2019), our findings introduce functional diversity as an important determinant of the use of collective PFP in the TMT. In doing so, our study extends the understanding of how and when boards tradeoff between individual and team incentives to motivate TMT performance.

Next, our study moves beyond the drivers of executive team incentives to provide the first evidence of performance improvements in firms where collective PFP is used to capitalize on collaborative synergies in functionally diverse TMTs. In this context, we also provide evidence that knowledge sharing serves as the mechanism through which this performance benefit arises. These performance results further highlight the importance of aligning incentive design with executive hiring decisions, not only at the individual level (e.g., Abernethy, Dekker, and Schulz 2015) but also at the team level – speaking to the broader literature on the systems of management controls.

We also note that relevant to the broader executive contracting literature, we reveal a new stylized fact regarding the development of executive compensation practices over time. While individual contracts have become more complex (Albuquerque et al. 2024) and more standardized across firms (Cabezon 2024), they are increasingly similar within firms, suggesting that, from a team perspective, these incentive structures appear to be simplifying over time.

In addition to these contributions to the executive contracting literature, our study also contributes to the emerging accounting literature on TMT functional diversity (e.g., Glover and Kim 2021; Liu and Zhang 2024; Zhang 2019). Prior studies have demonstrated how this diversity can benefit the TMT's decision-making quality (Liu and Zhang 2024; Wang 2023) but can also lead to detrimental firm outcomes (Zhang 2019). We show how boards aim to harness TMT's functional diversity by creating more emphasis on collective PFP. We also show that such collective PFP contributes to an effective functioning of functionally diverse TMTs.

II. Theory and hypotheses

The Challenge of Capitalizing on Collaborative Synergies in TMTs

The TMT consists of a group of executives that collectively governs the firm and determines its strategic direction. The TMT is monitored by the board of directors, which is tasked with making value-enhancing TMT control decisions (e.g., hiring, firing and compensating TMT members). This role implies evaluating not only how control decisions influence executives individually but also considering the collective impact on multiple executives. This is important as boards need to ensure that shareholders can capitalize on potential collaborative synergies that may exist between TMT members. Collaborative synergies can emerge from the diversity of executives' functional backgrounds (Glover and Kim 2021). This is because executives with functionally diverse backgrounds possess non-overlapping knowledge bases and diverse perspectives that, when

combined, form a richer pool of expertise and insight enhancing decision-making processes (Certo et al. 2006; Liu and Zhang 2024; Simons et al. 1999).

At the same time, non-overlapping knowledge bases and diverse perspectives may complicate communication in the TMT, leading to team fragmentation and diminished team identity. This control problem posed by functional diversity, if not adequately addressed, can lead to underperformance (Bunderson and Sutcliffe 2002). As one control choice, boards may implement organizational design and hiring policies aimed at selecting less diverse executives to avoid teaming and communication issues. This approach, however, forgoes the incremental collaborative synergies of more diverse TMTs—leading to an incomplete solution to the underlying control problem. Hence, boards, seeking to maximize shareholder value, may move beyond employee selection to identify alternative control mechanisms that incentivize functionally diverse executives to exchange and integrate their knowledge. Structuring executive compensation contracts to encourage knowledge exchange and integration may be an obvious way to address this control problem and capitalize on collaborative synergies in the TMT.

The Prevalence of the Individual-Agent Perspective in Executive Contracting

Despite the potential for collaborative synergies to arise between executives, prior academic research on executive compensation has primarily focused on the control problem stemming from the proposed agency conflict between shareholders and the individual manager (for a review, see Edmans et al. 2017). Based on this conflict, agency theory provides clear theoretical predictions for the structure and features of individual compensation contracts. For example, these contracts should include performance metrics that are precise and congruent with the interests of shareholders, such that they are sensitive to individual performance but not to uncontrollable events (Banker and Datar 1989; Feltham and Xie 1994). Contracting efficiency is judged with respect to

the ability of selected performance metrics to inform principals about variation in individual effort with limited noise from non-agent sources. For functionally diverse TMTs, given the variety in expertise, this view suggests that the optimal set of performance metrics differs for each executive.

However, this single-agent perspective fails to capture the complexity of the control problem faced by the board of directors in effectively incentivizing the top management *team*. It implies that maximizing shareholder value is achieved by optimizing the set of performance metrics for each individual executive independently and without accounting for potential synergies that can arise from interactions between executives. These individualized performance metrics can further motivate fragmentation and information hoarding (Kelly 2010; Quigley, Tesluk, Locke, and Bartol 2007; Van Alstyne 2005). Thus, when there are potential collaborative synergies between executives, optimizing each executive's individual incentives independently may not simultaneously optimize overall team output (Edmans, Goldstein, and Zhu 2013).

Collective Incentivizing in the Team Literature

While most conceptual and empirical studies on executive pay focus on optimizing individual contracts of executives independently,[1] the broader literature on teams provides some insight into incentivizing team performance (for a review, see Nyberg, Maltarich, Abdulsalam, Essman, and Cragun 2018). This literature emphasizes collective goals and team-based monetary incentives as important drivers of collaboration and knowledge exchange in groups (e.g., Hwang et al. 2009). The idea is that if team members' pay is contingent on the team's collective performance, they have a greater incentive to share knowledge, cooperate and coordinate their actions (e.g., Siemsen, Balasubramanian, and Roth 2007). Further, prior work documents that team incentives help to

[1] Notable exceptions are studies on the coordination of pay-for-performance sensitivity dispersion across the TMT (Bushman et al. 2016; Kim, Kyung, and Ng 2022) and Guay et al. (2019), who provide initial evidence that executive bonus contracts may be used by boards to provide team incentives.

promote team cohesion and collaborative efforts (Chen, Williamson, and Zhou 2012; Englmaier, Grimm, Grothe, Schindler, and Schudy 2024; Friebel, Heinz, Krueger, and Zubanov 2017) and facilitate knowledge sharing in the presence of intra-team differences in status or ability (Haesebrouck et al. 2018; Hamilton, Nickerson, and Owan 2003). Finally, Itoh (1991) shows analytically that incentivizing cooperation in teams by providing team incentives is optimal when team members' efforts are 'strategic complements'.[2]

While the proposed benefits of team incentives with regard to team behavior have been supported, there may also be unintended consequences in the form of lower individual motivation to exert effort. In the economics literature, these problems are commonly referenced as shirking and free riding (Alchian and Demsetz 1972; Holmström 1982), but they have also been noted by studies in psychology and organizational behavior as 'social loafing' (e.g., Karau and Williams 1993). The mechanism underlying this behavior ties back to the individual contracting literature. Collective outcomes are often noisy signals of the individual effort of separate team members which weakens the link between effort and pay—reducing instrumentality and creating less effective incentives (e.g., Vroom 1964; Holmström and Milgrom 1991).

Overall, these insights from the team literature suggest that collective PFP may help to address the control problem that boards face in capitalizing on collaborative synergies from functional diversity in the TMT. However, the literature also reveals potential drawbacks in the form of lower informativeness of diverse executive effort, making the decision to implement collective PFP complex. This warrants further empirical research to better understand whether and

[2] Effort here is defined as strategically complementary if the marginal cost of effort by a team member decreases as a result of 'help effort' by their peer. This definition overlaps with that of synergies (Edmans et al. 2013) and productive complementarities (Glover and Kim 2021).

how boards use collective PFP to capitalize on collaborative synergies across the entire TMT, as well as the potential consequences of its implementation.[3]

Collective Pay-for-Performance to Capitalize on Collaborative Synergies in the TMT

Considering the single-agent and team literatures, boards face a trade-off in using more common metrics (i.e., collective PFP, incentivizing knowledge exchange and integration) or more individual performance metrics (i.e., individual PFP, incentivizing individual effort) in the bonus contracts of functionally diverse executives. We expect that boards will make the decision to use collective PFP conditional on the functional diversity of their TMT for the following reasons.

First, boards likely consider the benefits of collaborative synergies arising from the exchange and integration of diverse knowledge as particularly valuable in the TMT context (Buyl, Boone, Hendriks, and Matthyssens 2011). TMTs collectively address the most complex problems of the firm and have the greatest impact on firm performance (Finkelstein, Hambrick, and Cannella 2009). Enhancing decision quality through diverse insights is thus likely more critical in the TMT as compared to a standard team. In addition, boards will recognize that creating an effective team "is difficult at any level, but for top teams, the challenges expand exponentially" (LeStage et al. 2024, 57). TMT members tend to interact frequently with others in their individual areas of responsibility or expertise (e.g., the business function or unit the TMT member is leading), but less frequently with other TMT members. This problem is compounded by non-overlapping knowledge bases among executives, which limit the common ground needed for effective knowledge exchange and integration (Bunderson and Sutcliffe 2002). Using more individual performance metrics in bonus contracts would further direct attention to these differences, likely obstructing collaboration

[3] Some recent studies also focus on executive compensation design across the TMT. However, the extent to which these studies have considered collective PFP in the TMT is limited. While they have focused on the dispersion of pay-performance sensitivity across the TMT (Bushman et al. 2016; Kim et al. 2022), they have not considered team incentives in its usual definition in the general team literature (i.e., pay that is contingent on the team's collective performance).

and knowledge exchange. In contrast, by using more collective performance metrics, the knowledge which is distributed across functionally diverse TMT members is more likely to be shared and used in TMT decision making.

Taken together, boards may prefer to increase collective PFP as a means to overcome the severe teaming issues in functionally diverse TMTs and incentivize their particularly valuable knowledge sharing—even if this comes at the expense of some individual effort incentives. Accordingly, we expect boards weight collective PFP conditional on TMT functional diversity.

H1a: *More functional diversity in the TMT is associated with more collective pay-for-performance across the TMT.*

Collective PFP incentivizes executives in functionally diverse TMTs to maximize their collective output by bringing together their unique knowledge and diverse perspectives. The benefits of integrating that knowledge can be particularly significant, as the decisions made collectively by TMTs are often the most complex and most impactful for a firm. Moreover, the problem of freeriding may be relatively muted in the context of functionally diverse TMTs, because shirking is more easily detected when, as a result of executives' unique backgrounds, this effort is less likely to be substitutable (Glover and Kim 2021). Consequently, the benefits to implementing collective PFP in firms with functionally diverse TMTs may outweigh the costs—leading to performance improvements.

In practice, it may be difficult for firms to accurately trade-off between individual and collective PFP in the context of functionally diverse TMTs. For example, Bushman, Dai, and Zhang (2016) show that boards struggle with optimizing pay-performance sensitivity in the TMT and that firms' observed TMT incentives often deviate from the theoretical optimum—resulting in negative performance effects. In a similar sense, balancing individual and collective incentives may

introduce complexity in contracting that is not well understood by boards, executives, shareholders, or labor market participants (e.g., Albuquerque et al. 2024). Such complexity and its consequences may cause boards to partially deviate from the optimal configuration of collective PFP across the TMT. However, those boards that are able to capitalize on the potential benefits of more collective PFP in functionally diverse TMTs may achieve higher firm performance. This leads to our second hypothesis.

> **H1b:** *Collective pay-for-performance across the TMT positively moderates the association between functional diversity in the TMT and a firm's performance.*

III. Methods

Sample and Data

To construct our sample, we start with executive-firm-year observations from ISS Incentive Lab between 2006 and 2022. ISS Incentive Lab contains detailed compensation contract information for the top five executives of over 2,000 publicly traded US firms. We merge ISS Incentive Lab data with firm and industry data from Compustat, and executive and board data from ExecuComp and BoardEx. Our final sample consists of 14,496 firm-year observations from 1,372 unique firms for years 2006 to 2022. Table 1 shows our sample construction process.

