

The Role of CEO–TMT Generational Alignment in Driving Firm Innovation

Abstract

What is the influence of the similarity of generations among the top management team (TMT) members on firm innovation? Based on the generational identity theory, we provide the first empirical evidence that the more similar the chief executive officers (CEO) and non-CEO executives are in their generations, the more likely the firm is to engage in innovation. Using panel data consisting of 1,906 S&P firms listed during 2002-2017, we confirm our theoretical prediction and further demonstrate that the positive effect is partially explained by enhanced managerial ability and is contingent on CEO power, firm investment in employee relations, and the high-tech industry. This study contributes to the literatures on upper echelons, strategic decision-making, and firm innovation by shedding light on the crucial effect of generation similarity in facilitating innovation and the moderating roles of CEO-, firm-, and industry-level characteristics.

Keywords: Generations, CEO-TMT interface, Firm innovation, Managerial ability, CEO power, Employee relations, High-tech industry

1. Introduction

As the average age of a newly appointed CEO is now 53.9 years (SpencerStuart, 2023), Generation X (born in 1965 and 1980) is poised to assume nearly all top executive roles. However, in 15-20 years, Generation Y (i.e., Millennials; born between 1981 and 1996) will replace them in top management teams (TMT), which typically include the CEO and other executives (Finkelstein et al., 2009). Given that TMT members of multiple generations have the authority to determine corporate strategies, it is imperative to examine how the generational composition of the TMT impacts a firm's innovation performance. Strategic leaders' dispositions and team-level behaviors influence innovation via the firm's investments in research and development (R&D) and its innovative output (e.g., patents and citations) (Chemmanur et al., 2019). While previous research rooted in the upper echelons tradition has empirically examined the effect of TMT members' demographic characteristics (e.g., Bass, 2019; Lee et al., 2025), personal experiences (e.g., Barkema and Shvyrkov, 2007; Boone et al., 2019), values (Narayan et al., 2021), and cognition (Kilduff et al., 2000) on firm innovation, little is known about the effect of the generational composition of the TMT.

A notable exception is He et al. (2023), who demonstrated the positive effect of Generation X directors on innovation activities. Even though their study is one of the first to meaningfully examine the effect of the generation on firm innovation, their empirical examination narrowly focused on firms with or without Generation X directors, ignoring not only the presence of multiple generations in the workforce, but also the TMT members who oversee the firm's major strategic directions. To this end, little empirical evidence exists regarding the role of generations on organizational outcomes (Parry and Urwin, 2011; Rudolph et al., 2021).

In this research, we shine a light on generations as an under-researched TMT characteristic worth a close examination for its relationship to firm innovation. More

specifically, we examine the role of generation similarity between the CEO and non-CEO executives on firm innovation. For this investigation, we make two assumptions. First, multiple generations coexist within the TMT. Our analysis of the generational composition of TMTs based on the 1,906 US firms listed in the S&P 1500 during 2002-2017 is presented in Figure 1. The majority of the current TMT members are Baby Boomers (59.14%), followed by Generation X (37.49%), Traditionalists (3.31%), and Generation Y (0.07%), and 87.1% of the firms in the sample have two or more generations in their TMTs.

[Insert Figure 1 here]

Second, the generations we refer to are age-based generations (Joshi et al., 2010). An age-based generation is defined based on membership in an age group that shares collective memories, such as the Great Depression or the 9/11 attacks during the formative years of life (Kupperschmidt, 2000). For operationalization, the typical approach in Western economies is to categorize generations into Generation X, Generation Y, Baby Boomers, and Traditionalists, with approximately 15-20 years of intervals between generations (Weller, 2000).

Relying on the generational identity theory (Joshi et al., 2010), we argue that there is a positive influence of generation similarity among TMT members on firm innovation, explained by enhanced managerial ability. That is, the more similar the TMT members are in terms of their generations, the higher the level of managerial ability they will achieve, which in turn will positively influence firm innovation. Furthermore, we demonstrate that this effect is even more pronounced with high levels of CEO power and investment in employee relations, as well as in the high-tech industry. We test our research hypotheses using longitudinal data from S&P 1500 firms located in the U.S. during 2002-2017.

The results advance our knowledge about the effect of generation among TMT members on firm innovation in three major ways. First, our study contributes to the literature

on innovation by examining generation similarity among the TMT as an antecedent to firm innovation. Unlike other TMT characteristics, generation has received limited attention in the existing literature as a prominent predictor in estimating the success of firm innovation. Therefore, our intention is to draw general conclusions about the overall generation effects rather than focusing on a particular generation, such as Generation X (He et al., 2023).