Collective Pay-for-Performance: Performance Metric Overlap across the TMT

Broadly speaking, collective PFP is defined as pay contingent on collective outcomes but operationally can take many forms. One simple implementation of collective PFP is the use of equity compensation across TMT members. Such equity incentives should align individual managers toward enhancing value for shareholders. However, such a PFP mechanism relates to distal shareholder performance and creates weaker perceived links between employee effort and

organizational outcomes (Nyberg et al. 2018). Team incentives, where individual payouts are tied to common operational outcomes, more directly incentivize the underlying cooperation and communication needed among the TMT. In this study, we focus on the collective PFP stemming from individual bonus metrics shared across executives in the TMT.[4]

Cash bonuses are awarded to executives upon meeting certain targets on specific performance metrics, such as earnings per share (EPS), customer satisfaction or individual achievements. Boards can influence the degree of collective PFP in the TMT through the configuration of shared performance metrics across executive bonus contracts. We construct a measure of collective PFP which captures the extent to which the performance metrics across individual executive bonus contracts overlap (*PM_Overlap*).[5]

Because we are interested in the collective PFP of the full TMT, we consider the degree to which the bonus contracts of all named executives include the same performance metrics.[6] To identify the overlap in performance metrics across TMT members, we define each unique metric or goal used in the evaluation of an executive as a separate performance metric. We then consider two metrics to overlap when the two metrics exactly match (e.g., EBITDA and EBITDA).

To calculate the performance metric overlap for each firm and fiscal year, we first calculate the overlap for each executive individually. The performance metric overlap of executive i in firm k and fiscal year t ($PM_Overlap_{k,i,t}$) is calculated as:

[4] Across all our tests, we control for the value of equity-based compensation and the dispersion of pay-for-performance sensitivities across the TMT.

[5] We acknowledge that similarity in performance metrics across TMT members may not reflect purposeful collective PFP arrangements but instead may arise as a result of efforts to reduce overall pay system complexity or as a result of forced reliance on a limited number of observable and informative contracting metrics for these executives. However, we suggest such adoption would bias against our results as we would not expect performance metric overlap arising from these sources to be associated with variation in TMT functional diversity nor with differential performance outcomes.

[6] Thereby, our performance metric overlap variable expands on the performance metric congruity variable from Guay et al. (2019) which only considers the extent to which the CEO and the lowest-paid executive have the same performance metrics in their bonus contracts. We further discuss differences between our measure and the measure from Guay et al. (2019) in Section IV.

$$PM_Overlap_{k,i,t} = \frac{\sum_{j=1,j\neq i}^{N_{k,t}} \left|PM_{k,i,t} \cap PM_{k,j,t}\right|}{\left|PM_{k,i,t}\right| \times (N_{k,t} - 1)} \quad (1)$$

In Equation (1), $\left|PM_{k,i,t} \cap PM_{k,j,t}\right|$ refers to the number of overlapping performance metrics between the sets of performance metrics of executives i and j in firm k and fiscal year t, $\left|PM_{k,i,t}\right|$ refers to the number of performance metrics of executive i in firm k and fiscal year t, and $N_{k,t}$ refers to the total number of executives in firm k and fiscal year t. We scale the number of overlapping metrics by the number of potential overlaps, defined as the number of performance metrics for that executive multiplied by the number of other members in the TMT. We then calculate the aggregate performance metric overlap for firm k in fiscal year t ($PM_Overlap_{k,t}$) by taking the average across the TMT in that firm year:

$$PM_Overlap_{k,t} = \frac{\sum_{i=1}^{N_{k,t}} PM_Overlap_{k,i,t}}{N_{k,t}} \quad (2)$$

Appendix A reports the performance metrics in the bonus contracts of top executives at two example firms (i.e., Avery Dennison Corporation and Apple Inc. for fiscal year 2022). It also further explains the calculation of performance metric overlap and demonstrates this calculation for these firms.

TMT Functional Diversity

As argued in our theoretical background, we expect that firms use performance metric overlap to reap the benefits of collaborative synergies that can arise between executives with functionally diverse backgrounds. Therefore, we want our measure to reflect the functional diversity that comes from the variety of work experience between individuals rather than the variety of work experience within individuals.[7] For this reason, we operationalize TMT functional diversity (*TMT_Funct_Div*)

[7] Consider, for example, TMT A and TMT B. TMT A consists of three generalist executives that each have 15 years of work experience equally distributed over the same three functional categories. TMT B consists of three specialist executives that each

using the variable developed by Boone and Hendriks (2009). Whereas other measures of functional diversity (e.g., Shannon-Wiener and Blau indices) do not disentangle interpersonal diversity from intrapersonal diversity, the variable we use measures interpersonal functional diversity net of intrapersonal functional diversity (Bunderson and Sutcliffe 2002). A high value of *TMT_Funct_Div* implies high functional background diversity, with expertise being uniquely distributed over TMT members. See Appendix B for an overview of this calculation.

Firm Performance

We use Tobin's Q to measure firm performance (*TobinsQ*). Tobin's Q serves as a proxy for firm value and is defined as the ratio of the market value of assets in place over the replacement cost of these assets (e.g., Gompers, Ishii, and Metrick 2003). We use one-year ahead Tobin's Q following prior research studying the association between compensation contract design and firm performance (Bushman et al. 2016; Cabezon 2024). We introduce alternative performance metrics and measurement periods in our additional analyses in Section V.

Control Variables

We include an extensive array of control variables in our multivariate models. First, we consider TMT characteristics. TMTs vary in terms of their structure. Some TMTs employ an array of functional executives (e.g., chief marketing officer, chief technology officer, etc.), while other TMTs predominantly consist of business-unit heads (president North America, president Europe, etc.). As these structural differences may alter the use of and return to collective PFP, we control for the presence of at least one business-unit head in the TMT (*Ind_BU_head*).[8] We further include

have 15 years of experience in a different functional category. For the purpose of our study, we view TMT B as more functionally diverse than TMT A.

[8] In untabulated tests, we control for these structural differences using a continuous measure of the number of business-unit heads in the TMT and the number of functional executives in the TMT and our inferences hold.

the shared tenure of the TMT (*TMT_length*). We also consider the level of influence of the CEO by including CEO duality (*Dual_CEO)* and CEO tenure (*CEO_tenure*).

Second, we include controls related to firm characteristics. The benefits from collaborative synergies are likely to be greater for firms with more growth opportunities (Guay et al. 2019). Therefore, we control for growth opportunities using three variables. We include the firm's Tobin's Q in the current year (*TobinsQ*), the ratio of investments in R&D expenses and capital expenditures to total assets (*Investments*), and firm age (*Firm_age*). Moreover, coordination needs may increase with the size and complexity of a firm, which may influence both the diversity of the TMT as well as the need for collective PFP. Therefore, we control for firm size (*Firm_size*), the standard deviation of the firm's previous 60 monthly stock returns (*Returns_vol*), the firm's leverage (*Leverage*), the firm's free cash flows (*FCF*) and the number of the firm's business segments (*Num_bus_segments*).

Third, we include other characteristics of the compensation contract that may confound our results. We include the average number of metrics included in the TMT's bonus contracts (*Mean_num_metrics_TMT*). Moreover, because financial metrics are often employed at an aggregate level, and thus more easily shared across TMT members, we control for the average proportion of earnings metrics (*%Earnings_metrics_TMT*). We also control for other ways in which firms can provide collective PFP: the average value of equity compensation provided to the TMT (*Mean_equity_comp_TMT*) and pay-for-performance sensitivity dispersion across the TMT (*PPS_dispersion_TMT*).

Empirical Models

In H1a, we predict that firms with more functional diversity in the TMT are associated with greater use of collective PFP. To test H1a, we regress performance metric overlap on TMT functional

diversity and other potential determinants of overlap. Specifically, we estimate the OLS model specified in Equation (3) that includes industry-fixed effects (γ_j) and year-fixed effects (δ_t).[9]

$$PM_Overlap_{i,t} = \beta_0 + \beta_1 TMT_Funct_Div_{i,t} + \varphi Controls_{i,t} + \gamma_j + \delta_t + \varepsilon_{i,t} \quad (3)$$

A positive coefficient on β_1 supports H1a and suggests a positive association between functional diversity and performance metric overlap.

In H1b, we predict that the association between TMT functional diversity and firm performance is positively moderated by collective PFP. To test this hypothesis, we regress firm performance on the interaction between TMT functional diversity and performance metric overlap. Specifically, we estimate the model specified in Equation (4) that includes industry-fixed effects (γ_j) and year-fixed effects (δ_t).

$$TobinsQ_{i,t+1} = \beta_0 + \beta_1 TMT_Funct_Div_{i,t} + \beta_2 PM_Overlap_{i,t} + \beta_3 TMT_Funct_Div_{i,t} * PM_Overlap_{i,t} + \varphi Controls_{i,t} + \gamma_j + \delta_t + \varepsilon_{i,t} \quad (4)$$

A positive coefficient on β_3 supports H1b and suggests that performance metric overlap positively moderates the relation between TMT functional diversity and firm performance.

In Equations (3) and (4), indices i, j, and t refer to the firm, the industry and time, respectively. *Controls* refers to the vector of control variables described in Section III. To alleviate concerns that our inferences are attributable to omitted time trends (e.g., macroeconomic shocks) or industry characteristics (e.g., business models across sectors), we include year fixed effects δ_t and industry fixed effects γ_j, which are based on two-digit SIC codes. To correct for any arbitrary correlation in the firm-year-specific error term $\varepsilon_{i,t}$ across time within a given firm, we base

[9] As performance metric overlap across the TMT is censored at values of zero and one, we also estimate the full model using a Tobit model in an untabulated analysis and again find support for H1a.

inferences on standard errors clustered at the level of treatment (i.e., firm), following Abadie, Athey, Imbens, and Wooldridge (2023).

IV. Results

Descriptive Statistics

Table 2 reports the distribution of our observations across time and industries. Panel A shows the distribution of observations across time and the mean of performance metric overlap and TMT functional diversity in each fiscal year. We document a gradual increase in performance metric overlap between 2006 and 2022. While average performance metric overlap in 2006 was 0.70, this number had increased by 16 percent to 0.81 by 2022. This increase is statistically significant (untabulated; *p-value* < 0.01). Panel B shows the distribution of observations across industries. We note some variation in both performance metric overlap and TMT functional diversity across industries—with the highest levels of overlap in the extractive industries and the highest levels of functional diversity in business equipment.

The annual means of performance metric overlap and TMT functional diversity presented in Panel A of Table 2 are displayed in Figure 1, along with the average number of unique performance metrics included per bonus plan. Our finding that executive bonus contracts have become more similar within TMTs is particularly interesting in light of other recent findings in the executive compensation literature. Consistent with Albuquerque et al. (2024), we document an increase in the number of unique performance metrics which suggests increasing complexity in individual contracts over this time period. However, paired with the evidence on performance metric overlap, these contracts appear to have gotten less complex from a team perspective. Further, we complement the finding of Cabezon (2024) that executive bonus contracts have become

increasingly similar *between* firms by showing that individual executive bonus contracts also have become increasingly similar *within* firms.

Table 3 reports summary statistics for our variables of interest and controls, as well as the differences in means between firm-years with low and high levels (median split) of TMT functional diversity. The results show that the average level of TMT functional diversity is 0.58. The average level of performance metric overlap in our sample is 0.75, while performance metrics completely overlap in 32 percent of firm-years (untabulated).[10] Performance metric overlap is significantly higher in firms with high TMT functional diversity (0.025; *p-value* < 0.01). We also document a sample mean $TobinsQ_{t+1}$ of 1.78 with significant differences across firm-years with high and low levels of functional diversity (0.334; *p-value* < 0.01).

Table 4 reports correlation coefficients across our full sample. Performance metric overlap and TMT functional diversity are significantly positively correlated (0.07; *p-value* < 0.01), and firm performance is significantly positively correlated with both performance metric overlap (0.04; *p-value* < 0.01) and TMT functional diversity (0.13; *p-value* < 0.01).

Multivariate Results

H1a predicts a positive association between functional TMT diversity and performance metric overlap across the TMT. Table 5 presents the results of estimating Equation (3), beginning with a simple no controls model and adding each control category. Across all specifications, functional diversity is positive and statistically significant, consistent with H1a, and suggests that performance

[10] Interestingly, the average performance metric overlap in our sample (0.75) is markedly lower than the average overlap in Guay et al. (2019) (0.83). Moreover, while performance metrics completely overlap across the TMT in 32 percent of firm-years in our sample, Guay et al. (2019) find 'perfect congruity' between the CEO and the lowest-paid executive in 66 percent of firm-years. This discrepancy is likely explained by the fact that we consider the bonus contracts from all named executives rather than only the CEO and the lowest-paid named executive. This finding underscores the importance of considering the performance metrics used across all TMT bonus plans.

metric overlap increases with increasing functional diversity.[11] In terms of economic significance, we find (based on Column (4) of Table 5) that an increase in TMT functional diversity from low (1σ below the mean) to high (1σ above the mean) is associated with an increase equivalent to 15.4 percent of the standard deviation in performance metric overlap. These results suggest that TMT diversity is an important driver of the use of collective PFP in TMTs.

H1b predicts that performance metric overlap positively moderates the association between TMT functional diversity and performance. Table 6 displays the results of estimating Equation (4). Consistent with the importance of diverse knowledge bases benefiting overall firm performance, we note a positive main effect of functional diversity on firm performance. More importantly for our study, across all specifications, we document a positive and significant interaction effect, consistent with H1b, and suggesting that collective PFP positively moderates the relation between functional diversity and firm performance. We plot these results (based on Column (4) of Table 6) in Figure 2. Figure 2 shows that, while increasing TMT functional diversity is generally associated with higher performance, this is more pronounced in firms with higher levels of collective PFP.[12] Specifically, while an increase in TMT functional diversity from low (1σ below the mean) to high (1σ above the mean) is associated with an increase equivalent to 2.4 percent of the standard deviation in Tobin's Q, this effect increases (decreases) by 75 percent when performance metric overlap increases (decreases) by one standard deviation from the sample mean. Together, these

[11] As H1a essentially predicts that performance metric overlap and TMT functional diversity are complements, Equation (3) can be seen as a so-called 'demand specification test'. Another way of performing the demand specification test is by separately regressing performance metric overlap and TMT functional diversity using seemingly unrelated regressions on a set of control variables, and correlating the residuals of these regression models (Masschelein and Moers 2020). In an untabulated analysis, we also perform this 'residuals correlation test', and find that the residuals are significantly positively related (0.075; *p-value* < 0.01), providing further evidence in support of H1a.

[12] The graph also suggests that combining low (1σ below the mean) TMT functional diversity with a high (1σ above the mean) level of collective PFP results in lower performance (Tobin's Q equal to 1.74) than combining low TMT functional diversity with a low level of collective PFP (Tobin's Q equal to 1.78). The difference is statistically significant (untabulated, *p-value* < 0.01). This is consistent with the single-agent contracting perspective and the idea that collective PFP is a relatively less efficient way of eliciting *individual* effort from executives than individual PFP.

results suggest that collective PFP provides a way for boards to translate collaborative synergies in functionally diverse TMTs into increased firm performance.

V. Additional tests

Knowledge Exchange and Integration in the TMT

We posit that collective PFP fosters knowledge exchange and integration between functionally diverse TMT members. We analyze three settings that signal such behavior. First, we consider the extent to which TMT members collaborate by focusing on collaboration-oriented language during the Q&A session of their firms' conference calls (*TMT_Collab*). We use a measure developed by Fiordelisi and Ricci (2014) focusing on the frequency of collaboration-oriented words, such as 'collaborate', 'team' and 'cooperate'. Second, we examine the firm's realized performance on innovation effort. Successful innovation effort is increasing in knowledge exchange and integration of managers with non-overlapping knowledge bases and diverse perspectives (Bantel and Jackson 1989). We operationalize innovation performance through the market value of the firm's patent filings in the fiscal year *(Innovation)* (Kogan et al. 2017).[13] Third, we focus on firm strategy, which can show greater variety (rather than simplicity) when TMT members with diverse knowledge and perspectives effectively exchange and integrate their insights during collective strategizing. We draw on a measure of strategic repertoire variety (*Strat_variety)* introduced by Ferrier, Smith, and Grimm (1999), which has recently also been adopted in the accounting literature (Feichter et al. 2022).[14] We test these expectations by regressing the three knowledge sharing proxies on *TMT_Funct_Div, PM_Overlap* as well as their interaction (*TMT_Funct_Div * PM_Overlap*).

[13] In an untabulated analysis, we measure innovation performance by the number of patent filings in the fiscal year that resulted in a granted patent (Arora et al. 2024), and our inferences hold.
[14] In an untabulated analysis, we use strategic change (Schäfer 2023) rather than strategic repertoire variety, and our inferences hold.

The results of these regressions are presented in Table 7. With regard to all three proxies for knowledge sharing, we find positive coefficients on *PM_Overlap* and the interaction term between *TMT_Funct_Div* and *PM_Overlap*. These results suggest the addition of collective PFP, itself but especially in functionally diverse TMTs, is associated with more collaborative language, more valuable patent activity, and more strategic variety. While each of these measures individually likely captures a different aspect of TMT collaboration, together they help paint a picture supporting knowledge exchange and integration as an important channel through which collective PFP influences the TMT. Overall, these findings provide further evidence that performance metric overlap captures a form of collective PFP that enables knowledge exchange and integration, and also that performance metric overlap is especially effective in stimulating exchange and integration in TMTs with functionally diverse backgrounds.

Cross-Sectional Variation: Knowledge Intensity

We propose knowledge exchange and integration as the mechanism underlying the effects of collective PFP—particularly in functionally diverse TMTs. Our analysis on knowledge sharing and integration thus far in this section provides some evidence in support of this mechanism. It should also be the case that we find that our documented effects are more pronounced in firms with a more knowledge-based business model as the benefits from knowledge sharing should be even more pronounced for these firms. To further investigate this mechanism, we analyze cross-sectional variation in the knowledge intensity of the firm's asset base.

To capture the knowledge intensity of the firm's asset base, we use the proportion of intangible assets to total assets (*%Intan_assets*) using modified asset values from Iqbal, Rajgopal, Srivastava, and Zhao (2024). For our analysis, we split our sample at the median of %*Intan_assets*. We present the results of the analysis in Table 8. In Panel A, we re-estimate Equation (3) in our

sub-samples. The results indicate that the relation between functional diversity and performance metric overlap is concentrated in the high knowledge intensity sub-sample. This is consistent with boards responding to TMT functional diversity with more collective PFP when harnessing TMT collaboration is especially beneficial—in the high knowledge intensity sub-sample. Further, the results in Panel B illustrate that performance improvements related to the alignment of functional diversity and collective PFP are also concentrated in high knowledge intensity firms, further underscoring a knowledge sharing mechanism.

VI. Robustness tests

Firm-Fixed Effects Specification and Two-Stage Control Function Approach

When testing the performance implications of the alignment between performance metric overlap and TMT function diversity, we use a broad range of control variables as well as industry- and time-fixed effects to mitigate the potential influence of confounding factors. Nonetheless, this method may fail to address all concerns arising from unobservable time-varying factors that could drive the relation. We further mitigate these concerns in two ways. First, we use a firm-fixed effects specification to re-estimate Equations (3) and (4), holding time-invariant firm characteristics constant. In this specification, we rely on within-firm variation in performance metric overlap and TMT functional diversity. Panel A of Table 9 presents the results of estimating these firm-fixed effects models. In both Columns (1) and (2), we find significantly positive coefficients on the variables of interest, providing further support for H1a and H1b.

Second, we adopt a two-stage control function approach (Wooldridge 2015).[15] Following Schäfer (2023) and Gong, Jiang, and Xie (2024), we use the style of the firm's compensation

[15] The approach works as follows. By using the residuals from a regression of our endogenous variable on an instrumental variable and the controls from the second-stage model, the method derives a variable that, when included in the second-stage model, renders the variation in the endogenous variable exogenous. This approach provides a more straightforward and parsimonious way to

consultant as our instrument to generate exogenous variation in performance metric overlap. The instrument's validity depends on two assumptions (Larcker and Rusticus 2010). First, the likelihood that a firm implements performance metric overlap across the TMT is affected by a compensation consultant's style. Second, the tendency of a firm's compensation consultant to promote performance metric overlap is uncorrelated with the error term in the model predicting firm performance. That is, the choice of a compensation consultant should not be correlated with firm performance other than through its association with the degree of performance metric overlap.

In the first stage, we regress the instrumented variable, *PM_Overlap*, on the instrumental variable, *%CC_high_PM_Overlap*, an interaction term between *%CC_high_PM_Overlap* and *TMT_Funct_Div*, and the same set of control variables that are included in the second-stage models. We operationalize *%CC_high_PM_Overlap* as the percentage of the compensation consultant clients that have above-average performance metric overlap in the fiscal year. In the second stage, we re-estimate Equation (4) including these residuals as an additional control variable.

Table 9 Panel B presents the results of our two-stage control function approach. Column (1) presents the first-stage results. The coefficient of *%CC_high_PM_Overlap* is positive and significant (0.356; *p-value* < 0.01). By showing that the style of the firm's compensation consultant is related to the level of performance metric overlap across the TMT, we justify the first assumption needed for the validity of our instrument. Column (2) presents the second-stage results. Even with the inclusion of the residuals from the first-stage model, we find a significantly positive coefficient on the interaction term *TMT_Funct_Div* * *PM_Overlap* (0.290; *p-value* < 0.05). These results further support that our results are not driven by unobserved time-varying firm characteristics.

address endogeneity concerns in models that include interaction terms than two-stage least squares regression (Ebbes, Papies, and van Heerde 2016; Wooldridge 2015).

Alternative Specifications of Performance Metric Overlap

Next, we test whether our results are robust to alternative specifications of performance metric overlap. We construct four alternative performance metric overlap variables. The first variable is an indicator variable that is equal to one if there is complete performance metric overlap in the TMT, and zero otherwise (*PM_Overlap_Complete)*. The second variable is a Gini index of the performance metric overlap of the executives in the TMT (*PM_Overlap_Gini*). We multiply the Gini index by -1 to ensure that higher values of *PM_Overlap_Gini* reflect a greater emphasis on collective PFP across executive bonus contracts. The third variable, *PM_Overlap_Weighted*, is similar to *PM_Overlap*, but accounts for the weight of each metric in the focal executive's bonus contract.[16] Finally, to provide further support for our assertion that all members of the TMT contribute to relevant PM overlap, and not just the CEO-executive relations, we create a fourth measure of performance metric overlap that measures overlap only across non-CEO TMT members (*PM_Overlap_No_CEO*).

Using these alternative measures of performance metric overlap, we re-estimate Equations (3) and (4). The results are shown in Panel A of Table 10. We continue to find evidence supporting H1a as all four alternative measures are positively associated with functional diversity in Columns (1) to (4). Next, we consider the performance implications in Columns (5) to (8). Again, we note consistent inferences and our evidence continues to support H1b. The only exception is the insignificant main effect of TMT functional diversity in Column (5). Since this specification uses complete performance metric overlap as a binary moderator, the coefficient reflects the association between TMT functional diversity and firm performance in contexts of non-complete performance

[16] To calculate *PM_Overlap_Weighted*, we modify Equation (1). Specifically, when calculating the overlap between $PM_{k,i,t}$ and $PM_{k,j,t}$, we multiply each metric in $PM_{k,i,t}$ by the metric's weight. We only retain observations where metric weights add up to 1.

metric overlap—and, thus, lower levels of collective PFP. Therefore, we conclude that our results are not driven by our specification of performance metric overlap across the TMT.