Second, despite a growing body of work devoted to understanding variations in firm innovation driven by the upper echelons, little research has documented the effects of exchange and joint decision-making between the CEO and other executives in the CEO-TMT interface, defined as “the linkage and interaction between the CEO and other executives” (Georgakakis et al., 2022, p. 1). CEOs do not make decisions alone. Instead, they interact with other executives, influence each other, and make collective decisions that shape firm-level outcomes (Georgakakis et al., 2022). By focusing on the generation similarity between the CEO and other executives, we respond to the research call to examine the effect of the “collective trait” shared by the CEO and other executives on firm innovation (Lee et al., 2025, p. 15), and answer the general call for research on the relationship between the “strategic leadership interfaces (i.e., interactions among CEOs, TMTs, and BODs) and innovation” raised by Cortes and Herrmann (2021, p. 235).

Lastly, we examine the roles of the CEO, firm, and industry characteristics in conjunction with the generation similarity effect on firm innovation. Our findings suggest that firm innovation performance can be enhanced if the TMT is composed of a CEO and non-CEO executives who are of similar generations. Moreover, while a high level of CEO power has a weakening impact, a high level of firm investment in employee relations and high-tech industries are more conducive to bringing out firm innovation. In the sections that follow, we review the relevant literature, propose hypotheses, present the data and results,

discuss the theoretical and managerial implications, and conclude with the limitations and future research agenda.

2. Background and Theoretical Development

2.1. Upper Echelons, CEO-TMT Interface, and Firm Innovation

The top management team (TMT), comprised of a small group of the CEO and other executives at the apex of an organization, plays a pivotal role in a firm's strategic decision-making (Finkelstein et al., 2009). In this study, we pay particular attention to the CEO-TMT interface. The CEO-TMT interface is "critical to examine the means by which the CEO leads the TMT and uses it to establish the CEO's true potential impact on overall organizational effectiveness" (Klimoski and Koles, 2001, p. 219). Despite the importance of examining the CEO-TMT interface, a review of the strategic leadership and innovation literature demonstrates that only 5% of existing studies focused on it (Cortes and Herrmann, 2021).

Innovation is a complex and resource-intensive process that involves the integration of the knowledge, capabilities, and creative efforts of firm members, especially strategic leaders (Cortes and Herrmann, 2021). According to the upper echelons perspective, strategic outcomes that entail great complexity, equivocality, and uncertainty are particularly susceptible to executive influence (Hambrick and Mason, 1984). While the effects of the TMT members' demographic characteristics (e.g., age; Bass, 2019; nationality; Lee et al., 2025), personal experiences (e.g., educational, functional, industrial, organizational, and regional background; Barkema and Shvyrkov, 2007; Boone et al., 2019), human capital (Chemmanur et al., 2019), values (political ideology; Narayan et al., 2021), cognition (i.e., interpretative ambiguity; Kilduff et al., 2000), and compensation (Bass, 2019) on firm innovation have been explored, to the best of our knowledge, no studies so far have focused on the effects of generations in the CEO-TMT interface on firm innovation.

2.2. Generations in the TMT

According to Joshi et al. (2010), there are three types of generations in organizations. The first one, rooted in sociology, refers to a generation as those who share monumental life experiences, such as World War II or the Great Recession. The second one, based on political sociology, considers a generation to be a group of individuals who experience a particular event within a specific interval, such as organizational entry or promotion. The last one, which originated in social anthropology and family sociology, defines generations based on occupancy in a role for a limited time-period (i.e., past, present, and future incumbent). Each type of generation represents “age-based”, “cohort-based”, and “incumbency-based” generations in an organization, respectively.

While these types of generations co-exist in organizations, we focus on the age-based generation in this study. Unlike the other two types of the generations, age uniquely shapes generational identity based on the common experiences outside the work domain, primarily driven by memories of historic events in the formative years of one’s life (Mannheim, 1952). The beliefs established through shared experiences from early childhood can influence the attitudes and behaviors of individuals at later points in time.

Traditionally, TMTs have been dominated by older executives who are members of the Baby Boomer and Traditionalist generations. Today, the proportion of younger generations as top executives, primarily Generation X, has been rising as the Baby Boomers and Traditionalists retire (Neal and Wellins, 2018). Despite these structural changes in TMT composition, no existing study has investigated the effects of generation on organizational outcomes. However, researchers increasingly acknowledge the emergence of younger generations in managerial positions and expect or demonstrate the positive organizational changes they bring. In the family business literature, Cirillo et al. (2022) indicate that

Generation Y family members' involvement in internationalization activities positively affects export intensity. Similarly, Guerrero et al. (2021) demonstrates that Generation Y has more propensity to be involved in corporate venturing activities than Baby Boomers or Generation X.