Alternative Specification of TMT Functional Diversity

We also test whether our results are robust to an alternative specification of TMT functional diversity. In our main analysis, we used a variable developed by Boone and Hendriks (2009) that measures interpersonal functional diversity net of intrapersonal functional diversity. While we posit that this unique property makes the measure particularly attractive for our study, the literature also commonly uses measures of interpersonal diversity that do not correct for intrapersonal diversity. Therefore, we re-estimate Equations (3) and (4) using the uncorrected Shannon-Wiener measure of functional diversity (see Appendix B, Equation (A2)). The results, reported in Panel B of Table 10, provide consistent inferences, although the interaction between performance metric overlap and TMT functional diversity becomes insignificant at conventional two-tailed levels of significance.

Alternative Specifications of Firm Performance

Next, we test whether our results are robust to different specifications of firm performance. In our main analysis, we measure firm performance using the firm's one year-ahead Tobin's Q. We re-estimate Equation (4) using the firm's return on assets (ROA_{t+1}) and Tobin's Q based on modified asset values from Iqbal et al. (2024) ($ModifiedQ_{t+1}$).[17] Further, to investigate longer-term performance implications, we use Tobin's Q averaged over the next three fiscal years ($TobinsQ_{t+1 \rightarrow t+3}$) following Abernethy, Kuang, and Qin (2019). We report the results in Table 10, Panel C. We continue to document positive and significant interaction coefficients, consistent with prior results, and further confirming H1b.

[17] We use modified Tobin's Q as a further test because it is adjusted for the firm's intangible (knowledge-based) capital. As we found that collective PFP is particularly present in knowledge intensive firm, it is important to validate whether our results hold when considering a measure that accounts for the potential inflation of Tobin's Qs in knowledge intensive firms.

VII. Conclusion

Our study provides comprehensive empirical evidence on the configuration of collective versus individual performance metrics across the TMT and its implications for firm performance. In the TMT members' incentive contract design, a trade-off is made between using collective PFP to incentivize collaborative synergy and selecting more individualized metrics that better reflect individual effort (Baker 2000; Banker and Datar 1989). Our study suggests that, as the potential for collaborative synergies among executives increases, so does the need for incentives that promote knowledge sharing and integration. We provide further insight that firms that align performance metric overlap with functional background diversity achieve higher firm performance. Our results are robust to alternative model specifications and variable measurement choices.

Our conceptual development is built on the premise of a knowledge sharing mechanism among TMT members, which we validate through additional analyses. We show that more overlap in functionally diverse TMTs is positively associated with the use of collaborative language by executives during the Q&A session of the firm's conference calls, innovation performance, and the variety of strategic actions. Second, considering that knowledge exchange and integration is likely especially needed in knowledge intensive firms, we turn to cross-sectional variation in the knowledge intensity of the firm's asset base. Our results show that firms with a knowledge-intensive asset base implement more performance metric overlap in TMTs with greater functional diversity, and that this enables especially these firms to achieve higher performance.

The results of our study should be interpreted with consideration of its limitations. In addition to common endogeneity concerns which we address from multiple angles, our focus on the TMT is limited to the five TMT members subject to mandatory disclosure regulation. We acknowledge that the TMT may include more than these five members and encourage future research to expand the scope of TMT analysis and explore the applicability of our findings in a

middle-management context. Nonetheless, we believe our study can be useful in furthering our understanding of executive compensation practices. Particularly given the documented increasing complexity in individual incentives plans (Albuquerque et al. 2024), our study suggests that collective PFP may be one way in which this complexity is mitigated. Moreover, given the heightened focus on CEO compensation plans vis-à-vis say-on-pay votes, our findings can assist practitioners—such as directors, proxy advisors, and institutional investors—in understanding the trade-offs associated with collective PFP.

References

Abadie, A., S. Athey, G. W. Imbens, and J. M. Wooldridge. 2023. When Should You Adjust Standard Errors for Clustering? *Quarterly Journal of Economics* 138 (1): 1–35.

Abernethy, M. A., H. C. Dekker, and A. K. D. Schulz. 2015. Are Employee Selection and Incentive Contracts Complements or Substitutes? *Journal of Accounting Research* 53 (4): 633–668.

Abernethy, M. A., Y. F. Kuang, and B. Qin. 2019. The Relation between Strategy, CEO Selection, and Firm Performance. *Contemporary Accounting Research* 36 (3): 1575–1606.

Albuquerque, A., M. E. Carter, Z. Guo, and L. J. Lynch. 2024. Complexity of CEO Compensation Packages. *Journal of Accounting and Economics*: forthcoming.

Alchian, A. A., and H. Demsetz. 1972. Production, Information Costs, and Economic Organization. *American Economic Review* 62 (5): 777–795.

Arora, A., S. Belenzon, L. Cioaca, L. Sheer, H. M. Shin, and D. Shvadron. 2024. DISCERN 2.0.1: Duke Innovation & SCientific Enterprises Research Network [Dataset]. *Zenodo (CERN European Organization for Nuclear Research)*.

Baker, G. 2000. The Use of Performance Measures in Incentive Contracting. *The American Economic Review* 90 (2): 415–420.

Banker, R. D., and S. M. Datar. 1989. Sensitivity, Precision, and Linear Aggregation of Signals for Performance Evaluation. *Journal of Accounting Research* 27 (1): 21–39.

Bantel, K. A., and S. E. Jackson. 1989. Top Management and Innovations in Banking: Does the Composition of the Top Team Make a Difference? *Strategic Management Journal* 10 (1 S): 107–124.

Boone, C., and W. Hendriks. 2009. Top Management Team Diversity and Firm Performance: Moderators of Functional-Background and Locus-of-Control Diversity. *Management Science* 55 (2): 165–180.

Bunderson, J. S., and K. M. Sutcliffe. 2002. Comparing Alternative Conceptualizations of Functional Diversity in Management Teams: Process and Performance Effects. *Academy of Management Journal* 45 (5): 875–893.

Bushman, R. M., Z. Dai, and W. Zhang. 2016. Management Team Incentive: Dispersion and Firm Performance. *The Accounting Review* 91 (1): 21–45.

Buyl, T., C. Boone, W. Hendriks, and P. Matthyssens. 2011. Top Management Team Functional Diversity and Firm Performance: The Moderating Role of CEO Characteristics. *Journal of Management Studies* 48 (1): 151–177.

Cabezon, F. 2024. Executive Compensation: The Trend toward One-Size-Fits-All. *Journal of Accounting and Economics*: forthcoming.

Cannella, A. A., J.-H. Park, and H.-U. Lee. 2008. Top Management Team Functional Background Diversity and Firm Performance: Examining the Roles of Team Member Colocation and Environmental Uncertainty. *Academy of Management Journal* 51 (4): 768–784.

Carter, M. E., L. J. Lynch, and M. A. Martin. 2022. Board Committee Overlap and the Use of Earnings in CEO Compensation Contracts. *Management Science* 68 (8): 6268–6297.

Certo, S. T., R. H. Lester, C. M. Dalton, and D. R. Dalton. 2006. Top Management Teams, Strategy and Financial Performance: A Meta-Analytic Examination. *Journal of Management Studies* 43 (4): 813–839.

Chen, C. X., M. G. Williamson, and F. H. Zhou. 2012. Reward System Design and Group Creativity: An Experimental Investigation. *The Accounting Review* 87 (6): 1885–1911.

Ebbes, P., D. Papies, and H. J. van Heerde. 2016. Dealing with Endogeneity: A Nontechnical Guide for Marketing Researchers. In *Handbook of Market Research*, edited by C. Homburg, M. Klarmann and A. Vomberg, 1–37. Cham, Switzerland: Springer Cham.

Edmans, A., X. Gabaix, and D. Jenter. 2017. Executive Compensation: A Survey of Theory and Evidence. In *The Handbook of the Economics of Corporate Governance*, edited by B. E. Hermalin and M. S. Weisbach, 383–539. Amsterdam, The Netherlands: Elsevier.

Edmans, A., I. Goldstein, and J. Zhu. 2013. *Contracting With Synergies*. (Working Paper). https://ssrn.com/abstract=2356977

Englmaier, F., S. Grimm, D. Grothe, D. Schindler, and S. Schudy. 2024. The Effect of Incentives in Nonroutine Analytical Team Tasks. *Journal of Political Economy* 132 (8): 2695–2747.

Feichter, C., F. Moers, and O. Timmermans. 2022. Relative Performance Evaluation and Competitive Aggressiveness. *Journal of Accounting Research* 60 (5): 1859–1913.

Feltham, G. A., and J. Xie. 1994. Performance Measure Congruity and Diversity in Multi-Task Principal/Agent Relations. *The Accounting Review* 69 (3): 429–453.

Ferrier, W. J., K. G. Smith, and C. M. Grimm. 1999. The Role of Competitive Action in Market Share Erosion and Industry Dethronement: A Study of Industry Leaders and Challengers. *Academy of Management Journal* 42 (4): 372–388.

Finkelstein, S., D. C. Hambrick, and B. Cannella. 2009. *Strategic Leadership*. Oxford, UK: Oxford University Press.

Fiordelisi, F., and O. Ricci. 2014. Corporate Culture and CEO Turnover. *Journal of Corporate Finance* 28: 66–82.

Friebel, G., M. Heinz, M. Krueger, and N. Zubanov. 2017. Team Incentives and Performance: Evidence from a Retail Chain. *American Economic Review* 107 (8): 2168–2203.

Glover, J., and E. Kim. 2021. Optimal Team Composition: Diversity to Foster Implicit Team Incentives. *Management Science* 67 (9): 5800–5820.

Gompers, P., J. Ishii, and A. Metrick. 2003. Corporate Governance and Equity Prices. *The Quarterly Journal of Economics* 118 (1): 107–156.

Gong, G., X. D. Jiang, and B. Xie. 2024. The Use of Cash Flows Metrics in CEO Compensation and the Design of Loan Contracts. *Contemporary Accounting Research* 41 (4): 2384–2416.

Guay, W. R., J. D. Kepler, and D. Tsui. 2019. The Role of Executive Cash Bonuses in Providing Individual and Team Incentives. *Journal of Financial Economics* 133 (2): 441–471.

Haesebrouck, K., M. Cools, and A. Van den Abbeele. 2018. Status Differences and Knowledge Transfer: The Effect of Incentives. *The Accounting Review* 93 (1): 213–234.

Hamilton, B. H., J. A. Nickerson, and H. Owan. 2003. Team Incentives and Worker Heterogeneity: An Empirical Analysis of the Impact of Teams on Productivity and Participation. *Journal of Political Economy* 111 (3): 465–497.

Holmström, B. 1979. Moral Hazard and Observability. *The Bell Journal of Economics* 10 (1): 74.

Holmström, B. 1982. Moral Hazard in Teams. *The Bell Journal of Economics* 13 (2): 324.

Holmström, B., and P. Milgrom. 1991. Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design. *Journal of Law, Economics, and Organization* 7: 24–52.

Hwang, Y., D. H. Erkens, and J. H. Evans. 2009. Knowledge Sharing and Incentive Design in Production Environments: Theory and Evidence. *The Accounting Review* 84 (4): 1145–1170.

Iqbal, A., S. Rajgopal, A. Srivastava, and R. Zhao. 2024. A Better Estimate of Internally Generated Intangible Capital. *Management Science* 71 (1): 731–752.

Itoh, H. 1991. Incentives to Help in Multi-Agent Situations. *Econometrica* 59 (3): 611–636.

Karau, S. J., and K. D. Williams. 1993. Social Loafing: A Meta-Analytic Review and Theoretical Integration. *Journal of Personality and Social Psychology* 65 (4): 681–706.

Kelly, K. 2010. The Effects of Incentives on Information Exchange and Decision Quality in Groups. *Behavioral Research in Accounting* 22 (1): 43–65.

Kim, T., H. Kyung, and J. Ng. 2022. Top Management Team Incentive Dispersion and Earnings Quality*. *Contemporary Accounting Research* 39 (3): 1949–1985.

Kogan, L., D. Papanikolaou, A. Seru, and N. Stoffman. 2017. Technological Innovation, Resource Allocation, and Growth*. *The Quarterly Journal of Economics* 132 (2): 665–712.

Larcker, D. F., and T. O. Rusticus. 2010. On the Use of Instrumental Variables in Accounting Research. *Journal of Accounting and Economics* 49 (3): 186–205.

LeStage, G., S. Nilsson DeHanas, and P. Gerend. 2024. Teamwork at the Top. *Harvard Business Review* 102 (5): 56–62.

Liu, B., and D. Zhang. 2024. Functional Background Diversity of Top Management Team and Managerial Forecasting Capability. *Journal of Management Accounting Research* 36 (3): 21–50.

Masschelein, S., and F. Moers. 2020. Testing for Complementarities Between Accounting Practices. *Accounting, Organizations and Society* 86: 101127.

Milgrom, P., and J. Roberts. 1995. Complementarities and Fit Strategy, Structure, and Organizational Change in Manufacturing. *Journal of Accounting and Economics* 19 (2–3): 179–208.

Nyberg, A. J., M. A. Maltarich, D. Abdulsalam, S. M. Essman, and O. Cragun. 2018. Collective Pay for Performance: A Cross-Disciplinary Review and Meta-Analysis. *Journal of Management* 44 (6): 2433–2472.

Plečnik, J. M., and S. Wang. 2021. Top Management Team Intrapersonal Functional Diversity and Tax Avoidance. *Journal of Management Accounting Research* 33 (1): 103–128.

Quigley, N. R., P. E. Tesluk, E. A. Locke, and K. M. Bartol. 2007. A Multilevel Investigation of the Motivational Mechanisms Underlying Knowledge Sharing and Performance. *Organization Science* 18 (1): 71–88.

Schäfer, P. 2023. Relative Performance Evaluation and Strategic Differentiation. *The Accounting Review* 98 (2): 419–453.

Siemsen, E., S. Balasubramanian, and A. V. Roth. 2007. Incentives That Induce Task-Related Effort, Helping, and Knowledge Sharing in Workgroups. *Management Science* 53 (10): 1533–1550.

Simons, T., L. H. Pelled, and K. A. Smith. 1999. Making Use of Difference: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams. *Academy of Management Journal* 42 (6): 662–673.

Van Alstyne, M. W. 2005. Create Colleagues, Not Competitors. *Harvard Business Review* 83 (9): 24–28.

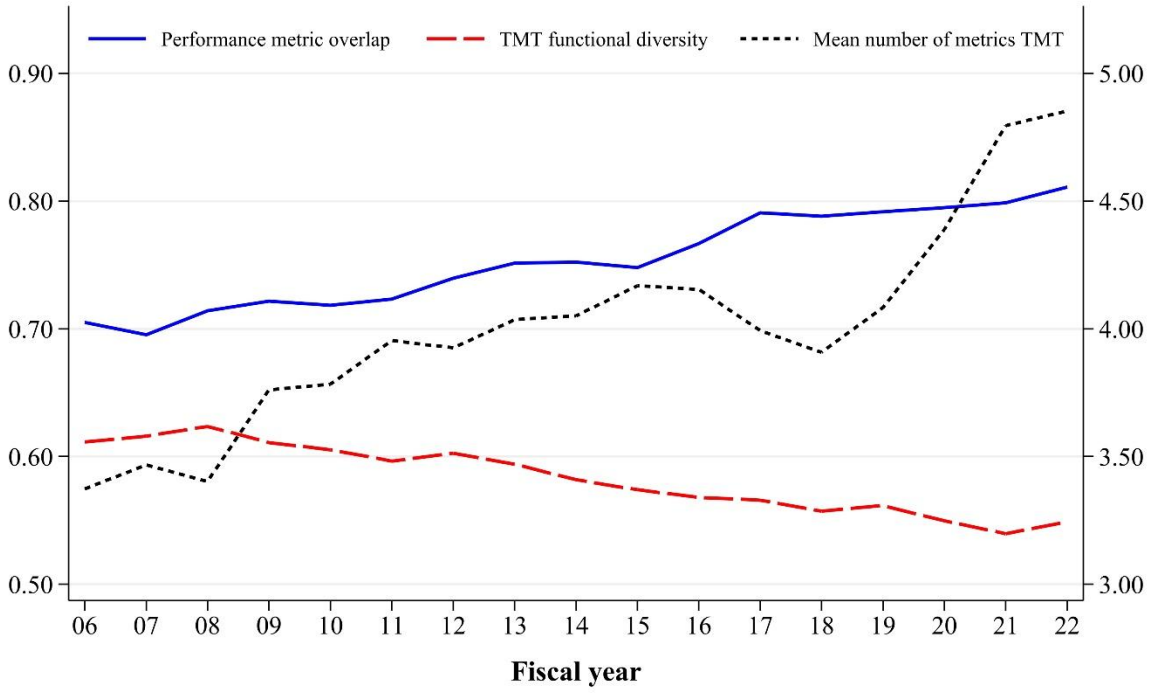
Vroom, V. H. 1964. *Work and motivation.* Oxford, UK: Wiley.

Wang, S. 2023. Top Management Team Functional Diversity and Management Forecast Accuracy. *Accounting Horizons* 37 (3): 243–278.

Wooldridge, J. M. 2015. Control Function Methods in Applied Econometrics. *Journal of Human Resources* 50 (2): 420–445.

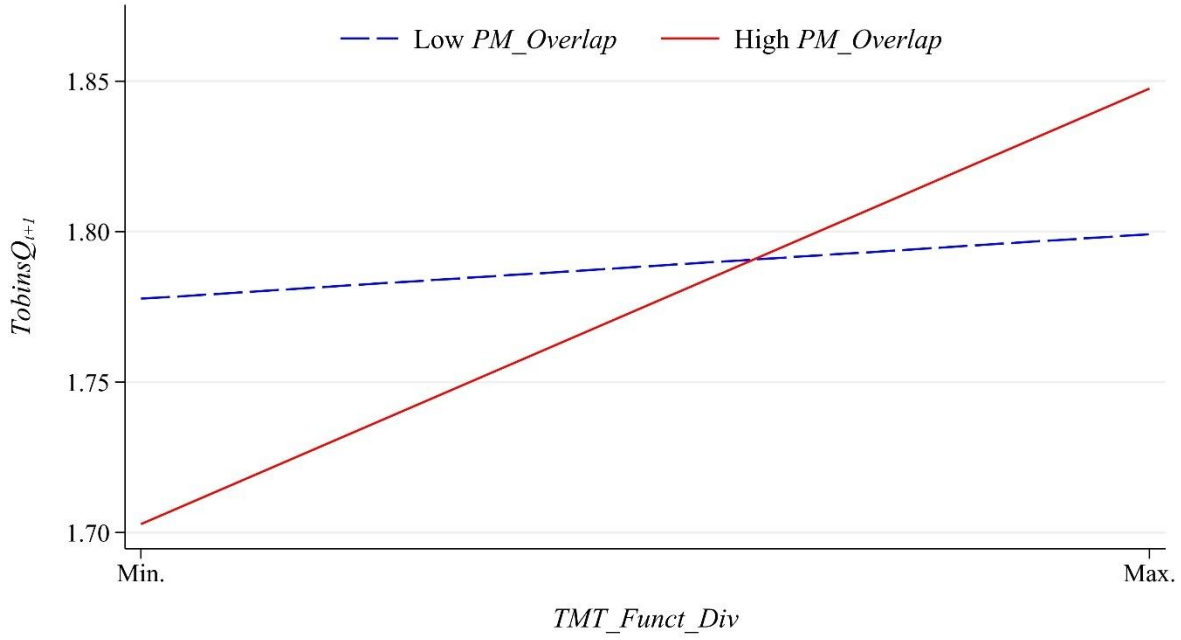
Zhang, D. 2019. Top Management Team Characteristics and Financial Reporting Quality. *The Accounting Review* 94 (5): 349–375.

Figure 1 – Performance metric overlap, TMT functional diversity and the mean number of unique metrics in the TMT's bonus contracts over time



Notes: This figure shows the development of performance metric overlap across the TMT, TMT functional diversity and the average number of unique metrics in the TMT's bonus contracts within our sample over time. Performance metric overlap and TMT functional diversity refer to the scale on the left-hand side, while the mean number of metrics TMT refers to the scale on the right-hand side. N = 14,496.

Figure 2 – The performance implications of TMT functional diversity across low and high performance metric overlap



Notes: This figure shows the performance implications of TMT functional diversity in firm-years when performance metric overlap is low (1σ below the mean) and high (1σ above the mean). N = 12,865.

Table 1 – Sample Selection

	Firm-years
Firm-year observations (2006-2022) from ISS Incentive Lab with details on performance metrics included in the bonus contracts of TMT members	18,967
Less: Firm-years with missing data or no match in BoardEx	(614)
Less: Firm-years with missing data or no match in ExecuComp	(2,604)
Less: Firm-years with missing data or no match in Compustat	(1,253)
Main sample	14,496
Less: Observations dropped due to lead in $TobinsQ_{t+1}$	(1,631)
Sample for tests related to H1b	12,865

Notes: This table reports information related to the sample selection process.

Table 2 – Performance metric overlap and TMT functional diversity across time and industry

Panel A: Performance measure overlap and TMT functional diversity by fiscal year

Fiscal Year	N	*PM_Overlap* Mean	*TMT_Funct_Div* Mean
2006	745	0.70	0.61
2007	855	0.69	0.62
2008	871	0.71	0.62
2009	837	0.72	0.61
2010	861	0.72	0.61
2011	844	0.72	0.60
2012	871	0.74	0.60
2013	884	0.75	0.59
2014	933	0.75	0.58
2015	920	0.75	0.57
2016	900	0.77	0.57
2017	884	0.79	0.57
2018	869	0.79	0.56
2019	836	0.79	0.56
2020	815	0.79	0.55
2021	797	0.80	0.54
2022	774	0.81	0.55
Total	14496	0.75	0.58

Panel B: Performance measure overlap and TMT functional diversity by industry

Industry (Fama-French 12)	N	*PM_Overlap* Mean	*TMT_Funct_Div* Mean
Consumer Non-Durables	868	0.69	0.59
Consumer Durables	367	0.73	0.55
Manufacturing	1766	0.73	0.59
Oil, Gas, and Coal Extraction and Products	735	0.84	0.62
Chemicals and Allied Products	526	0.72	0.59
Business Equipment	2590	0.75	0.63
Telephone and Television Transmission	342	0.76	0.57
Utilities	837	0.71	0.57
Wholesale, Retail, and Some Services	1521	0.78	0.58
Healthcare, Medical Equipment, and Drugs	1081	0.77	0.62
Finance	1956	0.75	0.49
Other	1907	0.77	0.58
Total	14496	0.75	0.58

Notes: This table presents the distributions of observations and the means of performance metric overlap (*PM_Overlap*) and TMT functional diversity (*TMT_Funct_Div*) across time (*Panel A*) and industries (*Panel B*).