In addition, with the increasing presence of Generation X directors in the boardroom both in the U.S. and around the world, scholars have shown their positive influence on firm innovation, the inclusion of women on the board (He et al., 2023), CSR in terms of ESG ratings (He et al., 2023; Regitya and Nainggolan, 2022), financial performance, and faster adjustment to the optimal mix of traditional and digital forms of advertising (Staneva et al., 2025). However, these studies narrowly focused on one particular emerging generation (e.g., Generation X or Generation Y), rather than investigating across the generations. Moreover, they did not examine effects of generations in the CEO-TMT interface.

2.3. Generation Similarity in the CEO-TMT Interface and Firm Innovation

We draw on the generational identity theory to propose a positive relationship between generation similarity and firm innovation in a CEO-TMT interface. Proposed by Joshi et al. (2010), the theory posits that individuals develop generation-based identities, which are influenced by their understanding of which generation they belong to as well as their emotional attachment to their generations. According to this perspective, those who belong to the same generation develop a unique and collective set of beliefs, attitudes, values, and behaviors through their shared formative experience. Furthermore, these characteristics of each generation tend to persist throughout their lifespan and influence work-related values, attitudes, lifestyles, and priorities.

Harrison et al. (1998) make an important distinction between surface-level attributes and deep-level characteristics of TMT executives. Surface-level attributes of TMT executives

are immediately observable and recognizable, such as age, gender, and ethnicity, while deep-level attributes encompass attitude, beliefs, and values that are not easily detectable but developed over time (Horwitz and Horwitz, 2007). Surface-level attributes of TMT members are not only less germane to the organizational task but are also “incomplete and imprecise, proxies of executives’ cognitive frames” (Hambrick, 2007, p. 335). On the other hand, deep-level attributes are more cognitively accessible, pervasive, and easily associated with social categorization processes (van Knippenberg et al., 2007).

When it comes to the influence of TMT generation and firm innovation, we expect that the CEO and non-CEO executives who share a similar generation will see more eye-to-eye in making strategic decisions about investing in firm innovation, given the shared attitudes and values formed as a result of belonging to the same or a similar generation. Innovation, a complicated and resource-intensive activity, requires integration of the knowledge, capabilities, and creative efforts of firm members, especially strategic leaders (Cortes and Herrmann, 2021). We propose that a CEO and other TMT executives who are of the same or similar generation will be more likely to engage in firm innovation. Formally:

H1: Similarity in the generation between the CEO and non-CEO executives promotes firm innovation.

2.4. Managerial Ability as a Mechanism

We argue that enhanced managerial ability is the mechanism through which generation similarity between the CEO and non-CEO executives promotes firm innovation. Managerial ability can be reflected in how efficiently TMT run a firm, specifically, how effectively they produce greater output while using limited resources (Demerjian et al., 2012), especially in challenging environments (Weterings and Koster, 2007). In this paper, we identify managerial ability as the “managers’ efficiency, relative to their industry peers, in

transforming corporate resources to revenues” (Demerjian et al., 2012, p. 1229). An underlying assumption in much of the empirical research using managerial ability is that it represents the extent of a manager’s knowledge (Demerjian et al., 2012) and skill sets (Gan, 2019).

Existing literature demonstrates that managerial ability is positively linked to firm risk-taking and greater financial outcomes (Demerjian et al., 2012), CSR (Cho and Lee, 2019), and investment efficiency (Gan, 2019). Moreover, older CEOs exhibit significantly lower managerial ability compared to younger CEOs, despite having more experience accumulated over time (Desir et al., 2024). Having more similar generations between the CEO and non-CEO executives is likely to foster greater managerial ability because generational alignment can enhance communication, mutual understanding, and strategic cohesion, leading to more effective collaboration and decision-making in firm innovation. Therefore, we propose enhanced managerial ability as a mechanism in the relationship between generation similarity in TMT members and firm innovation. This leads to:

H2: Managerial ability mediates the positive relationship between the similarity in the generation between the CEO and non-CEO executives and firm innovation.

2.5. CEO Power

CEO power represents the level of dominance of the CEO compared to other members of the TMT in the firm’s decision-making process (Bebchuk and Fried, 2003). According to Halebian and Finkelstein (1993), a balanced power distribution in the TMT promotes more robust and well-rounded organizational decisions. However, when the power is shifted to one way another in TMT, it can significantly alter decision-making dynamic, influence strategic priorities, and impact the overall firm performance. We propose that the positive relationship between TMT generation similarity and firm innovation is weakened

when the CEO's power is high. This moderating effect is grounded in the premise that powerful CEOs may be unwilling to collaborate with or take advice from TMT members.