Table 3 – Summary statistics

	Full sample						*TMT_Funct_Div*				
							Low		High		High vs. Low
	N	Mean	SD	Min	Med	Max	N	Mean	N	Mean	Diff
TMT_Funct_Div	14496	0.58	0.22	0.07	0.58	1.09					
PM_Overlap	14496	0.75	0.24	0.00	0.80	1.00	7248	0.74	7248	0.77	0.025***
$TobinsQ_{t+1}$	12865	1.78	1.48	0.15	1.34	9.64	6433	1.62	6432	1.95	0.334***
Ind_BU_head	14496	0.48	0.50	0.00	0.00	1.00	7248	0.51	7248	0.44	-0.068***
TMT_length	14496	2.73	2.05	1.00	2.00	11.00	7248	2.69	7248	2.77	0.083**
Dual_CEO	14496	0.42	0.49	0.00	0.00	1.00	7248	0.42	7248	0.42	0.006
CEO_tenure	14496	6.51	6.49	0.00	5.00	31.00	7248	6.64	7248	6.39	-0.253**
$TobinsQ_t$	14496	1.77	1.48	0.15	1.33	9.64	7248	1.60	7248	1.94	0.344***
Investments	14496	0.07	0.06	0.00	0.05	0.37	7248	0.06	7248	0.07	0.014***
Firm_age	14496	33.05	19.69	2.00	28.00	71.00	7248	33.38	7248	32.73	-0.647**
Firm_size	14496	2.53	1.29	0.01	2.44	5.71	7248	2.59	7248	2.46	-0.128***
Returns_vol	14496	0.10	0.05	0.04	0.09	0.30	7248	0.10	7248	0.10	0.002***
Leverage	14496	0.29	0.20	0.00	0.27	0.99	7248	0.30	7248	0.28	-0.011***
FCF	14496	0.09	0.07	-0.27	0.08	0.32	7248	0.08	7248	0.10	0.018***
Num_bus_segments	14496	3.44	2.09	0.00	3.00	9.00	7248	3.65	7248	3.23	-0.421***
Mean_num_metrics_TMT	14496	4.00	2.63	1.00	3.17	14.60	7248	4.07	7248	3.93	-0.137***
%Earnings_metrics_TMT	14496	0.10	0.20	0.00	0.00	1.00	7248	0.11	7248	0.08	-0.023***
Mean_equity_comp_TMT	14496	1.96	0.43	0.00	2.07	2.31	7248	1.96	7248	1.95	-0.006
PPS_dispersion_TMT	14496	0.10	0.35	0.00	0.02	3.07	7248	0.11	7248	0.09	-0.014**

Notes: This table presents summary statistics for the main variables in our sample. We first do so for the full sample. Then, we split our sample by the median of TMT functional diversity (*TMT_Funct_Div*). *, **, and *** denote statistical significance at two-tailed probability levels of 10%, 5%, and 1%, respectively. Appendix C defines all variables.

Table 4 – Correlation statistics

Panel A: 1-10

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) *TMT_funct_div*	1.00									
(2) *PM_Overlap*	0.07***	1.00								
(3) *TobinsQ$_{t+1}$*	0.13***	0.04***	1.00							
(4) *Ind_BU_head*	-0.08***	-0.05***	0.01	1.00						
(5) *TMT_length*	0.04***	0.05***	0.05***	-0.08***	1.00					
(6) *Dual_CEO*	0.03***	-0.03***	-0.07***	-0.04***	0.05***	1.00				
(7) *CEO_tenure*	-0.01	-0.03***	0.09***	0.00	0.24***	0.26***	1.00			
(8) *TobinsQ$_{t}$*	0.14***	0.03***	0.90***	0.01	0.05***	-0.06***	0.09***	1.00		
(9) *Investments*	0.14***	0.06***	0.28***	-0.04***	-0.05***	-0.04***	0.01	0.29***	1.00	
(10) *Firm_age*	-0.02**	-0.01*	-0.17***	0.10***	-0.04***	0.19***	-0.09***	-0.17***	-0.08***	1.00
(11) *Firm_size*	-0.03***	-0.01	-0.10***	0.11***	-0.09***	0.16***	-0.06***	-0.09***	-0.15***	0.31***
(12) *Returns_vol*	0.00	0.06***	-0.09***	-0.04***	-0.06***	-0.13***	-0.04***	-0.09***	0.18***	-0.21***
(13) *Leverage*	-0.02***	0.04***	-0.01	0.05***	-0.05***	-0.03***	-0.08***	-0.02*	-0.12***	0.06***
(14) *FCF*	0.14***	0.04***	0.39***	-0.01	0.04***	-0.01	0.05***	0.43***	0.28***	-0.14***
(15) *Num_bus_segments*	-0.10***	-0.10***	-0.22***	0.08***	-0.02***	0.10***	-0.03***	-0.22***	-0.23***	0.29***
(16) *Mean_num_metrics_TMT*	-0.03***	0.01	-0.05***	0.08***	-0.04***	0.06***	-0.02**	-0.06***	0.05***	0.13***
(17) *%Earnings_metrics_TMT*	-0.08***	0.11***	0.10***	0.26***	0.00	-0.10***	0.01	0.09***	-0.10***	0.07***
(18) *Mean_equity_comp_TMT*	0.01	0.06***	0.04***	0.09***	-0.04***	0.03***	-0.03***	0.05***	-0.02*	0.12***
(19) *PPS_dispersion_TMT*	-0.02***	-0.03***	0.12***	-0.04***	0.09***	-0.01	0.18***	0.13***	0.03***	-0.10***

Panel B: 11-20

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
(11) *Firm_size*	1.00									
(12) *Returns_vol*	-0.20***	1.00								
(13) *Leverage*	0.06***	0.05***	1.00							
(14) *FCF*	0.05***	-0.05***	-0.19***	1.00						
(15) *Num_bus_segments*	0.24***	-0.14***	0.07***	-0.15***	1.00					
(16) *Mean_num_metrics_TMT*	-0.03***	-0.04***	0.07***	-0.08***	0.06***	1.00				
(17) *%Earnings_metrics_TMT*	0.12***	-0.02**	0.13***	-0.02*	0.03***	-0.14***	1.00			
(18) *Mean_equity_comp_TMT*	0.18***	-0.14***	0.05***	0.02**	0.06***	0.10***	0.10***	1.00		
(19) *PPS_dispersion_TMT*	0.03***	-0.01	-0.07***	0.08***	-0.01	-0.08***	0.01	-0.10***	1.00	

Notes: This table shows correlations between the variables in our main analysis. *, **, and *** denote statistical significance at two-tailed probability levels of 10%, 5%, and 1%, respectively. Appendix C defines all variables. N = 14,496 (N = 12,865 for correlations with *TobinsQ$_{t+1}$*).

Table 5 – TMT functional diversity and performance metric overlap across the TMT

	PM_Overlap			
	(1)	(2)	(3)	(4)
TMT_Funct_Div	0.100***	0.093***	0.085***	0.084***
	(0.000)	(0.000)	(0.000)	(0.000)
Ind_BU_head		-0.046***	-0.045***	-0.044***
		(0.000)	(0.000)	(0.000)
TMT_length		0.006***	0.007***	0.007***
		(0.000)	(0.000)	(0.000)
Dual_CEO		0.001	0.008	0.007
		(0.951)	(0.384)	(0.413)
CEO_tenure		-0.002**	-0.002***	-0.002**
		(0.012)	(0.007)	(0.016)
$TobinsQ_t$			-0.003	-0.003
			(0.273)	(0.304)
Investments			0.219***	0.222***
			(0.007)	(0.006)
Firm_age			0.000	0.000
			(0.793)	(0.799)
Firm_size			0.003	0.002
			(0.547)	(0.639)
Returns_vol			0.257***	0.289***
			(0.010)	(0.004)
Leverage			0.024	0.020
			(0.314)	(0.410)
FCF			0.097**	0.098**
			(0.045)	(0.043)
Num_bus_segments			-0.009***	-0.010***
			(0.000)	(0.000)
Mean_num_metrics_TMT				-0.000
				(0.829)
%Earnings_metrics_TMT				0.084***
				(0.000)
Mean_equity_comp_TMT				0.019**
				(0.023)
PPS_dispersion_TMT				-0.021*
				(0.054)
Industry-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
Observations	14,496	14,496	14,496	14,496
Adjusted R^2	0.077	0.088	0.098	0.102

Notes: This table presents the results of estimating Equation (3) that tests the association between TMT functional diversity (*TMT_Funct_Div*) and performance metric overlap across the TMT (*PM_Overlap*). The industry classification follows two-digit SIC codes. *P-value*s are in parentheses and are adjusted for within-cluster correlation at the level of treatment (i.e., firm). *, **, and *** denote statistical significance at two-tailed probability levels of 10%, 5%, and 1%, respectively. Appendix C defines all variables.

Table 6 – The moderating effect of performance metric overlap on the relation between TMT functional diversity and firm performance

	$TobinsQ_{t+1}$			
	(1)	(2)	(3)	(4)
TMT_Funct_Div	0.716***	0.694***	0.079***	0.081***
	(0.000)	(0.000)	(0.002)	(0.002)
PM_Overlap	0.092	0.067	-0.028	-0.026
	(0.341)	(0.486)	(0.244)	(0.270)
*TMT_Funct_Div * PM_Overlap*	0.931**	0.850**	0.247**	0.248**
	(0.018)	(0.027)	(0.032)	(0.031)
Ind_BU_head		-0.111**	-0.011	-0.011
		(0.035)	(0.412)	(0.399)
TMT_length		0.040***	0.006**	0.006**
		(0.000)	(0.033)	(0.037)
Dual_CEO		-0.176***	-0.010	-0.009
		(0.001)	(0.462)	(0.479)
CEO_tenure		0.018***	0.001	0.001
		(0.000)	(0.455)	(0.562)
$TobinsQ_t$			0.867***	0.867***
			(0.000)	(0.000)
Investments			0.701***	0.696***
			(0.000)	(0.000)
Firm_age			-0.000	-0.000
			(0.619)	(0.683)
Firm_size			-0.023***	-0.023***
			(0.000)	(0.001)
Returns_vol			-1.097***	-1.104***
			(0.000)	(0.000)
Leverage			0.208***	0.209***
			(0.000)	(0.000)
FCF			0.040	0.042
			(0.801)	(0.791)
Num_bus_segments			-0.008**	-0.008**
			(0.015)	(0.015)
Mean_num_metrics_TMT				0.002
				(0.241)
%Earnings_metrics_TMT				0.032
				(0.498)
Mean_equity_comp_TMT				-0.013
				(0.355)
PPS_dispersion_TMT				0.017
				(0.358)
Industry-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
Observations	12,865	12,865	12,865	12,865
Adjusted R^2	0.233	0.245	0.835	0.835

Notes: This table reports the results of estimating Equation (4) modelling the influence of performance metric overlap across the TMT (*PM_Overlap*) on the association between TMT functional diversity (*TMT_Funct_Div*) and firm performance ($TobinsQ_{t+1}$). $TobinsQ_{t+1}$ measures the firm's Tobin's Q in the next year. The industry classification follows two-digit SIC codes. *P-value*s are in parentheses and are adjusted for within-cluster correlation at the level of treatment (i.e., firm). *, **, and *** denote statistical significance at two-tailed probability levels of 10%, 5%, and 1%, respectively. Appendix C defines all variables.