As the leader of the TMT, the CEO is also an important integrator within the TMT and can strongly influence other members. At the same time, TMT members support and implement the CEO's decisions (Papadakis and Barwise, 2002). However, power in the CEO-TMT interface is a zero-sum game, such that a powerful CEO means less powerful TMT (Anderson and Brown, 2010). Thus, the more powerful the CEO is, the more difficult it will be for the TMT to agree on the investment in innovation, resulting in a negative relationship between CEO power and firm innovation (Prugsamatz, 2021). Thus, when the CEO has dominant decision power, they are unlikely to identify with other TMT members with the same or similar generation, which will lead to a dampened positive relationship between the similarity in the generation of the CEO and non-CEO executives and firm innovation. Therefore:

H3: When CEO power is high (vs. low), the positive relationship between the similarity in the generation of the CEO and non-CEO executives and firm innovation is weakened.

2.6. Firm Investment in Employee Relations

Some firms demonstrate a stronger orientation toward their employees (Harrison et al., 2010), by ensuring higher levels of employment security and facilitating a fair distribution of the value created between the firm and the employees, which leads to greater trust-based and long-term relationships (Jones, 1995). Innovation depends on the entrepreneurial initiatives of employees and managers. Yet, innovative projects come with a high level of uncertainty, increasing the probability of employee termination. In addition, although the payoffs of innovation tend to accrue over the long term rather than the short term (Sood and

Tellis, 2009), employees generally prefer short-term projects unless they are provided with adequate incentives (Ederer and Manso, 2013).

Given these challenges associated with firm innovation, stakeholder orientation is likely to have important implications for a firm's ability to develop innovative capabilities. Much like innovation, stakeholder orientation focuses on the long run rather than immediate payoffs (Wang and Bansal 2012). Therefore, a firm's strong relationship orientation toward employees enables firm-level innovation by leading employees to take greater risks (Coleman, 1990), encouraging experimentation and increasing employees' innovative productivity (Flammer and Kacperczyk, 2016), and motivating employees to build on and perfect existing knowledge (Gambeta et al., 2019).

The firm's employee orientation can be achieved by a TMT whose members' relationship orientation is concerned with maintaining harmonious and cooperative relationships with employees to accomplish the goals, which are likely to make the groups more cohesive at the organizational level. Thus, we argue that firms with strong employee relations will create a sound organizational culture that encourages both employees' and leaders' commitment to innovation, strengthening the positive relationships between the similarity in the generation of the CEO and non-CEO executives and firm innovation. This leads to:

H4: For firms with strong (vs. weak) employee relationships, the positive relationship between the similarity in the generation of the CEO and non-CEO executives and firm innovation is strengthened.

2.7. High-Tech Industry

High-tech industries present an environment that poses TMTs with challenges in making new and unfamiliar decisions (Clark and Maggitti, 2012). The high-tech or

technology-intensive industry is characterized by “active and rapid innovation, significant geographic clustering (at a handful of high-tech hubs), rapid job mobility, high concentration of ownership at the firm level, and strong influence of angel and venture investors” (Shi et al., 2016, p. 1042). It represents a high level of industry dynamism that is “high-growth, uncertain, and technology-intensity” (Hambrick and Cannella, 2004, p. 963), necessitating frequent reshaping of strategies to stay adaptable to fast-changing industry demands (Hamel and Prahalad, 1994).

Given that innovation is a primary requisite for survival in high-tech industries (Hamel and Prahalad, 1994), TMTs in high-tech firms need to make innovation decisions rather quickly to take advantage of the first mover advantage. Indeed, research shows that TMTs in high-tech companies tend to invest heavily in R&D to avoid being left behind in the market (Fong, 2010). As such, we argue that the positive effect of generation similarity between the CEO and non-CEO executives on firm innovation will be enhanced in high-tech industries as opposed to non-high-tech industries because TMTs in high-tech-industries will be more likely to realize the need for innovation. This leads to:

H5: For firms in high-tech (vs. non-high-tech) industries, the positive relationship between the similarity in the generation of the CEO and non-CEO executives and firm innovation is strengthened.

3. Data and Methods

3.1. Data and Sample

To test our hypotheses, we collected variables from multiple secondary databases for S&P 1500 firms. To identify a list of TMT members at each firm and each TMT member’s generation from their age, we used Standard and Poor’s ExecuComp database. When a TMT member’s age was missing, we used alternative sources, such as Marquis Who’s Who,

LexisNexis, and various online sources including Wikipedia, LinkedIn, and Bloomberg. We obtained other CEO- and TMT-related covariates from the ExecuComp database and firm-related covariates and financial variables from the Center for Research in Security Prices (CRSP)-Compustat merged database.

For firm innovation, we collected patent and citation data built by extracting bulk data from the United States Patent and Trademark Office (USPTO), available at Kogan et al. (2017)'s website (<https://github.com/KPSS2017/Technological-Innovation-Resource-Allocation-and-Growth-Extended-Data>), which has also been used in other studies (e.g., Chemmanur et al., 2019; Chen et al., 2016). By aggregating multiple secondary databases, we constructed a longitudinal dataset of 1,906 S&P firms listed in the S&P 1500 during 2002-2017.

3.2. Measures

3.2.1. Generation Similarity between CEO-TMT

To create measures for TMT members' generations, we followed a widely accepted age bracket of the generations adopted in the academic literature (e.g., Bourne, 2015; Kelly et al., 2016).

We constructed the generation similarity between CEO and non-CEO executives (*GENSIM*) as the total number of the non-CEO executives in the TMT team who have the same generation as their CEO. For instance, if a CEO was a Generation Xer but the other four non-CEO executives were of different generations, *GENSIM* was denoted as 0. If one non-CEO executive was a Generation Xer, however, *GENSIM* was denoted as 1. If the four non-CEO executives were Generation Xers, *GENSIM* was denoted as 4. That is to say, a higher number for *GENSIM* means more non-CEO executive members belong to the same generation as the CEO.

3.2.2. Firm Innovation

Following the existing literature, we measured firm innovation using two proxy variables: the natural logarithm of one plus the number of patents for each firm in each year ($PATENT_{t+1}$; Chen et al., 2016; Dutta and Folta, 2016) and the natural logarithm of one plus and the number of citations from patents filed by each firm in each year ($CITATION_{t+1}$; Chen et al., 2016; Dutta and Folta, 2016).

3.2.3. CEO Power

We followed Han et al. (2016) and constructed CEO power ($POWER_t$) as an indexed variable by summing each of the following indicators: CEO pay slice, duality, triality, tenure, ownership, dependent directors, and founding family. CEO pay slice, defined as the percentage of the total compensation of the firm's top five executives (Bebchuk et al., 2011), is an indicator that equals 1 if it is above the industry median and 0 otherwise. Duality is an indicator that equals 1 if the CEO is also the firm's chair of the board of directors and 0 otherwise. Triality is an indicator that equals 1 if the CEO holds the title of the president of the firm in addition to the role of the chairman and 0 otherwise. CEO tenure is an indicator that equals 1 if CEO tenure is above the industry median and 0 otherwise. Ownership is an indicator that equals 1 if the CEO's stock ownership is above the industry median and 0 otherwise. Dependent directors is an indicator that equals 1 if the proportion of the dependent directors for the firm is above the industry median and 0 otherwise. Founding family is an indicator that equals 1 if the CEO is the founder or a descendent of the founder and 0 otherwise. Thus, CEO power ranges from 0 to 7; a higher number indicates greater CEO power (Han et al., 2016)

3.2.4. Managerial Ability

We used a measure of managerial ability ($ABILITY_t$) developed by Demerjian et al. (2012) to measure how efficiently managers use their firms' resources. We regressed total firm managerial ability on key firm-specific characteristics, including firm size, market share, positive free cash flow, firm age, and complex multi-segment and international operations with the Tobit model, took the residual from the estimation, and created decile ranks of managerial ability by year and industry (Demerjian et al., 2012).

3.2.5. Employee Relations

We used KLD's employee relations data to construct the employee relations variable ($EMPREL_t$). The data include strengths and concerns related to union relations, no-layoff policy, case profit sharing, employee involvement, retirement benefits, health and safety, and other employee relations initiatives. We followed Servaes and Tamayo (2013)'s approach by computing the sum of the maximum possible numbers of strengths and concerns for the dimension of employee relations and then subtracting the concerns score from the strengths score.

3.2.6. High-Tech Industry

Consistent with previous literature (e.g., Ali et al., 2019; Gong et al., 2009), we used an indicator for high-tech industry that equals 1 if the firm belongs to any of the following four-digit Standard Industrial Classification (SIC) codes: 2833-2836 (biotechnology), 3570-3577 (computer and office equipment), 3600-3674 (electronics), 7371-7379 (computer software services), or 8731-8734 (R&D services), and 0 otherwise.

3.2.7. Control Variables

To ensure robust results and avoid confounding effects, we included additional variables that could impact firm innovation as firm-level and executive-related covariates. For the firm-level covariates, we controlled for firm size (*SIZE*), leverage (*LEV*), market-to-book ratio (*MB*), return on assets (*ROA*), cash holdings (*CASH*), sales growth (*SALEGRW_t*), and firm age (*FAGE_t*), consistent with the extant literature (e.g., Chen et al., 2016). An effect of female executives has been found (e.g., Liu and Wu, 2023), so we also controlled for the fraction of female executives (*FRCFEMALE_t*).

To control for the CEO's influence over the TMT members, we created three variables: median age of executives (*EXEAGE_t*), standard deviation of ages among executives (*EXEAGEVOL_t*), and median tenure of executives (*EXETENURE_t*). Detailed descriptions of the measures and previous studies that utilize the measures are presented in Table 1.