Table 7 – Knowledge exchange and integration

	TMT_Collab	*Innovation*	*Strat_variety*
	(1)	(2)	(3)
TMT_Funct_Div	-0.027	0.398	-0.003
	(0.157)	(0.148)	(0.944)
PM_Overlap	0.042***	0.635***	0.054
	(0.005)	(0.006)	(0.119)
*TMT_Funct_Div * PM_Overlap*	0.084†	1.496*	0.235*
	(0.192)	(0.089)	(0.060)
Controls	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes
Observations	12,200	7,558	14,336
Adjusted R^2	0.711	0.486	0.187

Notes: This table presents the results of estimating the association between performance metric overlap, TMT functional diversity, and different proxies of knowledge exchange and integration at the firm level. In Column (1), we consider TMT collaborative behavior (*TMT_Collab*), which is measured using the extent to which TMT members use collaborative language in the Q&A session of firms' conference calls. We additionally control for the total number of words spoken in the Q&A session as well as the frequency of the words in the other dimensions from Fiordelisi and Ricci (2014) (i.e., compete, control, and create). In Column (2), we consider innovation performance (*Innovation*), which we operationalize using the value of patents issued in the fiscal year using data from Kogan et al. (2017). In Column (3), we consider the variety of the firm's strategic and competitive actions (*Strat_variety*) based on Feichter et al. (2022). The industry classification follows two-digit SIC codes. *P-value*s are in parentheses and are adjusted for within-cluster correlation at the level of treatment (i.e., firm). *, **, and *** denote statistical significance at two-tailed probability levels of 10%, 5%, and 1%, respectively. † denotes statistical significance at the one-tailed probability level of 10%. Appendix C defines all variables.

Table 8 – Cross-sectional analysis

Panel A: Performance metric overlap

	PM_Overlap	
%Intangible_assets	Low	High
	(1)	(2)
TMT_Funct_Div	0.044*	0.120***
	(0.073)	(0.000)
TMT_Funct_Div: (2) > (1)	5.20**	
Controls	Yes	Yes
Industry-fixed effects	Yes	Yes
Year-fixed effects	Yes	Yes
Observations	5,514	5,512
Adjusted R^2	0.117	0.158

Panel B: Long-term firm performance

	$TobinsQ_{t+1}$	
%Intangible_assets	Low	High
	(1)	(2)
TMT_Funct_Div	0.057*	0.119**
	(0.095)	(0.018)
PM_Overlap	-0.028	-0.015
	(0.373)	(0.756)
*TMT_Funct_Div * PM_Overlap*	0.062	0.510**
	(0.676)	(0.029)
*TMT_Funct_Div * PM_Overlap*: (2) > (1)	3.76**	
Controls	Yes	Yes
Industry-fixed effects	Yes	Yes
Year-fixed effects	Yes	Yes
Observations	5,029	5,027
Adjusted R^2	0.796	0.825

Notes: This table presents the results of re-estimating Equations (3) and (4) across sub-samples of knowledge intensity. *Panel A* (*Panel B*) re-estimates Equation (3) (Equation (4)) across a median split on the level of knowledge intensity *(%Intangible_assets*). In both panels, we test the difference of the coefficient of interest in Column (1) and Column (2) using a Chow test and report the F-statistic. We obtain *%Intangible_assets* using data from Iqbal et al. (2024). The number of observations in the tests in this table is lower as Iqbal et al. (2024) exclude certain industries when calculating modified asset values. The industry classification follows two-digit SIC codes. *P-value*s are in parentheses and are adjusted for within-cluster correlation at the level of treatment (i.e., firm). *, **, and *** denote statistical significance at two-tailed probability levels of 10%, 5%, and 1%, respectively. Appendix C defines all variables.

Table 9 – Firm-fixed effects and two-stage control function approach

Panel A: Firm-fixed effects

	PM_Overlap	*TobinsQ$_{t+1}$*
	(1)	(2)
TMT_Funct_Div	0.026*	0.185**
	(0.087)	(0.019)
PM_Overlap		0.016
		(0.784)
*TMT_Funct_Div * PM_Overlap*		0.691**
		(0.015)
Controls	Yes	Yes
Firm-fixed effects	Yes	Yes
Year-fixed effects	Yes	Yes
Observations	14,496	12,865
Adjusted R^2	0.476	0.743

Panel B: Two-stage control function approach

	PM_Overlap	*TobinsQ$_{t+1}$*
	First stage	Second stage
	(1)	(2)
TMT_Funct_Div	0.093***	0.088***
	(0.000)	(0.008)
%CC_high_PM_Overlap	0.356***	
	(0.000)	
*TMT_Funct_Div * %CC_high_PM_Overlap*	-0.211	
	(0.118)	
First stage residual		0.013
		(0.950)
PM_Overlap		-0.034
		(0.870)
*TMT_Funct_Div * PM_Overlap*		0.290**
		(0.013)
Controls	Yes	Yes
Industry-fixed effects	Yes	Yes
Year-fixed effects	Yes	Yes
Observations	11,212	11,212
Adjusted R^2	0.117	0.844

Notes: This table reports robustness tests. *Panel A* shows the results of using firm-fixed effects rather than industry-fixed effects. *Panel B* reports the results of a robustness test using a two-stage control function approach. We use the percentage of clients of the firm's compensation consultant in the fiscal year that have above average performance metric overlap across the TMT (*%CC_high_PM_Overlap*) as our instrument. The industry classification follows two-digit SIC codes. *P-value*s are in parentheses and are adjusted for within-cluster correlation at the level of treatment (i.e., firm). *, **, and *** denote statistical significance at two-tailed probability levels of 10%, 5%, and 1%, respectively. Appendix C defines all variables.

Table 10 - Alternative specifications of key variables

Panel A: Alternative specifications of *PM_Overlap*

	PM_Overlap				*TobinsQ$_{t+1}$*			
PM_Overlap_Alt	*Complete*	*Gini*	*Weighted*	*No_CEO*	*Complete*	*Gini*	*Weighted*	*No_CEO*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TMT_Funct_Div	0.093***	0.024***	0.081***	0.095***	0.019	0.079***	0.099***	0.084***
	(0.003)	(0.000)	(0.000)	(0.000)	(0.536)	(0.002)	(0.001)	(0.001)
PM_Overlap_Alt					-0.015	0.000	-0.028	-0.027
					(0.280)	(0.994)	(0.311)	(0.225)
*TMT_Funct_Div * PM_Overlap_Alt*					0.191***	0.672***	0.255**	0.220**
					(0.002)	(0.004)	(0.041)	(0.043)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,496	14,496	10,529	14,372	12,865	12,865	9,321	12,761
Adjusted R^2	0.137	0.099	0.084	0.103	0.835	0.835	0.835	0.836

Panel B: Alternative specification of TMT functional diversity

	PM_Overlap	*TobinsQ$_{t+1}$*
	(1)	(2)
TMT_Functional_Diversity_Shannon	0.048***	0.071***
	(0.004)	(0.006)
PM_Overlap		-0.026
		(0.271)
*PM_Overlap * TMT_Functional_Diversity_Shannon*		0.142†
		(0.131)
Controls	Yes	Yes
Industry-fixed effects	Yes	Yes
Year-fixed effects	Yes	Yes
Observations	14,496	12,865
Adjusted R^2	0.099	0.835

(Continued on next page)

(Table 10 continued)

Panel C: Alternative specifications of firm performance

	ROA_{t+1}	$ModifiedQ_{t+1}$	$TobinsQ_{t+1 \rightarrow t+3}$
	(1)	(2)	(3)
TMT_Funct_Div	0.005**	0.120***	0.138***
	(0.021)	(0.001)	(0.002)
PM_Overlap	0.002	0.014	-0.040
	(0.213)	(0.688)	(0.285)
*TMT_Funct_Div * PM_Overlap*	0.015*	0.367**	0.373**
	(0.081)	(0.013)	(0.037)
Controls	Yes	Yes	Yes
Industry-fixed effects	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes
Observations	12,865	9,896	11,164
Adjusted R^2	0.711	0.892	0.787

Notes: This table reports robustness tests. *Panel A* shows the results of using four different specifications of *PM_Overlap*: *PM_Overlap_Complete* is an indicator variable that equals 1 if all executives in the TMT have exactly the same performance metrics, and 0 otherwise. *PM_Overlap_Gini* is a (reverse-coded) Gini index of the performance metric overlap of each individual executive in the TMT, where high values indicate greater degrees of performance metric overlap. *PM_Overlap_Weighted* is a variable measuring the degree of performance metric overlap across the TMT taking into account the contractual weight of each metric. *PM_Overlap_No_CEO* is a variable that measures the performance metric overlap across all named non-CEO executives in the TMT. *Panel B* shows the results of using an alternative measure of TMT functional diversity. *TMT_Funct_Div_Shannon* is a Shannon-Wiener measure of the diversity of the TMT's functional backgrounds. *Panel C* shows the results of using alternative specifications for firm performance. In Column (1), we use return on assets in the next year (ROA_{t+1}. In Column (2), we use modified Tobin's Q measured in the next year ($ModifiedQ_{t+1}$) based on data from Iqbal et al. (2024). In Column (3), we use the firm's Tobin's Q over the subsequent three-year period ($TobinsQ_{t+1 \rightarrow t+3}$). The industry classification follows two-digit SIC codes. *P-value*s are in parentheses and are adjusted for within-cluster correlation at the level of treatment (i.e., firm). *, **, and *** denote statistical significance at two-tailed probability levels of 10%, 5%, and 1%, respectively. † denotes statistical significance at the one-tailed probability level of 10%. Appendix C defines all variables.

Appendix A

Calculation of Performance Metric Overlap Across The TMT

Example Calculation of Performance Metric Overlap

We demonstrate how we calculate performance metric overlap across the TMT using the case of Avery Dennison Corporation in fiscal year 2022. We first calculate the performance metric overlap for each individual executive (see Equation (1)). The CEO had 9 performance metrics in his compensation contract, as shown in Panel A of Table 2. The performance metrics in the CEO's bonus contract overlap with a total of 18 metrics in the bonus contracts of the other executives in the TMT. That is, four other executives also have 'Adjusted sales growth', 'FCF', and 'Total company adjusted EPS' in their bonus contract, which makes for 12 matches. He shares an additional 6 metrics with the COO. This brings the total number of metric overlaps to 18. We divide this number by the total number of potential metric overlaps defined as the product of the number of metrics of that executive (i.e., 9) and the total number of other executives in the TMT (i.e., 4), and obtain a performance metric overlap of $\left(\frac{18}{9*(5-1)} =\right)$ 0.50 for the CEO in 2022.

The intuition behind this performance metric overlap variable is as follows. If the board had decided to use the performance metrics in the bonus contract of the CEO in the bonus contracts of all executives in the TMT, the performance metrics in the bonus contract of the CEO would have overlapped with a total of 36 performance metrics in the bonus contracts of other executives (i.e., 9 overlapping metrics in each of the bonus contracts of the other 4 executives in the TMT). However, the board decided not to implement some of the performance metrics in the bonus contracts of the CEO and COO in the bonus contracts of the other three executives. As a result, the performance metric overlap is only 0.50 (i.e., 18 overlapping performance metrics) of what could

have been theoretically possible if all executives had the exact same set of performance metrics as the CEO (i.e., 36 overlapping performance metrics).

We next calculate the performance metric overlap for the other executives. As the COO has the exact same set of performance metrics in his bonus contract as the CEO, performance metric overlap for him is also 0.50. The remaining three executives each have three performance metrics that appear in the bonus contracts of all executives in the TMT as well as one performance metric that reflects their individual performance and hence does not overlap. These three executives thus have a performance metric overlap of $\left(\frac{12}{4*(5-1)} =\right)$ 0.75.

To calculate the performance metric overlap for the overall firm, we take the average performance metric overlap across the TMT. For Avery Dennison Corporation, performance metric overlap in fiscal year 2022 was thus equal to 0.65 $\left(=\frac{0.50+0.75+0.50+0.75+0.75}{5}\right)$. In general, *PM_Overlap* can take values from 0 in the case of a complete absence of overlapping performance metrics in the TMT to 1 when all executives in the TMT have the exact same set of performance metrics. This latter instance, which we label complete performance metric overlap, is the case for Apple Inc. in fiscal year 2022, as shown in Panel B of Table 2.