[Insert Table 1 here]

4. Results

4.1. Descriptive Statistics

Table 2 presents the means, standard deviations, and correlations of the variables of interest and covariates. We confirmed that multicollinearity is not a concern in our study as all VIF scores ranged from 2.56 to 4.41, which is well below 10, as suggested by Dielman (2001).

[Insert Table 2 here]

4.2. Main Results and Analyses

To test the hypotheses, we performed a fixed-effects regression model, controlling both year and two-digit SIC industry fixed effects with robust standard errors adjusted for firm-level clustering. H1 proposed that generation similarity of the CEO and non-CEO

executives promotes firm innovation. The results in Table 3 show the positive effects of generation similarity on both patents ($\beta_{GENSIM_t} = 0.028, p < 0.01$ for $PATENT_{t+1}$) and citations ($\beta_{GENSIM_t} = 0.043, p < 0.01$ for $CITATION_{t+1}$), supporting H1.

[Insert Table 3 here]

H2 posited that managerial ability mediates the positive relationship between generation similarity of the CEO and non-CEO executives and firm innovation. To test this hypothesis, we followed the Sobel test procedure recommended by Baron and Kenny (1986). See Figure 2 for the Sobel test statistics.

[Insert Figure 2 here]

In the first step, we tested the main effect of generation similarity between the CEO and non-CEO executives (IV) on firm innovation (DV) and estimated the coefficients c for patents and citations. As presented in Table 4 Panel A, the coefficients for patents ($\beta = 0.073; p < 0.01$) in Model 3 and citations ($\beta = 0.095; p < 0.01$) in Model 7 are significant. The second step was to test the effect of the IV on managerial ability (mediator) to estimate the coefficient a . As presented in Table 4 Panel B, the coefficient ($\beta = 0.005; p < 0.01$) is significant. The third step was to test the main effect of the IV on the DV when the effect of the mediator is controlled and estimate the coefficient b in the model. Panel A presents the significant coefficient for patents ($\beta = 2.925; p < 0.01$) in Model 4 and for citations ($\beta = 4.164; p < 0.01$) in Model 8. The fourth step tests the direct effect of the IV on the DV when we control the effect of the mediator and estimate the coefficient c' . In Panel A, the coefficients for patents ($\beta = 0.061; p < 0.01$) in Model 4 and for citations ($\beta = 0.079; p < 0.01$) in Model 8 are significant but decreased. This demonstrates partial mediation through managerial ability. Thus, H2 is supported.

[Insert Table 4 here]

H3 posited that when CEO power is high, the positive relationship between generation similarity between the CEO and non-CEO executives and firm innovation is weakened. Table 5 shows that as CEO power is high, the positive relationships between generation similarity and firm innovation is weakened for both patents ($\beta_{GENSIM_t \times CEOPOWER_t} = -0.005, p < 0.05$) and citations ($\beta_{GENSIM_t \times CEOPOWER_t} = -0.009, p < 0.05$), supporting H3.

[Insert Table 5 here]

H4 proposed that the positive relationship between generation similarity between the CEO and non-CEO executives and firm innovation is strengthened for firms with strong employee relations. As seen in Table 6, we found a significant interaction effect for patents ($\beta_{GENSIM_t \times EMPREL_t} = 0.118, p < 0.05$) and a marginally significant interaction effect for citations ($\beta_{GENSIM_t \times EMPREL_t} = 0.094, p < 0.10$). This partially supports H6.

[Insert Table 6 here]

H5 proposed that the positive effect of TMT generation similarity and firm innovation is strengthened for firms in high-tech industries. As seen in Table 7, we found a significant interaction effect for both patent ($\beta_{GENSIM_t \times HIGHTECH_t} = 0.045, p < 0.05$) and citations ($\beta_{GENSIM_t \times HIGHTECH_t} = 0.079, p < 0.01$). Therefore, H5 is supported.

[Insert Table 7 here]

4.3. Robustness Tests

We conducted additional analyses to address concerns about possible endogeneity issues. First, we ran our main panel regression model considering industry-year fixed effects that used robust standard errors adjusted for firm-level clustering. Second, we also lagged all independent variables, moderators, and covariates by one year in the main model to make our causal inferences more rigorous (e.g., Oh and Barker, 2018).

Additionally, to alleviate any measurement-based endogeneity issues, we replicated our main analysis using an alternative independent variable: generation dissimilarity between a CEO and the non-CEO executives (*GENDIST*). The alternative measure of generation dissimilarity is operationalized as the sum of the absolute values of the generation differences for each CEO -non-CEO executive pair. For example, imagine that a firm has a TMT consisting of one Generation X CEO, two Baby Boomer executives, one Traditionalist executive, and one Generation X executive. While the focal variable *GENSIM* tested in the main model will be 1, this alternative measure *GENDIST* will be 4 by summing 2 for two Baby Boomer executives ($|\text{Gen X}_{\text{CEO}} - \text{Baby Boomers}_{\text{executives}}| * 2 = 2$), 2 for one Traditionalist executive ($|\text{Gen X}_{\text{CEO}} - \text{Traditionalist}_{\text{executives}}| = 2$), and 0 for one Generation X executive ($|\text{Gen X}_{\text{CEO}} - \text{Gen X}_{\text{executives}}| = 0$). This alternative measure reflects more variances than similarity in generations between CEOs and other non-CEO executives, in the opposite direction of our original measure. Thus, if *GENDIST* shows a negative effect on innovation, we can conclude that the results are consistent with the results using our original measure (i.e., *GENSIM*).

As presented in Table 8, the alternative measure of TMT generations (*GENDIST*) has a negative effect on innovation ($\beta_{\text{GENDIST}_t} = -0.040, p < 0.01$ for PATENT_{t+1} ; $\beta_{\text{GENDIST}_t} = -0.056, p < 0.01$ for CITATION_{t+1}). With this result, we conclude that dissimilarity in TMT generational cohorts will decrease innovation, which mirrors our initial results in a different way. This finding supports the robustness of the results.

[Insert Table 8 here]

5. Discussion

Using panel data collected from 2002 to 2017, we find support for our theoretical prediction that generation similarity of the TMT members and the CEO promotes firm innovation. We explain these effects using generational identity theory (Joshi et al., 2010) as

a theoretical basis: members who belong to the same generation are more likely to agree on the firm's strategic decisions in terms of innovation due to their collective identity and shared value-based beliefs based on the monumental historical, political, and social events they experienced in common during their formative years.

We further identified that increased managerial ability explains in part the positive relationship between the TMT generation similarity and firm innovation. Moreover, we showed the TMT-level (i.e., CEO power), firm-level (i.e., firm investment in employee relations), and industry-level (i.e., high-tech industry) moderators as crucial contexts in which generation similarity among the TMT members should be considered for firms interested in achieving superior innovation performance.

5.1. Theoretical and Managerial Implications

Our findings have important theoretical implications. First, while previous research has investigated the role of various TMT characteristics in firm innovation, there has been little attention to the effect of generations in the TMT. Even if categories of generation are somewhat arbitrary, and thus the construct of generation might be viewed as “atheoretical” (Parry and Urwin, 2011, p. 83), each generation experiences remarkable historical events which shape values that remain relatively unchanged throughout one's life (Inglehart, 1977). Based on the generational identity theory (Joshi et al., 2010), a set of historical events and related cultural phenomena during the formative years of life impact individuals in a way that creates a distinct generation with separate values and attitudes (Joshi et al., 2010). Our results show that this bond created through belonging to the same or similar generation magnifies managerial abilities, or how efficiently firms can generate greater output with limited resources (Demerjian et al., 2012). This way, we investigate generation as a meaningful trait

of the TMT members, going beyond the surface-level attributes such as age, gender, and ethnicity that are immediately observable and recognizable (Horwitz and Horwitz, 2007).

Second, our findings extend the upper echelons and strategic leadership theories by identifying TMT characteristics that better inform the extent of firm innovation. Despite a growing body of work devoted to understanding variation in firm innovation driven by the upper echelons (e.g., Lee et al., 2025), there is a lack of studies on the effects of the interaction and joint decision-making between the CEO and other executives in the CEO-TMT interface. By identifying not only the generation similarity in the TMT that predicts the likelihood of the firm's engagement in innovation, but also by using the CEO as an anchor for generation similarity with other non-CEO executives, we highlight the influential role of the CEO in shaping firm-level outcomes, consistent with the observations of Bachrach et al. (2023), Friedman et al. (2016), and Georgakakis et al. (2022). Our study also responds to the research call to understand the role of shared common traits in the CEO-TMT interface (Lee et al., 2025) and the relationship between the strategic leadership interface (i.e., interactions among CEOs, TMTs, and BODs) and innovation (Cortes and Herrmann, 2021).

Third, by examining CEO power, firm investment in employee relations, and high-tech industry as three important variables that moderate the positive relationship between generation similarity in the TMT and firm innovation, we enrich the understanding of how to assist the strategic decisions made by TMTs that have far more at stake than just day-to-day tactical decisions due to the significant mobilization of the firm's resources and the difficulty of reversing the decisions (Smith et al., 1992). Undoubtedly, firms should not merely assume a direct influence of generation similarity in the TMT on firm innovation but should also consider contextual characteristics that shape generation identity (Joshi et al., 2010) and that weaken or strengthen the positive generation similarity effect.