Determining Whether Two Performance Metrics Overlap

To determine whether two performance metrics overlap, we consider the exact text of the performance metrics in ISS Incentive Lab. We specifically consider the content of three data items. The item 'metricType' describes the metric in a highly aggregate manner (e.g., "Accounting", "Stock" and "Other"), 'metric' describes the metric in a more detailed but still standardized manner (e.g., "Earnings", "Sales", or "Other"), and 'metricOther' provides additional information on the metric when 'metric' takes the values "Vague" or "Other". Moreover, when 'metric' takes another

value (e.g., “EBIT”), ‘metricOther’ in many cases provides additional information on the metric (e.g., “adjusted”), which is taken directly from the disclosed compensation plans. We concatenate the text in ‘metricType’, ‘metric’ and ‘metricOther’ to create a variable ‘metricDef’ and use this variable to compare the performance metrics. In principle, we view performance metrics to be overlapping if the text in ‘metricDef’ is exactly the same. For example, if executive A has a metric ‘TSR’ and executive B has a metric ‘TSR’, there is an exact match and thus overlap in the sense of our measure. If executive A has a metric ‘net sales’ and executive B has a metric ‘operating income', there is no exact match and thus no overlap in the sense of our measure.

There are cases in which there is an exact text match between two metrics, but we do not recognize the metrics as overlapping in our measure. First, firms regularly disclose performance metrics of executives as unspecified ‘individual goals’. If there are two or more executives in a TMT with such unspecified ‘individual goals’, based purely on the text reported, the metrics would be classified as exact matches and thus as overlapping. However, as these metrics refer to individual performance goals, which we posit differ across individuals, we do not recognize them as overlapping. Second, firms can evaluate two executives based on divisional performance (e.g., divisional return on assets). In some cases, this metric is reported as ‘divisional return on assets’. In other cases, it is reported as ‘return on assets’ and a variable named ‘metricIsBusGeo’ indicates that the metric relates to a business unit or geographic area. In both of these cases, there is an exact match between the two metrics based purely on the text reported. However, when these metrics relate to different divisions, we do not recognize them as overlapping. Of course, it can be the case that all executives are rewarded based on the performance of a specific division. We account for this by considering the value of the target that is attached to the performance metric. If two executives have a performance metric (e.g., divisional return on assets) that relates to a business

unit and has the same target attached to it (e.g., 4.5 percent), then we regard these metrics as referring to the same business unit and thus classify these metrics as overlapping.

Table A.1 – Example of performance metrics included in individual bonus contracts

Panel A: Avery Dennison Corporation FY2022					
Name	Mitchell R. Butier	Gregory S. Lovins	Deon M. Stander	Deena Baker-Nel	Ignacio J. Walker
Role	Chairman & CEO	SVP & CFO	President & COO	SVP & CHRO	SVP & CLO
Metric 1	Adjusted sales growth	Adjusted sales growth	Adjusted sales growth	Adjusted sales growth	Adjusted sales growth
Metric 2	FCF	FCF	FCF	FCF	FCF
Metric 3	Total company adjusted EPS	Total company adjusted EPS	Total company adjusted EPS	Total company adjusted EPS	Total company adjusted EPS
Metric 4	Drive outsized growth in high-value categories	Individual modifiers	Drive outsized growth in high-value categories	Individual modifiers	Individual modifiers
Metric 5	Focus relentlessly on productivity		Focus relentlessly on productivity		
Metric 6	Allocate capital effectively		Allocate capital effectively		
Metric 7	Grow profitably in our base businesses		Grow profitably in our base businesses		
Metric 8	Refine/execute leadership succession plan		Refine/execute leadership succession plan		
Metric 9	Lead in an environmentally and socially responsible manner		Lead in an environmentally and socially responsible manner		
Panel B: Apple Inc. FY2022					
Name	Timothy D. Cook	Luca Maestri	Jeffrey E. Williams	Katherine Adams	Deirdre O'Brien
Role	CEO	SVP, CFO	COO	SVP, GC, Secretary	SVP, retail + people
Metric 1	Operating income	Operating income	Operating income	Operating income	Operating income
Metric 2	Environment	Environment	Environment	Environment	Environment
Metric 3	Privacy	Privacy	Privacy	Privacy	Privacy
Metric 4	Inclusion & diversity	Inclusion & diversity	Inclusion & diversity	Inclusion & diversity	Inclusion & diversity
Metric 5	Net sales	Net sales	Net sales	Net sales	Net sales
Metric 6	Accessibility	Accessibility	Accessibility	Accessibility	Accessibility
Metric 7	Education	Education	Education	Education	Education
Metric 8	Key community initiatives	Key community initiatives	Key community initiatives	Key community initiatives	Key community initiatives
Metric 9	Supplier responsibility	Supplier responsibility	Supplier responsibility	Supplier responsibility	Supplier responsibility

Notes: This table presents examples of the performance metrics included in the bonus contract of the executives of Avery Dennison Corporation and Apple Inc. in fiscal year 2022.

Appendix B

Calculation of TMT Functional Diversity

We use BoardEx data on the employment history of executives to build an executive-year panel with the accumulated work experience of each executive in each of the following categories: 1) accounting and finance, 2) general and strategic management, 3) legal, 4) marketing and sales, 5) production and operations, 6) R&D, 7) personnel and labor relations, and 8) other (Cannella, Park, and Lee 2008; Plečnik and Wang 2021). We then build a frequency table where the y-axis indicates TMT members (from 1 to J) and the x-axis indicates functional category (from 1 to 8) and derive the measure for TMT functional diversity, *TMT_Funct_Div*, as follows:

$$TMT_Funct_Div = H_x + H_y - H_{xy} \quad \text{(A1)}$$

$$H_x = \sum_{i=1}^{8}\left(p_i * \ln\frac{1}{p_i}\right), \text{ with } p_i = \frac{n_i}{n} \quad \text{(A2)}$$

$$H_y = \sum_{j=1}^{J}\left(p_j * \ln\frac{1}{p_j}\right), \text{ with } p_j = \frac{n_j}{n} \quad \text{(A3)}$$

$$H_{xy} = \sum_{i=1}^{8}\sum_{j=1}^{J}\left(p_{ij} * \ln\frac{1}{p_{ij}}\right), \text{ with } p_{ij} = \frac{n_{ij}}{n} \quad \text{(A4)}$$

In Equations (A1) to (A4), H_x (i.e., the Shannon–Wiener index) measures the proportional distribution of the number of team members over the functional categories, H_y measures the proportional distribution of the number of functional categories over the team members, and H_{xy} measures the total entropy of the frequency table. Further, n refers to the combined total years of experience of all TMT members in all categories, n_i refers to the combined total years of experience of all TMT members in category i, n_j refers to the combined total years of experience accumulated by TMT member j in all categories, and n_{ij} refers to the years of experience of TMT member j in category i. J refers to the number of executives in the firm-year.

Appendix C

Variable Definitions

Table C.1 - Variable definitions

PM_Overlap	The proportion of performance metrics used in the TMT's bonus contracts that overlap between executives. See Appendix A for details. (Data: ISS Incentive Lab)
TMT_Funct_Div	The diversity in the accumulated work experience of the firm's executives. High values imply high functional diversity. See Appendix B for details. (Data: BoardEx)
TobinsQ	Tobin's Q is measured as the sum of market value of equity and debt scaled by the book value of total assets ((PRCC_F*CSHO + DLTT + DLC) /AT) (Data: Compustat)
Ind_BU_head	An indicator for the presence of at least one business-unit head in the TMT (Data: ISS Incentive Lab)
TMT_length	The number of years the TMT has remained together with no more than one departure (Data: Execucomp)
Dual_CEO	An indicator variable equal to one if the CEO also serves as the chairman of the board during the focal year, and zero otherwise. The variable 'rolecode' in the 'ParticipantFY' table for one executive in the fiscal year includes "CB" and "CEO" (Data: ISS Incentive Lab)
CEO_tenure	The difference between the Execucomp data item BECAMECEO and the focal year, or if BECAMECEO is missing, the difference between the CEO's first appearance as the firm's CEO in the database and the focal year (Data: Execucomp)
Investments	The ratio of research and development expenses plus capital expenditures to total assets (XRD +CAPX)/(AT) (Data: Compustat)
Firm_age	The number of years since the firm's first appearance in the Compustat database (Data: Compustat)
Firm_size	The natural logarithm of the firm's number of employees (EMP) (Data: Compustat)
Returns_vol	The standard deviation of the firm's previous 60 monthly stock returns (TRT1M) (Data: Compustat)
Leverage	The book value of total debt scaled by total assets ((DLC + DLTT) / AT) (Data: Compustat)
FCF	Operating cash flow minus common and preferred dividends, divided by average total assets ((OANCF- DVT) / ((AT + l.AT)/2)) (Data: Compustat)
Num_bus_segments	The number of business segments operated in the current fiscal year (Data: Compustat)
Mean_num_metrics_TMT	The average number of unique performance metrics used in the bonus contract per TMT member (Data: ISS Incentive Lab)
%Earnings_metrics_TMT	The percentage of unique performance metrics in the executive bonus contracts that are earnings-based, where the definition of earnings-based metrics is taken from Carter, Lynch, and Martin (2022) (Data: ISS Incentive Lab)
Mean_equity_comp_TMT	Mean equity-based compensation in the TMT - calculated as ln(1 + OPTION_AWARDS_FV + STOCK_AWARDS_FV) (Data: Execucomp)
PPS_dispersion_TMT	The standard deviation of pay-for-performance sensitivity (PPS) in the TMT - PPS is calculated following Bushman et al. (2016) (Data: Execucomp)

TMT_Collab	The natural logarithm of the frequency with which executives use collaborative words (e.g., team, cooperate) during the Q&A session of the firm's conference calls, where words are classified following Fiordelisi and Ricci (2014) (Data: Thomson Reuters StreetEvents)
Innovation	The market value of the firm's patents filed in the fiscal year (Data: Kogan et al. 2017)
Strat_variety	The Herfindahl index of the distribution of actions across eight strategic and competitive dimensions, where actions are based on news data following Feichter et al. (2022) (Data: Ravenpack)
%Intangible_assets	The percentage of assets that are intangible (ln(modified intangible assets / modified total assets)) (Data: Compustat; Iqbal et al. 2024)
%CC_high_PM_Overlap	The percentage of clients of the firm's compensation consultant in the fiscal year that have above average performance metric overlap across the TMT (Data: ISS Incentive Lab)
PM_Overlap_Complete	An indicator variable that is equal to one if there is complete performance metric overlap in the TMT, and zero otherwise (Data: ISS Incentive Lab)
PM_Overlap_Gini	A Gini index of the performance metric overlap of each individual executive in the TMT. The index is multiplied by -1, so a higher value indicates a greater degree of performance metric overlap. (Data: ISS Incentive Lab)
PM_Overlap_Weighted	The proportion of performance metrics used in the TMT's bonus contracts that overlap between executives, accounting for the weight of the metric in the focal executive's bonus contract (Data: ISS Incentive Lab)
PM_Overlap_No_CEO	The proportion of performance metrics used in the TMT's bonus contracts that overlap between non-CEO executives (Data: ISS Incentive Lab)
TMT_Funct_Div_Shannon	A Shannon-Wiener version of the degree of functional diversity across the TMT. See Appendix B for details. (Data: BoardEx)
ROA	Net income divided by the firm's assets (IB / AT) (Data: Compustat)
ModifiedQ	Tobin's Q calculated with modified asset values following Iqbal et al. (2024) (Data: Compustat; Iqbal et al. 2024)