As many organizations face significant shifts in their TMT generations and challenges associated with generation gaps, our findings provide some implications for practitioners. The most obvious implication is that for firms interested in increasing their innovation performance, composing the TMT with members who share similar generations between the CEO and non-CEO executives is beneficial. When it comes to the effect of TMT age diversity on a firm's financial performances, existing research shows conflicting results (Kilduff et al., 2000; Tanikawa et al., 2017). Our findings suggest that the generations of the TMT members might be a more accurate and furthermore positive indicator of a firm's innovation performance than their ages.

In addition, firms headed by a TMT with members from similar generations are less likely to engage in innovation when the CEO has higher power and more likely to engage when the firm invests heavily in employee relations and competes in high-tech industries. These findings indicate which contexts will offer more or fewer benefits from taking advantage of TMT generation similarity while pursuing firm innovation. Moreover, firm innovation was measured in our study as a two-stage process encompassing innovation inputs (i.e., R&D activities) and outputs (i.e., patents and citations). Thus, our findings indicate that a TMT composed of members from similar generations has a positive ripple effect on the two sides of the firm's innovation activities, informing firms of the compelling need to consider creating their TMT with the same or similar generations who grew up together and share the same monumental events in their formative years.

6. Limitations and Future Research

As with any research, our study is not without limitations. The specific birth year ranges that define each generation can differ significantly (Parry and Urwin, 2011; Rudolph et al., 2021). Future researchers could adopt different birth year brackets for each generation

and compare the results to test the robustness of the effects. Moreover, as the composition of the generations in the TMT continues to shift, it will be important to include the up-and-coming TMT generations (e.g., Generations Y and Z) in the sample and examine their dynamics with other generations in the context of strategic leadership and decision-making.

Another limitation is the measure of managerial ability we adopted from Demerjian et al. (2012), which primarily focused on efficiency in resource deployment at the firm level, without consideration of the cognitive or psychological aspects of managerial ability at the TMT member level. This may have contributed to the partial mediation effect of managerial ability between TMT generation similarity and innovation. Thus, future researchers could capture multifaceted aspects of managerial ability complemented by their cognitive (Young et al., 2000) or psychological abilities (Filinova et al., 2015) or competency (Nuthall, 2001; Wang, 2003), using self-reported assessments or natural language processing (NLP) techniques on press releases, company websites, and so on.

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Table 1. Variables and their measures

Variables	Measures	Illustrative studies
Dependents		
R&D (RD_{t+1})	R&D expenses divided by book value of total assets	Chemmanur et al., 2019; Chen et al., 2016
Patent ($PATENT_{t+1}$)	Natural logarithm of the number of patents	Dutta and Folta, 2016
Citation ($CITATION_{t+1}$)	Natural logarithm of the number of citations received by patents	Dutta and Folta, 2016
Independent		
Generational cohort ($GENSIM_t$)	Total number of generational cohorts between CEO and non-CEO executives in TMT	Newly created
Mediator		
Managerial ability ($ABILITY_t$)	Decile rank (by industry and year) of the Managerial Ability Score.	Demerjian et al., 2012
Moderators		
CEO power ($POWER_t$)	Sum of each of the indicator variables: CEO Pay Slice, Duality, Triality, Tenure, Ownership, Dependent Directors, and Founding Family.	Han et al., 2016
Employee relation ($EMPREL_t$)	Sum of firms' KLD scores for the dimension of employee relations scaled by the maximum strengths any firm has in the fiscal year	Chen et al., 2016; Servaes & Tamayo, 2013
High-tech industry firm ($TECH$)	Indicator that equals 1 if a firm belongs to the following SIC codes: 2833-2836, 3570-3577, 3600-3674, 7371-7379, or 8731-8734 and 0 otherwise	Ali et al., 2019; Gong et al., 2009
Covariates		
Firm size ($SIZE_t$)	Natural logarithm of assets	Chen et al., 2016
Leverage (LEV_t)	Long-term debt divided by book value of total assets	Chen et al., 2016
Market to book (MB_t)	Ratio of market value of assets to book value of assets	Chen et al., 2016
Return on asset (ROA_t)	Ratio of operating income before extraordinary items to total assets	Chen et al., 2016
Cash holdings ($CASH_t$)	Cash divided by book value of total assets	Chen et al., 2016
Sales growth ($SALEGRW_t$)	Annual growth rate of revenue	Chen et al., 2016
Firm age ($FAGE_t$)	Natural logarithm of the number of years since the firm first appears on CRSP	Chen et al., 2016
Fraction of female executives ($FRCFEMALE_t$)	The number of female executives divided by the total number of executives	Liu and Wu, 2023
Median age of executives ($EXEAGE_t$)	Natural logarithm of median age of executives	Newly created
Standard deviation of ages among the executives ($EXEAGEVOL_t$)	Standard deviation of ages among the executives	Newly created
Median tenure of executives ($EXETENURE_t$)	Natural logarithm of median tenure of executives	Newly created